Appendix T

Final Community Well-Being Technical Support Document

MARTEN FALLS FIRST NATION
COMMUNITY ACCESS ROAD

Community Well-Being Technical Support Document: Existing Conditions & Effects Assessment

February 2026

Disclaimer: AECOM CANADA ULC

The attached Report (the "Report") has been prepared by AECOM Canada ULC ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

The Client required that the work be completed on an accelerated schedule. As a result, all activities were carried out within a compressed timeframe. AECOM expressly disclaims responsibility for any omissions, inaccuracies, or impacts that arise from the shortened schedule.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time. AECOM further advises that the accelerated schedule limited the time available for data review, analysis, and internal quality assurance. Accordingly, the Information may contain a degree of uncertainty than would typically be expected for work of this nature performed under a standard schedule. AECOM makes no representations pertaining to the completeness of information made available for review considering the accelerated schedule required by the Client and other third parties.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2024-12-21
© 2009-2024 AECOM Canada ULC All Rights Reserved.

Authors

Report Prepared By:

Crista Gladstone
Senior Community Engagement Specialist

Report Reviewed By:

Erin Huck
Senior Urban Planner

Report Approved By:

Elaine Lee-Ho, M.Sc., P.Biol., P.Ag.
Associate Vice President Department
Manager Ecology and Permitting

Executive Summary

This Report presents the existing conditions and effects assessment for the community well-being discipline and is being prepared in support of the *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report.*

Marten Falls First Nation is proposing a multi-purpose Community Access Road that will connect the community to the Ontario provincial highway network. Currently, the community is accessible by air and a seasonal winter road. The construction of the road connecting Marten Falls could lead to lowered cost of goods, increase the variety of goods available for purchase lead to more reliable medical access, and potentially improve the housing crisis by allowing timely delivery of building supplies.

"*For as long as I can remember, Marten Falls First Nation has had a strong desire to develop a road that would connect our remote northern community to the Ontario provincial highway network and advance our vision of building a sustainable and thriving community in the north.*" – Chief Bruce Achneepineskum, September 2023.

Scope of the Assessment

This assessment evaluates the potential effects of the Marten Falls First Nation Community Access Road on community well-being, including socio-economic conditions, cultural preservation, public safety, and human health. Socio-community and cultural well-being support a strong sense of identity, pride, and cultural continuity among residents. These factors shape the social fabric of the community and reinforce connections to traditions, language, and land. Human health and community safety include access to healthcare, living conditions, emergency response services, and the safety of residents. By integrating these elements into a single framework, this assessment provides a holistic understanding of the interconnected factors that contribute to community well-being. This approach allows for a more nuanced analysis, and an understanding of how various factors contribute to the quality of life in the community.

Gender-Based Analysis Plus and Indigenous Knowledge were interwoven throughout this report as integral components of a culturally relevant assessment. The Gender-Based Analysis Plus approach provided insights into how diverse community members, including women, youth, and Elders, may be differently affected by the Project. Indigenous Knowledge, gathered through engagement with Indigenous communities, was used to deepen the understanding of land use, cultural values, and community priorities, so that the assessment reflects local perspectives and lived experiences.

Local Study Area Existing Conditions

The Local Study Area (LSA) includes Marten Falls First Nation and Aroland First Nation due to their proximity to the proposed access road and the potential for direct and indirect effects on these communities. Marten Falls First Nation is the primary community that will gain road access, making it directly affected by changes in transportation, connectivity, and associated socio-economic effects. Aroland First Nation is also included as the proposed road will establish a connection between the two communities, potentially influencing local well-being, economic opportunities, and access to services.

Marten Falls First Nation

Marten Falls First Nation has experienced population growth between 2011 and 2021. The population is relatively balanced in terms of gender, with a slight increase in the number of women over time. The community faces challenges such as housing shortages, inadequate infrastructure, and limited access to healthcare and social services. The community faces a housing shortage, overcrowding, and deteriorating infrastructure. The average household size is 3.5 people, and 71.4% of homes meeting suitability standards in 2021.

The latest financial statement for the community (2018 / 2019) shows revenues of $25.1 million and expenditures of $22.8 million, resulting in a surplus of $2.2 million. In 2024, the working-age population was estimated at 170 individuals, with a 41% participation rate and a 30% unemployment rate. The community faces barriers to employment, including limited local job opportunities and infrastructure challenges. The average after-tax income in 2024 was higher for women ($34,500) than for men ($26,000).

There is limited access to healthcare and social services, including maternal and child health services, mental health support, and Elder care. The community lacks a fire station, fire truck, and ambulance services, relying on medical transportation services for emergencies. The community struggles with inadequate water and wastewater treatment facilities.

Hunting, fishing, trapping, and gathering remain vital to the community's way of life, supporting food security, cultural preservation, and community resilience. Participation in traditional activities has declined due to economic, social, and political pressures, climate factors, and decreased transmission of Indigenous Knowledge.

Marten Falls First Nation has faced challenges with substance use, particularly alcoholism and opioid addiction. The community has struggled with access to effective withdrawal medications and engagement with regional services. Efforts are underway to build a treatment centre to provide in-community addictions treatment.

Between January 1 and December 1, 2023, the Nishnawbe Aski Police Service recorded 10,191 crime occurrences throughout the Central region, which includes communities such as Marten Falls First Nation, Aroland First Nation, Kasabonika Lake First Nation, Constance Lake First Nation, Greenstone Municipality, and others. Many of these incidents involved assaults, mental health concerns, personal well-being checks, family disputes, and domestic disputes. The community has raised concerns about lateral violence, which includes exclusion, bullying, gossip, and intimidation. Additionally, Indigenous women and girls in Canada are disproportionately affected by human trafficking. While specific data for Marten Falls First Nation is not available, the community is at risk for racialized violence and gender discrimination.

Aroland First Nation

Aroland First Nation, according to Statistics Canada, has experienced a population decline from 361 to 178 residents on-reserve between 2011 and 2021, although the Aroland First Nation website estimates the population of the community to be approximately 400 residents, suggesting growth. The majority of the Aroland First Nation population lives off-reserve, facing challenges such as housing and infrastructure limitations. The community faces a housing crisis, with an average household size of 3.1 people and 83.3% of homes meeting suitability standards

The latest financial statement (2023 / 2024) shows revenues of $16.8 million and expenditures of $13.6 million, resulting in a surplus of $3.2 million. In 2024, the working-age population was estimated at 130 individuals, with a 38% participation rate and near 0% unemployment rate. The average after-tax income in 2024 was higher for women ($30,800) than for men ($23,600).

Aroland First Nation faces significant challenges related to infrastructure and essential services. Limited access to healthcare and social services effects the well-being of community members, while deficiencies in water and wastewater treatment facilities present ongoing concerns. Aroland First Nation does not have a hospital, fire truck, or fire hall. The community has a volunteer fire department (Indigenous Fire Service Directory, 2024) which may rely on support from neighbouring communities when needed. In medical emergencies, residents depend on transportation services to access the nearest hospital. Additionally, unreliable internet connectivity further hinders access to critical resources and communication.

Hunting, fishing, trapping, and gathering are central to the community's way of life, supporting both cultural continuity and economic development. Traditional species such as blueberries, raspberries, and timber face pressure from industrial activities, which may strain the traditional economy.

Aroland First Nation faces challenges with substance abuse, including alcoholism and drug addiction. Specific data on substance use rates in Aroland First Nation is not readily

available, but the community's struggles with addiction are acknowledged. The community has limited access to healthcare and social services which intensifies addiction issues.

Aroland First Nation is located within the Central Region of the Nishnawbe Aski Police Service. The Central Region is broad and includes communities such as Kasabonika Lake First Nation and Constance Lake First Nation. The types of incidents and calls received by the police services in the area include serious and violent crimes. Indigenous women and girls in Aroland First Nation are at high risk for human trafficking due to systemic factors such as unstable housing, lack of social supports, and exposure to the sex trade from a young age.

Regional Communities

Municipalities with both geographic proximity to the Project and existing or anticipated connections that could reasonably experience these interactions were therefore included in the Regional Study Area. The regional municipal communities of Greenstone and Thunder Bay were identified based on the potential for interaction between the Project and select valued components, specifically sustainable population growth and public safety. The Project is expected to increase regional accessibility and facilitate more frequent movement of people through adjacent regions, creating a potential pathway for effect for those regional communities related to population dynamics and community safety. Based on these criteria, the municipalities of Greenstone and Thunder Bay were identified as having a plausible pathway for effect and were included within the Regional Study Area for these valued components. Beyond these two municipalities, additional Indigenous communities were considered where their Areas of Interest overlap with the Local Study Area or where a plausible pathway for effects exists, such as downstream water connectivity or shared traditional food resources. This supports that the assessment appropriately reflects potential interactions between project activities and Indigenous traditional practices by incorporating community-defined Areas of Interest and relevant pathways of effect.

The following communities have overlapping interests in the Local Study Area due to the Areas of Interest defined in their confidential community-specific *Aboriginal and / or Treaty Rights and Interests Impact Assessment Reports*: Animbiigoo Zaagi'iga Anishinaabek First Nation; Constance Lake First Nation; Ginoogaming First Nation; Long Lake #58 First Nation; and Neskantaga First Nation. All Indigenous communities were assessed for pathways to effect related to traditional foods.

Greenstone Municipality

Between 2011 and 2021, the population of Greenstone declined from 4,724 to 4,309 residents. In 2024, the working age population was estimated to be around 3,800 residents, with approximately 55% participation in in the labour force, and around 9% unemployment rate. The median after-tax income in 2024 was higher for men ($45,100) than for women ($40,700).

Greenstone Municipality crime statistics are included with the Central Region of the Nishnawbe Aski Police Service, mentioned in the Marten Falls First Nation section above. The Crime Severity Index for the Central Region was substantially higher than the provincial average for Ontario from 2021 to 2023.

Thunder Bay Region

Thunder Bay's Metropolitan Area population increased slightly from 121,600 in 2011 to 123,258 in 2021. In the broader Thunder Bay Census District, the working age population was estimated around 133,200 in 2024, with Thunder Bay District's median after-tax income higher for men ($47,800) than for women ($38,900). An estimated 58% of the working-age population participated in the labour force in 2024, with an estimated unemployment rate of about 11%.

The City of Thunder Bay consistently records higher crime severity index (CSI) values than the provincial average for Ontario. Between 2021 and 2023, Thunder Bay's overall Crime Severity Index ranged from 103 to 108, almost double that of Ontario overall. Thunder Bay also has a significantly higher violent crime rate severity, with nonviolent crimes remaining comparable to or below the national average.

Constance Lake First Nation

Constance Lake First Nation was assessed for pathways to effect related to the following valued components: cultural preservation and change; access to clean water; traditional foods; public safety; and biophysical factors influencing human health. Constance Lake First Nation maintains a strong connection to its lands and waterways, which historically supported a traditional economy based on hunting, fishing, trapping, and plant gathering. These practices remain integral to cultural identity and food security today, complemented by education initiatives and conservation programs such as Woodland Caribou stewardship. The Community-Based Land Use Plan (2023) identifies tourism as a key opportunity for sustainable economic development. Proposed initiatives include guided canoe trips along historic river routes, wildlife viewing, and educational experiences that share Indigenous Knowledge, and promote protection of sensitive habitats and sacred sites.

Neskantaga First Nation

Neskantaga First Nation First Nation was assessed for pathways to effect related to the following valued components: cultural preservation and change; access to clean water; traditional foods; public safety; and biophysical factors influencing human health. Neskantaga First Nation's traditional economy followed a seasonal cycle of hunting, trapping, fishing, and plant harvesting, with sturgeon holding cultural and economic significance. Women played a vital role in trapping and trade, while fishing supported both subsistence and commercial needs. Today, the community prioritizes sturgeon conservation

and expresses concerns about development impacts on wildlife such as moose and caribou, which remain essential to cultural identity and traditional food systems. These practices continue to reinforce cultural continuity and community resilience.

Animbiigoo Zaagi'igan Anishinaabek First Nation

Animbiigoo Zaagi'igan Anishinaabek First Nation was assessed for pathways to effect related to the following valued components: cultural preservation and change; access to clean water; traditional foods; public safety; and biophysical factors influencing human health. Animbiigoo Zaagi'igan Anishinaabek First Nation historically relied on seasonal harvesting of wildlife, fish, and plants for sustenance and trade. Fur trading and commercial fishing provided income, while berry harvesting—particularly blueberries—offered additional economic opportunities. Today, trapping, commercial fishing, and plant gathering continue to support livelihoods, reflecting a traditional economy that integrates cultural values, ecological knowledge, and adaptive strategies. These activities remain central to cultural identity and contribute to food security and economic diversification.

Ginoogaming First Nation

Ginoogaming First Nation First Nation was assessed for pathways to effect related to the following valued components: cultural preservation and change; access to clean water; traditional foods; public safety; and biophysical factors influencing human health. Ginoogaming First Nation's traditional economy has historically centered on hunting, trapping, fishing, and plant harvesting across a broad territory that includes Lake Nipigon, Long Lake, and areas north of Lake Superior. These practices supported food security and cultural continuity, with moose and Woodland Caribou as key species and trapping providing both household use and trade. Fishing for species such as pike, sucker, and walleye complemented these practices, while plant gathering—including cedar, sweetgrass, and medicinal roots—reinforced cultural traditions. In recent years, community members have raised concerns about environmental changes and development pressures that threaten traditional activities, including declining wildlife health, deteriorating fish quality, and forestry impacts on berries and medicinal plants. These pressures risk eroding traditional practices and cultural resilience.

Long Lake #58 First Nation

Long Lake #58 First Nation was assessed for pathways to effect related to the following valued components: cultural preservation and change; access to clean water; traditional foods; public safety; and biophysical factors influencing human health. Long Lake #58 First Nation's traditional economy was historically rooted in subsistence activities that supported cultural practices and trade. Hunting and trapping were central, with moose regarded as the most significant game species and Woodland Caribou contributing to diets. Fishing remains a staple food source, complemented by seasonal harvesting of plants, berries,

and fungi for nutritional and medicinal purposes. Beyond sustenance, hunting and trapping served as primary economic drivers, with fur trading remaining dominant well into the mid-20th century. Cultural materials such as porcupine quills were highly valued for decorative purposes, reinforcing the integration of economic and cultural systems. These practices collectively formed a resilient traditional economy that sustained livelihoods while strengthening cultural identity.

Potential Effects and Proposed Mitigations

Construction Phase Effects

During construction, employment opportunities may lead to an increase in the working-aged population, and potentially altering the gender balance within Marten Falls First Nation and Aroland First Nation. Increased employment could encourage off-reserve members to return, leading to an increase in the on-reserve population in the communities, potentially leading to increased demand for infrastructure and services, and placing further strain on housing due to increased population.

There will be increased employment and business opportunities for local and Indigenous workers and companies during construction, contributing to the creation of approximately 8,600 jobs in Ontario, increasing economic activity and providing high earnings for individuals. The construction phase will lead to increased tax revenues.

During construction, there may be some disruption to traditional activities, decreased availability of traditional foods, and potential loss of traditional harvesting areas, but the increased income from construction jobs could also help community members purchase equipment, fuel, and supplies for hunting and trapping, and support traditional harvesting. There are potential effects on traditional foods and water quality, which could affect the traditional economy. Effects on quality of traditional foods could affect human health through consumption of these foods. There is potential for increased mental health challenges and substance use, violence and harassment, strain on emergency services, and an increase in road-related accidents. There are also potential effects on air, water, soil, and noise levels.

Operation and Maintenance Phase Effects

During Operations and Maintenance of the road, there is a potential increase to the on-reserve population due to improved connectivity to Marten Falls First Nation. Employment and business opportunities may also increase in the community, creating long-term economic growth. Population and business growth may lead to increased demand on infrastructure and services and continued strain on housing, but road access will enable reduced costs and improved logistics to build new homes, improving community housing in the long term.

During Operations and Maintenance, ongoing disruptions to traditional foods availability may occur. Additionally, disruption from road operations may affect water quality, which could reduce the quality of traditional foods, potentially leading to decreased consumption. However, increased access during operations may open new areas for traditional harvesting and transportation. Increased transportation access may further contribute to greater reliance on store-bought foods, which can represent a shift away from traditional foods.

There may be continued challenges related to mental health and substance use, as well as an increased risk of violence due to shifting social dynamics, including the possibility of heightened risks of human trafficking. Year-round road access will likely lead to more road-related accidents as travel increases, however, the road will also allow greater access to emergency services. The new road may make it easier to bring in drugs and alcohol into Marten Falls First Nation, potentially worsening existing addiction challenges, although the current high rates of substance use indicate that drugs and alcohol are already reaching the community through other means. Additionally, the Community Access Road could affect air, water, and soil quality, along with increased noise levels.

Mitigation Measures

Mitigation measures to address potential effects during both construction and operations phases include establishing working groups with local communities, supporting education and training for more Indigenous Conservation officers to address potential illegal or over-harvesting effects, housing workers in autonomous camps, implementing Diversity, Equity, and Inclusion hiring policies, and developing plans for equipment mobilization, waste management, and access management. Additionally, the project will provide mental health support, enforce zero-tolerance policies for harassment and discrimination, and conduct extensive monitoring of environmental quality. These proactive steps will help mitigates risks associated with the project and enhances positive outcomes for the community and the environment.

Residual Effects

Some positive and negative residual effects remain following mitigation measures.

Key **positive** effects include improved accessibility to and from Marten Falls First Nation, leading to small increases in on-reserve population, positive effects on productivity and economic growth, and sustained tax revenues. Year-round access will also reduce the cost of essential goods such as bottled water and building materials, making everyday necessities more affordable. Additionally, improved transportation will create new opportunities for local businesses, employment, and community development, contributing to long-term resilience.

Key **negative** residual effects include temporary gender imbalance due to more working-age men in work camps, additional strain on housing, potential disruption of traditional

activities, potential reduced availability of traditional foods, and increased access to drugs and alcohol are also noted. Environmental effects on air, water, soil, and noise levels may affect human health directly or indirectly. Increased road-related accidents and risks of harassment and violence are significant concerns. Ongoing monitoring and adaptive management will support effective management of these effects.

Cumulative Effects

The cumulative effects assessment for the Marten Falls First Nation Community Access Road project identifies potential increased risks related to public safety, mental health and wellbeing, traditional food availability and quality, access to clean water, and other biophysical determinants of human health, particularly where project activities overlap with other regional developments. To address these risks, the project will implement mitigation measures including safety training, environmental monitoring, community based reporting mechanisms, and measures to support cultural and land based connections. Regular monitoring and adaptive management will help support the effectiveness of these measures, demonstrating the project's commitment to reducing cumulative effects and promoting positive outcomes for the community and the environment.-being, traditional food availability and quality, access to clean water, and other biophysical determinants of human health, particularly where project activities overlap with other regional developments. To address these risks, the project will implement mitigation measures including safety training, environmental monitoring, community-based reporting mechanisms, and measures to support cultural and land-based connections. Regular monitoring and adaptive management will help support the effectiveness of these measures, demonstrating the project's commitment to reducing cumulative

Future Commitments and Monitoring

The project includes several future commitments to support the implementation of effective mitigation measures throughout detailed design, construction, and operations. These commitments include establishing ongoing working groups with Marten Falls First Nation and Aroland First Nation, developing equipment mobilization and waste management plans, and advancing community readiness initiatives such as local training strategies, labour and business capacity assessments, and diversity, equity, and inclusion hiring practices. Additional commitments include supporting cultural safety training, enhancing mental health and wellness supports, and contributing to Indigenous Conservation Officer program development. Monitoring programs (carried out before construction and continuing through construction and operations) will verify existing conditions, track changes to air, water, soil, groundwater, and country foods, and evaluate the effectiveness of mitigation measures.

Conclusion

The Marten Falls First Nation Community Access Road presents an opportunity for improved connectivity, economic growth, and long-term resilience for Marten Falls First Nation and surrounding communities. While the project brings key benefits such as improved accessibility, lower costs for essential goods and services, and increased employment and business opportunities, it also introduces challenges that require careful management. By implementing proactive mitigation measures and ongoing monitoring, the project aims to balance economic development with cultural preservation and environmental sustainability, allowing for future generations to benefit from a more connected community.

The road will enhance community well-being through connection. It will provide young people with the opportunity to pursue education and visit family, create new jobs, provide access to essential services, and improve food security and housing suitability, thus contributing to improved mental health and well-being in the community.

> "*As we move forward to now begin to consider road construction and operations, our commitment remains to be strong stewards of our lands and our environment, in balance with being active partners in growing economic opportunities and benefits for both our communities and other First Nation communities*"
>
> – Chief Bruce Achneepineskum, July 2024.

Table of Contents

Executive Summary i

1. Introduction 1

1.1 Project Overview 1
1.2 Qualifications of Individuals 2

2. Project Description 3

2.1 Project Components 3
2.1.1 Roads 3
2.1.2 Bridges and Culverts 4
2.1.3 Pits and Quarries 4
2.1.4 Temporary Infrastructure for Construction 4

3. Information Shared by Indigenous Peoples and Other Interested Persons Which Informed This Report 6

3.1 Indigenous Knowledge 6
3.2 Indigenous Engagement 11
3.3 Regulator and Public Stakeholder Input 12

4. Study Methods and Assessment Scope 13

4.1 Study and Work Plan Purpose and Objectives 13
4.2 Study Scoping 13
4.2.1 Temporal Boundaries 13
4.2.2 Valued Components and Indicators 14
4.2.3 Spatial Boundaries 17
4.2.4 Tailored Impact Statement Guidelines Requirements Mitigation and Enhancement Measures and Terms of Reference Requirements 22
4.3 Existing Conditions Study Design and Methods 24
4.3.1 Desktop Assessment Methodology 24
4.3.2 Socio-Community and Social Determinants of Health Methodology 25
4.3.3 Economic Analysis Methodology 28
4.3.4 Biophysical Factors Influencing Human Health Analysis Methodology 29
4.3.5 Regional Study Area Communities 31
4.4 Effects Assessment Methodology 35
4.4.1 Project-Environment-Interactions 36

4.4.2 Assessing Potential Effects 36
4.4.3 Mitigation and Enhancement Measures Methodology 37
4.4.4 Residual Effects Characteristics 39
4.4.5 Discipline Specific Characteristics 40
4.4.6 Determination of Significance 42
4.4.7 Methods for Predicting Future Conditions 42
4.4.8 Economic Analysis Methodology 44
4.4.9 Regional Study Area Communities Assessment Methodology 47
4.5 Gender-Based Analysis Plus 48
4.5.1 Community Well-Being Gender-Based Analysis Plus Approach 49
4.6 Data Analysis and Management 50
4.6.1 Data Analysis 50
4.6.2 Data Management 51
4.7 Deviations from Draft Study Plan and Tailored Impact Statement Guidelines 51

5. Existing Environment Description 55

5.1 Local Study Area 56
5.1.1 Sustainable Population Growth 56
5.1.2 Labour Market Dynamics 63
5.1.3 Economy 75
5.1.4 Community Access to Infrastructure and Services 80
5.1.5 Housing 86
5.1.6 Cultural Preservation and Change 93
5.1.7 Community and Public Health 103
5.1.8 Access to Clean Water 114
5.1.9 Traditional Foods 120
5.1.10 Public Safety 135
5.1.11 Biophysical Factors Influencing Human Health 144
5.2 Regional Study Area 146
5.2.1 Sustainable Population Growth 147
5.2.2 Labour Market Dynamics 149
5.2.3 Economy 164
5.2.4 Public Safety 173

6. Selection of the Preferred Route 176

6.1 Alternative Segments and Routes Within Each Segment 176
6.2 Preferred Route 178
6.3 Refined Study Areas / Presumed Impact Areas 180

7. Effects Assessment of the Project 181
7.1 Construction Phase 181
7.1.1 Potential Effects and Mitigation 181
7.2 Operation and Maintenance Phase 224
7.2.1 Potential Effects and Mitigation 224
7.3 Decommissioning Phase 260
7.4 Summary of the Assessment of Effects 261

8. Cumulative Effects of the Project 274
8.1 Cumulative Effects Methodology 274
8.1.1 Definitions 274
8.2 Cumulative Effects Scoping 276
8.2.1 Valued Components with Residual Effects 276
8.2.2 Spatial and Temporal Boundaries 278
8.2.3 Physical Activities Inclusion List 280
8.2.4 Summary of Outcome 284
8.3 Cumulative Effects Assessment 287
8.3.1 Valued Component: Community Access to Infrastructure and Services 287
8.3.2 Valued Component: Cultural Preservation and Change 288
8.3.3 Valued Component: Community and Public Health 288
8.3.4 Valued Component: Access to Clean Water 290
8.3.5 Valued Component: Traditional Foods 291
8.3.6 Valued Component: Public Safety 292
8.3.7 Valued Component: Biophysical Factors Influencing Human Health 295
8.3.8 Summary of Cumulative Effects 295

9. Monitoring Programs and Future Commitments 297
9.1 Pre-Construction Monitoring Program 297
9.2 Construction Monitoring Program 297
9.3 Operations Monitoring Program 299
9.4 Future Commitments 299
9.5 Future Permits and Approvals 301

10. Summary and Recommendations 302

11. References 308

List of Figures

Figure 4-1: Discipline Local and Regional Study Area Communities 21
Figure 4-2: Gender Based Analysis Plus Intersecting Identity Factors 48
Figure 5-1: Community Well-Being 55
Figure 5-2: Population Pyramid reflecting Population by Age and Gender in Marten Falls First Nation (Statistics Canada, 2021) 59
Figure 5-3: Population Pyramid reflecting Population by Age and Gender in Aroland First Nation (Statistics Canada, 2021) 63
Figure 5-4: Percent of Suitable Housing by Region for Marten Falls, Kenora, and Ontario (Statistics Canada, 2021) 87
Figure 5-5: Housing Adequacy by Region (Statistics Canada, 2021) 89
Figure 5-6: Housing Suitability by Region (Statistics Canada, 2021) 91
Figure 5-7: Housing Adequacy by Region (Statistics Canada, 2021) 92
Figure 5-8: Health Unit Boundaries 109
Figure 5-9: Nishnawbe Aski Police Service Areas 139
Figure 6-1: Route Alternatives and Segments 177
Figure 6-2: Preferred Route 179
Figure 8-1: Projects included in the Cumulative Effects Assessment 286

List of Tables

Table 1-1: Qualifications of Individuals 2
Table 3-1: Indigenous Knowledge 8
Table 3-2: Indigenous Engagement 11
Table 3-3: Public, Agency and Other Input 12
Table 4-1: Community Well-Being Indicators 15
Table 4-2: Project Study Areas Definition and Description 17
Table 4-3: Discipline Specific Study Areas Description and Rationale 19
Table 4-4: Tailored Impact Statement Guidelines Section 20 and Terms of Reference Requirements 22
Table 4-5: Overview of the Potential Impact Pathways for Regional Communities 33
Table 4-6: Project – Environment Interactions 36
Table 4-7: Potential Discipline Indirect Interactions 38
Table 4-8: Residual Effects Characteristics 39
Table 4-9: Community Well-Being Magnitude Definition 41
Table 4-10: Deviations from Draft Study Plan and Tailored Impact Statement Guidelines 52
Table 5-1: Percent of Population by Age and Gender in Marten Falls, District of Kenora and Ontario (2011-2021)* 58

Table 5-2: Registered Population of Marten Falls First Nation Living On and Off Reserve by Gender (INSTAT 2025) 60
Table 5-3: Percent of Population by Age and Gender in Aroland, Thunder Bay Census District, and Ontario (2021 - 2011) 62
Table 5-4: Registered Population of Aroland First Nation Living On and Off Reserve by Gender (INSTAT 2025) 63
Table 5-5: Labour Market Indicators for Marten Falls First Nation (2011, 2016, 2021, 2024) 64
Table 5-6: Labour Market Indicators for Marten Falls First Nation, Kenora District, and Ontario (2024) 65
Table 5-7: Labour Force by Industry for Marten Falls First Nation (2011, 2016, 2021, 2024) 65
Table 5-8: Labour Force by Industry for Marten Falls First Nation, Kenora District, and Ontario (2024) 66
Table 5-9: After-tax Income for Marten Falls First Nation (2011, 2016, 2021, 2024) 67
Table 5-10: Earnings for Marten Falls First Nation, Kenora District, and Ontario (2024) 68
Table 5-11: Highest Attained Education for the Population Aged 15 and Older in Marten Falls First Nation, Kenora, and Ontario (Statistics Canada, 2011, 2016, 2021) 69
Table 5-12: Labour Market Indicators for Aroland First Nation (2011, 2016, 2021, 2024) 70
Table 5-13: Labour Market Indicators for Aroland First Nation, Thunder Bay District, and Ontario (2024) 70
Table 5-14: Labour Force by Industry for Aroland First Nation (2011, 2016, 2021, 2024) 71
Table 5-15: Labour Force by Industry for Aroland First Nation, Thunder Bay District, and Ontario (2024) 71
Table 5-16: Earnings for Aroland First Nation (2011, 2016, 2021, 2024) 73
Table 5-17: Earnings for Aroland First Nation, Thunder Bay District, and Ontario (2024) 73
Table 5-18: Highest Attained Education for the Population Aged 15 and Older in Aroland First Nation, Thunder Bay, and Ontario (Statistics Canada, 2011, 2016, 2021) 74
Table 5-19: Financial Statement for Marten Falls First Nation (2018 / 2019) 77
Table 5-20: Financial Statement for Aroland First Nation (2023 / 2024) 79
Table 5-21: Air Transportation in Marten Falls First Nation 81
Table 5-22: Average Household Size (2016 - 2021) in Marten Falls, Kenora, and Ontario 87
Table 5-23: Average Household Size (2016 – 2021) in Aroland, Thunder Bay District, and Ontario (Statistics Canada, 2016 – 2021) 91

Table 5-24: Knowledge of Languages in Marten Falls First Nation, Kenora District, and Ontario (2016-2021) 99
Table 5-25: Health Services and Programs available in Marten Falls First Nation 103
Table 5-26: Nishnawbe Aski Police Service, Number of Mental Health Related Calls by Type for the Central Region (2023 – 2024) 105
Table 5-27: Self-reported Rate of Current Alcohol Consumption, by Percent (2015 – 2020) 110
Table 5-28: Health Services and Programs available in Aroland First Nation 111
Table 5-29: Self-reported Rate of Current Drinking Percent (2015 – 2020) 114
Table 5-30: Offenses in the Nishnawbe Aski Police Service Central Region 143
Table 5-31: Age and Gender Distribution, 2011, 2016, 2021 for Greenstone Municipality 148
Table 5-32: Age and Gender Distribution, 2011, 2016, 2021 for Thunder Bay 149
Table 5-33: Labour Market Indicators for Kenora District (2011, 2016, 2021, 2024) 150
Table 5-34: Labour Force by Industry for Kenora District (2011, 2016, 2021, 2024) 150
Table 5-35: Earnings for Kenora District (2011, 2016, 2021, 2024) 151
Table 5-36: Kenora District Educational Attainment 152
Table 5-37: Labour Market Indicators for Thunder Bay District (2011, 2016, 2021, 2024) 153
Table 5-38: Labour Force by Industry for Thunder Bay District (2011, 2016, 2021, 2024) 154
Table 5-39: Earnings for Thunder Bay District Earnings (2011, 2016, 2021, 2024) 155
Table 5-40: Thunder Bay District Educational Attainment 155
Table 5-41: Labour Market Indicators for Cochrane District (2011, 2016, 2021, 2024) 157
Table 5-42: Labour Force by Industry for Cochrane District (2011, 2016, 2021, 2024) 157
Table 5-43: Earnings for Cochrane District (2011, 2016, 2021, 2024) 158
Table 5-44 Labour Market Indicators for Greenstone Municipality (2011, 2016, 2021, 2024) 159
Table 5-45: Labour Force by Industry for Greenstone Municipality (2011, 2016, 2021, 2024) 160
Table 5-46: Earnings for Greenstone Municipality (2011, 2016, 2021, 2024) 161
Table 5-47: Labour Market Indicators for Ontario (2011, 2016, 2021, 2024) 162
Table 5-48: Labour Force by Industry for Ontario (2011, 2016, 2021, 2024) 163
Table 5-49: Earnings for Ontario (2011, 2016, 2021, 2024) 164
Table 5-50: Ontario Economic Indicators 166
Table 5-51: Average Food Prices (2018) 167
Table 5-52: Crime Severity Index, Violent Crime Severity Index and Non-Violent Crime Severity Index by Region 173
Table 5-53: Offense Type in Central Region of the Nishnawbe Aski Police Service 174

Table 5-54: Crime Severity Index, Violent Crime Severity Index and Non-Violent Crime Severity Index by Region 175
Table 7-1: Summary of Construction Effects on Labour Market Dynamics in the Effects Assessment Study Area 183
Table 7-2: Construction Effects on Taxes by Government 188
Table 7-3: Ontario Construction Effects 189
Table 7-4: Canada Construction Effects 189
Table 7-5: Construction Effects on Output 189
Table 7-6: Ontario Transportation Engineering Construction Indirect Industries 191
Table 7-7: Operation and Maintenance Effects on Labour Market Dynamics 226
Table 7-8: Operation and Maintenance Effects on Taxes by Government 228
Table 7-9: Ontario Operation and Maintenance Effects 229
Table 7-10: Canada Operation and Maintenance Effects 229
Table 7-11: Operation and Maintenance Effects on Output 229
Table 7-12: Operation and Maintenance Effects on Gross Domestic Product 230
Table 7-13: Operation and Maintenance Effects on Labour Income 230
Table 7-14: Operation and Maintenance Effects on Gross Operating Surplus 230
Table 7-15: Operation and Maintenance Effects on Taxes 231
Table 7-16: Operation and Maintenance Effects on Employment 231
Table 7-17: Ontario Support Activities for Transportation Indirect Industries during Operations and Maintenance 232
Table 7-18: Air Quality Contaminant Modelling 255
Table 7-19: Summary of Effects and Residual Effects Characterization 261
Table 7-20: List of Proposed Topics for Working Groups 273
Table 8-1: Residual Effects Characteristics – Definitions 275
Table 8-2: Valued Components and Residual Effects 277
Table 8-3: Spatial and Temporal Boundaries 279
Table 8-4: Project and Physical Activity Inclusion List 283
Table 8-5: Summary of Outcome 284
Table 8-6: Proposed Mitigation Measures for Cumulative Effects 296
Table 8-7: Cumulative Effect Summary and Recommendations 296
Table 9-1: Summary of Future Commitments 300
Table 10-1: Potential Effects Summary and Recommendations 303

Attachments

Attachment A. Final Problem Formulation for Human Health Risk Assessment

Attachment B. Draft Study Plan, Work plan and Regulator Comments

1. Introduction

This Report presents the existing conditions and effects assessment for the community well-being discipline and is being prepared in support of the Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report.

Marten Falls First Nation is a remote First Nation community in northern Ontario, approximately 430 km from Thunder Bay, Ontario, located at the junction of the Albany and Ogoki rivers. Marten Falls First Nation is proposing a multi-purpose Community Access Road (the Project) that will connect the community to the Ontario provincial highway network. The Project includes the construction and operations of the Community Access Road with the following key characteristics:

- approximately 184 km (see **Section 6** for further details on the selection of the Preferred Route) of two-lane gravel all-season road on a new right-of-way;
- approximately 100 m wide right-of-way cleared to a width of 60 m; and
- proposed designated speed limit of 80 km per hour.

Marten Falls First Nation is currently accessible year-round by air transportation out of Thunder Bay, Ontario and Nakina, Ontario, and by a winter access road constructed on an annual basis, if winter conditions permit. Since the 1990s, Marten Falls First Nation has received provincial funding to maintain the 140 km of winter road to the community.

1.1 Project Overview

The Project consists of a Community Access Road from Painter Lake Road located approximately 57 km north of Nakina, Ontario to the Community of Marten Falls First Nation. The Community Access Road will serve community access and industrial supply needs for the community (e.g., fuel, construction supplies, water treatment supplies) and industrial proponents (e.g., mining, forestry), thereby minimizing infrastructure corridors in the Far North. Therefore, the Project will be for a multi-purpose road built to meet industrial use specification.

In April 2018, Marten Falls First Nation signed an agreement with the Ministry of the Environment, Conservation and Parks to prepare an environmental assessment under the *Ontario Environmental Assessment Act*, 1990 to support the development of the Community Access Road. A study under the *Ontario Environmental Assessment Act* was formally initiated by Marten Falls First Nation in March 2019 when the Notice of Commencement for a Terms of Reference for the Project was published.

All-season public roads that require 75 kilometres or more of new right-of-way, as per Schedule 1 (51) of the Physical Activities Regulations under the Impact Assessment Act, may be subject to the Act (Government of Canada, 2019b). After considering the detailed

Project Description, the Agency determined that a federal impact assessment is required for the Community Access Road and an Impact Statement needs to be submitted to the Agency for review and approval. The Agency prepared and released the Marten Falls Community Access Road Project: Tailored Impact Statement Guidelines in February 2020 (Impact Assessment Agency of Canada, 2020a) to outline the information and studies necessary to conduct the impact assessment.

The Federal and provincial governments are co-operating on the assessment of the Community Access Road, in accordance with the Co-operation Plan (Impact Assessment Agency of Canada, 2020b). The Co-operation Plan allows Marten Falls First Nation to prepare one single Environmental Assessment / Impact Statement submission to satisfy both the federal and provincial processes (Government of Canada).

1.2 Qualifications of Individuals

A list of names and qualifications of the authors and technical reviewers of this Report is presented in **Table 1-1**.

Table 1-1: Qualifications of Individuals

Name	Title / Role	Years of Experience	Qualifications
Elaine Lee-Ho	Associate Vice President / Lead Verifier	21	B.Sc., M.Sc., P.Biol., P.Ag.
Erin Huck	Senior Urban Planner / Senior Review	20	M.A., MCP, MCIP RPP, CE
Mary-Ellen Starodub	Risk Assessment Lead / Senior Review of Physical Determinants of Health	28	M.Sc., QP_{RA} ON and SK
Eldar Sehic	Economics Lead / Senior Review of Economics Modelling	19	B.A., M.A., Ph.D.
Crista Gladstone	Senior Social Scientist / Socio-Community Lead	16	B.A. (Advanced), MNRM
Lesley Reid	Senior Environmental Engineer and Risk Assessment Specialist / Biophysical Determinants of Health Lead	30	M.Eng., P.Eng.(BC), CSAP (BC)
Tatianna Brierley	Environmental Scientist / Community Well-Being Specialist Lead Author	5	BES (Hon), MES
Victoria Anderson	Socio-Economic Specialist / Research and Review	2	B.A., B.Sc.
Carla Church	Ecologist / Research and Review	14	B.Sc. (HONS), M.Sc. (Candidate)

2. Project Description

The Project will be executed in three main phases:

- Planning and design, which includes the preparation of the Environmental Assessment / Impact Statement Report, obtaining regulatory approvals and detailed engineering design;
- Construction, which is anticipated to last between three and 10 years; and
- Operation and maintenance, for a permanent road.

2.1 Project Components

2.1.1 Roads

The Project consists of an approximately 184 km all-season road within a 100 m wide right-of-way, 60 m of which will be cleared of vegetation. Additional temporary clearing occurring in certain locations to accommodate construction activities, access, aggregate source areas, pits and quarry sites, and temporary infrastructure such as staging areas, camps and debris and / or timber stockpiles will be required. It has a roadway approximately 11 m in width to accommodate a two-lane gravel road with culverts and two-lane bridges at water crossing locations. Traffic levels for the Project have been estimated at 700 vehicles per day for the north-south section and 100 vehicles a day for the east-west section of the Marten Falls First Nation Community Access Road. These volumes are reflective of the anticipated peak traffic in 2046.

The predominant building materials will be blasted rockfill and composite excavation material capped with granular surface material. The majority of blasted rockfill will be obtained from rock outcrops within and / or adjacent to the right-of-way. Building materials will be primarily obtained through the pits and quarries developed specifically to support construction of the project.

Early investigations on permafrost have shown the Project is located within a sporadic discontinuous permafrost zone, with known locations documented and monitored. Excavation within identified permafrost areas will be avoided, whenever possible, as cutting into surface vegetation can disturb the permafrost regime resulting in thaw and unstable ground. As a precaution, the design will primarily use fill to minimize any permafrost degradation and will follow the recommendations outlined in a Permafrost Management Plan. At the time of drafting no areas of known permafrost have been found within the Construction Disturbance Area.

2.1.2 Bridges and Culverts

Bridges will be required over the various waterways to provide grade separation with sizes ranging from single span to multi-span bridges to carry two lanes of traffic with appropriate shoulder widths. The foundation support for the bridge abutments are expected to consist of driven steel piles, drilled concrete piles or concrete spread footings.

Equalization culverts will be installed at locations where it is determined that spring-melt or storm runoff needs to pass from one side of the Project to the other to prevent flooding and / or erosion. The purpose of equalization culverts is to maintain the existing surface water drainage patterns in the area. Culverts will be put in place as construction progresses along the Project.

2.1.3 Pits and Quarries

Pits and quarries, and aggregate source areas will be developed to provide crushed rock and granular materials for the construction of the Project and temporary access roads. Most of the rock required for construction is expected to come from quarry sites adjacent to the Project. Temporary access roads will be established to connect the various Project components as required and will be limited in length to the extent feasible.

All materials will be subject to a geotechnical verification process, so they possess the desired physical properties for use in construction. The development and operation of all pits and quarries will be subject to the aggregate permitting process under the Aggregate Resources Act (Aggregate Resources of Ontario: Site Plan (2020) Standards and Technical Reports and Information (2023)). Permitted pits and quarries will follow the progressive and final rehabilitation requirements outlined in the approved site plans under the Act.

Only material that has been cleared through a geochemical verification process will be utilized for the road surface to avoid acid rock drainage or metal leaching. Monitoring of runoff will be conducted from an erosion and sediment control perspective; further details about this specific type of monitoring will be available in the Erosion and Sediment Control Plan.

2.1.4 Temporary Infrastructure for Construction

Temporary access roads may be required to access the right-of-way during construction. The purpose of the temporary access roads is to facilitate emergency access, equipment and personnel access, and to provide access to and from pits and quarries, and aggregate source areas. The temporary access roads will be cleared, but not grubbed, to approximately 10 m wide to accommodate equipment movement.

Upon completion of construction, sand and gravel pits, including temporary access roads leading to the pits will be rehabilitated (progressive and final rehabilitation) and surrendered in accordance with the Aggregate Resources Act.

Temporary construction camps, staging areas and stockpile areas are anticipated to be established at various locations along the right-of-way and / or near other Project components. These components are proposed to support crews, store equipment, vehicles, materials and supplies.

3. Information Shared by Indigenous Peoples and Other Interested Persons Which Informed This Report

In the course of completing the description of existing conditions and effects assessment for this report, information provided by Indigenous knowledge holders, Indigenous community members, regulators and public stakeholders was used to develop the approach and assessment conducted for this study. This information and how it informed the development of this report are described below. This section does not detail all the information, comments or questions received related to the Project and is limited to only the information which informed this Report. For a full description of all consultation and engagement related to the Community Access Road refer to the Record of Consultation and Engagement for the Environmental Assessment / Impact Statement Report. Information related to the Indigenous Knowledge Program can be found in the *Aboriginal and / or Treaty Rights and Interests Technical Support Document [Appendix O].*

3.1 Indigenous Knowledge

Indigenous Knowledge refers to Indigenous systems of knowledge as well as cultural practices related to the production of knowledge based on traditional belief systems, relationships to the environment, and community practices. It is the accumulated and living knowledge built upon the historic experiences of Peoples living on the land and adapting to social, economic, environmental, spiritual and political change (Chiefs of Ontario, n.d.). It includes knowledge about the natural environment (e.g., locations of caribou seasonal use and calving areas), the relationships between environmental changes and species or ecosystems, and how potential effects to the environment can be avoided or reduced.

Indigenous Land and Resource Use refers to specific areas and resources used for traditional purposes when Indigenous peoples learn and practice their Indigenous Knowledge (Garvin & Northern Forestry Centre (Canada), A Guide to Conducting a Traditional Knowledge and Land Use Study, 2001). This includes the areas and sites used for hunting, trapping, fishing, and gathering and the resources harvested, as well as cultural sites, features and practices—sometimes referred to as Traditional Land Use.

In 2019, the Marten Falls First Nation Community Access Road Project Team launched a program to collect Indigenous Knowledge. The Indigenous Knowledge Program provides important information for the EA / IS and all technical discipline assessments. The information generated through the Indigenous Knowledge Program has been woven with scientific approaches, and both knowledge systems will be given equal consideration will inform analysis of existing conditions, predicting potential project effects, and determining appropriate mitigation and monitoring methods.

The Indigenous Knowledge Program occurs in two concurrent phases:

1. Collecting existing Indigenous Knowledge and information on Indigenous land and resource use to help inform the early stages of the assessments; and
2. Completing project-specific Indigenous Knowledge and Lands and Resource Use studies.

The protection and confidentiality of Indigenous Knowledge and information on Indigenous land and resource use was established via Indigenous Knowledge Sharing Agreements; these were developed with interested communities prior to the use of community information. The Sharing Agreement outlines how confidential and sensitive information will be woven into the Project's environmental / impact and design processes.

All Indigenous communities and groups identified by the Ministry of the Environment, Conservation and Parks and the Impact Assessment Agency of Canada (the Agency) through the Indigenous Engagement and Partnership Plan have had the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the Project; and / or complete Project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program included opportunities for Indigenous communities and groups to meet with the proponent to discuss the program, ask questions, and share concerns and interests.

The proponent strove to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values were considered in reporting, and how potential effects to Aboriginal and Treaty Rights and Interests were assessed. Measures to support this included: engaging Indigenous communities to solicit information on Indigenous Knowledge and Indigenous land and resource use and cultural values; to inform existing conditions, providing Indigenous communities with draft sections of the *Environmental Assessment / Impact Statement Report*; to illustrate how Indigenous Knowledge and information on Indigenous land and resource use and cultural values has been integrated, and to confirm it has been presented appropriately. The proponent aims to complete collaborative working sessions with Indigenous communities to inform the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights were assessed is provided in the Aboriginal and Treaty Rights and Interests Study Plan (Dillon Consulting Limited, 2021).

Information provided by Indigenous knowledge holders, recognized as such by their Indigenous Community, has been obtained through literature review and shared directly by Indigenous nations in support of this Project through face-to-face meetings or receipt of Indigenous knowledge reports. The information that has been used to inform this reporting is described in **Table 3-1** below.

Table 3-1: Indigenous Knowledge

Valued Component	Indigenous Community	Details	Section Reference
■ **Traditional Foods** ■ **Cultural Preservation and Change**	■ Aroland First Nation	■ Information from Natural Resource Management and Indigenous Food Systems in Northern Ontario (LeBlanc 2014) was used to inform the list of traditional foods and traditional economies for this Project. Information was also included about contamination and spraying concerns to various plant species.	■ Sections 5.1.7 and 5.1.11
■ **Cultural Preservation and Change**	■ Marten Falls First Nation	■ The *Draft Community Based Land Use Plan*[1] (Marten Falls First Nation, 2020) was used to provide information on historical and contemporary socio-economic activities, such as trapping, tanning hides, and crafting.	■ Section 5.1.7
■ **Community Infrastructure** ■ **Cultural Preservation and Change**	■ Marten Falls First Nation	■ Information received during the Community Access Road field monitoring programs informed the Project about the disruption of historical travel routes, alteration or shorelines, and fluctuating water levels due to hydroelectric development on local rivers.	■ Sections 5.1.5 and 5.1.7
■ **Cultural Preservation and Change**	■ Aroland First Nation	■ The *Understanding Traditional Food Behaviour and Food Security in Rural First Nation Communities: Implications for Food Policy* report was used to describe the benefits of local food harvesting practices.	■ Section 5.1.7
■ **Community Infrastructure** ■ **Cultural Preservation and Change**	■ Marten Falls First Nation	■ Information obtained from the Marten Falls First Nation Community Access Road Indigenous Knowledge program was used to describe the importance of trapping, hunting, fishing, and other harvesting to the Community's way of life. Information from this program also provided insight into concerns from the Community about the potential effects of the Community Access Road on harvesting practices, including potential poaching from outsiders. The challenges to the Community's way of life due to natural and built structures on rivers was also discussed. Concerns about potential safety-related issues resulting from the Community Access Road were shared.	■ Sections 5.1.5 and 5.1.7
■ **Cultural Preservation and Change**	■ Eabametoong First Nation	■ The *Matawa First Nations Community and Life Experiences, Volume 2 (North)* (Jacasum, Matawa First Nations Community and Life Experiences Volume 2 (North), 2007) report was used to note commercial fishing practices in Eabametoong First Nation, as well as seasonality of harvesting practices.	■ Section 5.1.11.3
■ **Cultural Preservation and Change**	■ Eabametoong First Nation	■ The press release titled *Eabametoong First Nation Forced to Head to Court to Protect Homelands from Mining in Ontario* (Eabametoong First Nation, 2018) was used to describe the prevalence of traditional food harvesting practices.	■ Section 5.1.11.3
■ **Cultural Preservation and Change**	■ Eabametoong First Nation	■ The *Kakinaa kaagoon gaabiimatiiziimakak nabikang kayah akiikang oomaabigoo Eabametoong (Eabametoong First Nation's Biodiversity Atlas)* (Eabametoong First Nation, 2016) provided information about the types of traditional foods harvested by Eabametoong First Nation members.	■ Section 5.1.11.3
■ **Cultural Preservation and Change**	■ Mishkeegogamang First Nation	■ The *Stories of the Past, How We Lived* report (Mishkeegogamang First Nation, 2010) was used to describe historical seasonal movements and traditional foods.	■ Section 5.1.11.3
■ **Cultural Preservation and Change** ■ **Traditional Foods**	■ Constance Lake First Nation	■ Indigenous Knowledge shared by Constance Lake First Nation informed the Project about historical reliance on interconnected river systems for travel and trade, sustainable harvesting practices, and cultural protocols that guide resource use. Current land use planning emphasizes tourism opportunities rooted in cultural interpretation and eco-tourism, promoting protection of sensitive habitats and sacred sites.	■ Section 5.1.7.1.3 and 5.1.11.3
■ **Cultural Preservation and Change** ■ **Traditional Foods**	■ Neskantaga First Nation	■ Indigenous Knowledge from Neskantaga First Nation informed the Project about historical seasonal cycles of hunting, trapping, and fishing, preservation methods such as smoking and pemmican, and the cultural significance of species like sturgeon and beaver. Current stewardship programs prioritize sturgeon conservation and express concerns about development impacts on wildlife essential to food security and cultural identity.	■ Section 5.1.7.1.3 and 5.1.11.3
■ **Cultural Preservation and Change** ■ **Traditional Foods**	■ Animbiigoo Zaagi'igan Anishinaabek First Nation	■ Indigenous Knowledge from Animbiigoo Zaagi'igan Anishinaabek First Nation informed the Project about seasonal harvesting practices for wildlife, fish, and plants, including the cultural and economic importance of species such as sturgeon and blueberries. Current activities like commercial fishing, berry harvesting, and trapping continue to support livelihoods while reflecting cultural values and ecological stewardship.	■ Section 5.1.7.1.3 and 5.1.11.3
■ **Cultural Preservation and Change** ■ **Traditional Foods**	■ Ginoogaming First Nation	■ Indigenous Knowledge from Ginoogaming First Nation informed the Project about historical practices of hunting, trapping, fishing, and plant gathering across a broad territory, as well as ongoing use of traplines for cultural and economic purposes. Community concerns highlight environmental changes and development pressures affecting wildlife health, fish quality, and plant resources, which threaten traditional practices and food security.	■ Section 5.1.7.1.3 and 5.1.11.3
■ **Cultural Preservation and Change** ■ **Traditional Foods**	■ Long Lake #58 First Nation	■ Indigenous Knowledge from Long Lake #58 First Nation informed the Project about historical subsistence practices including hunting, trapping, fishing, and plant harvesting, as well as preservation techniques like drying and smoking. Fur trading and adaptive trapline management were key economic activities, reflecting the integration of cultural values with resource management.	■ Section 5.1.7.1.3 and 5.1.11.3
■ **Community and Public Health**	■ Marten Falls First Nation	■ Indigenous knowledge from Marten Falls First Nation informed the Project about concerns surrounding substance use in the community.	■ Section 5.1.7.1.4

1. *As the Draft Marten Falls First Nation Community Based Land Use Plan is not yet a finalized document, it is subject to change.*

Valued Component	Indigenous Community	Details	Section Reference
Community and Public Health	Aroland First Nation	Indigenous knowledge from Aroland First Nation informed the Project about concerns surrounding substance use in the community.	Section 5.1.7.2.4
Access to Clean Water	Kashechewan First Nation	Indigenous Knowledge from Kashechewan First Nation informed the Project about reliance on waterways for boat travel, hunting waterfowl, and trapping species such as beaver and muskrat. Community members noted declining water levels caused by upriver dams, which have affected access to hunting camps and harvesting activities, highlighting the cultural and subsistence importance of healthy water systems.	Section 5.1.9.3
Access to Clean Water	Neskantaga First Nation	Indigenous Knowledge from Neskantaga First Nation informed the Project about the cultural importance of interconnected waterways for seasonal travel, sustenance, and identity. Historic routes along rivers such as the Attawapiskat, Albany, and Winisk supported mobility and resource harvesting, reflecting deep ties between water systems and land-based knowledge.	Section 5.1.9.3
Access to Clean Water	Ginoogaming First Nation	Indigenous Knowledge from Ginoogaming First Nation informed the Project about the cultural and subsistence importance of waterways for fishing, canoe travel, and maintaining family connections. Community members reported concerns about declining water quality and fish health in Kenogamisis Lake, Kenogamisis River, and Long Lake, while emphasizing the significance of historic canoe routes and healing camps along these waterways.	Section 5.1.9.3
Access to Clean Water	Animbiigoo Zaagi'igan Anishinaabek First Nation	Indigenous Knowledge from Animbiigoo Zaagi'igan Anishinaabek First Nation informed the Project about reliance on local waterbodies such as Kenogamisis Lake and River for drinking water and fishing. Elders noted direct consumption from Kenogamisis Lake and emphasized the importance of protecting habitats and spawning areas, particularly in Goldfield Creek, due to the cultural and economic significance of fishing.	Section 5.1.9.3
Traditional Foods	Fort Albany First Nation	Indigenous Knowledge from Fort Albany First Nation informed the Project about the cultural and nutritional importance of traditional foods, including hunting waterfowl such as Canada Geese, trapping species like beaver and muskrat, and harvesting moose and caribou. Fishing for sturgeon, whitefish, walleye, and other species, along with gathering berries and medicinal plants, reflects practices that sustain food security and cultural identity.	Section 5.1.11.3
Traditional Foods	Attawapiskat First Nation	Indigenous Knowledge from Attawapiskat First Nation informed the Project about seasonal cycles of traditional food harvesting, including spring goose and duck hunts, muskrat hunting, summer fishing for whitefish, and fall caribou and moose harvests. Winter trapping of beaver, muskrat, and rabbit provided both food and trade opportunities, reflecting practices that sustain cultural identity and food security.	Section 5.1.11.3
Traditional Foods	Eabametoong First Nation	Indigenous Knowledge from Eabametoong First Nation informed the Project about seasonal harvesting practices, including hunting moose and geese, fishing for sturgeon, walleye, and whitefish, and gathering berries, wild rice, and medicinal plants. These activities continue to sustain food security and cultural identity, reflecting deep connections to the land and water.	Section 5.1.11.3
Traditional Foods	Kasabonika Lake First Nation	Indigenous Knowledge from Kasabonika Lake First Nation informed the Project about communal systems of hunting and trapping organized under Elders' guidance, seasonal harvesting of moose, caribou, and waterfowl, and women's central role in processing and preparing traditional foods.	Section 5.1.11.3
Traditional Foods	Kitchenuhmaykoosib Inninuwug First Nation	Indigenous Knowledge from Kitchenuhmaykoosib Inninuwug First Nation informed the Project about the cultural and subsistence importance of caribou hunting and the need to maintain migration routes to protect access to this resource. Elders emphasized that disruptions to caribou habitat would impact traditional harvesting practices and cultural continuity for future generations.	Section 5.1.11.3
Traditional Foods	Kingfisher Lake First Nation	Indigenous Knowledge from Kingfisher Lake First Nation informed the Project about the cultural and subsistence importance of Woodland Caribou and the role of hunting and trapping in sustaining food systems. Elders described historic protocols for inter-community cooperation when hunting across territories, reflecting values of respect and social agreements that supported traditional harvesting practices.	Section 5.1.11.3
Traditional Foods	Mishkeegogamang First Nation	Indigenous Knowledge from Mishkeegogamang First Nation informed the Project about seasonal harvesting practices, including hunting moose and beaver, fishing for sturgeon, walleye, and whitefish, and gathering berries and wild rice, as well as preservation methods.	Section 5.1.11.3
Traditional Foods	Nibinamik First Nation	Indigenous Knowledge from Nibinamik First Nation informed the Project about seasonal harvesting practices, including hunting moose, caribou, rabbits, and waterfowl, as well as fishing and food preservation methods like smoking and drying. These practices are rooted in spiritual values and mobility along traditional canoe routes, reflecting a deep connection to the land and sustaining cultural identity.	Section 5.1.11.3
Traditional Foods	Kashechewan First Nation	Indigenous Knowledge from Kashechewan First Nation informed the Project about seasonal harvesting practices, including spring hunts for ducks and waterfowl, fall hunting for moose and caribou, summer fishing for species such as Northern Pike, Walleye, Sturgeon, and Whitefish, and winter trapping of beaver, marten, and other furbearers. These activities support food security and cultural continuity through sharing and community-based practices.	Section 5.1.11.3
Traditional Foods	Wapekeka First Nation	Indigenous Knowledge from Wapekeka First Nation informed the Project about seasonal harvesting practices, including hunting moose and beaver in winter, geese in spring and fall, and caribou during migration periods. Fishing for species such as walleye, northern pike, whitefish, trout, sturgeon, and gathering berries like blueberries and cloudberries remain important for food security and cultural continuity.	Section 5.1.11.3

Valued Component	Indigenous Community	Details	Section Reference
Traditional Foods	Wawakapewin First Nation	Indigenous Knowledge from Wawakapewin First Nation informed the Project about the community's role in regional food security through flexible hunting and trapping practices, including harvesting Woodland Caribou and moose. Elders highlighted intergenerational knowledge transfer and recent initiatives to revitalize traditional harvesting, complemented by local food production projects that strengthen resilience and cultural continuity.	Section 5.1.11.3
Traditional Foods	Webequie First Nation	Indigenous Knowledge from Webequie First Nation informed the Project about seasonal harvesting practices, including spring and fall hunts for geese, ducks, and moose, as well as trapping and fishing. Elders described resourceful use of harvested animals.	Section 5.1.11.3
Traditional Foods	Weenusk First Nation	Indigenous Knowledge from Weenusk First Nation informed the Project about the cultural and subsistence importance of caribou, moose, fish, and geese, with caribou harvested year-round and moose primarily in the fall. Seasonal fishing, including summer and winter ice fishing, and community sharing practices reflect stewardship values that sustain food security and cultural continuity.	Section 5.1.11.3
Traditional Foods	Wunnumin Lake First Nation	Indigenous Knowledge from Wunnumin Lake First Nation informed the Project about the cultural and subsistence importance of Woodland Caribou and moose hunting, as well as family-based land use systems that organized resource harvesting. Elders described intergenerational practices such as children assisting with bird hunting and fish net gathering, reflecting deep ties to the land and continuity of Indigenous Knowledge.	Section 5.1.11.3
Public Safety	Aroland First Nation	Information obtained from Aroland First Nation during the Indigenous Knowledge program noted concerns around increased traffic due to the Community Access Road, including road safety. The community noted concerns about safety of community members with increased access to the area from outsiders.	Section 5.1.10.2.2

3.2 Indigenous Engagement

In addition to the Indigenous Knowledge provided by Indigenous Knowledge Holders, information was collected from Indigenous Community members with interests in this Project. The information used to inform this report is described in **Table 3-2** below.

Table 3-2: Indigenous Engagement

Valued Component	Details	Section Reference
■ **Economy**	■ Marten Falls First Nation spoke to economic opportunities as a result of the Community Access Road, and about the systemic issues that currently hinder employment and economic opportunities within the community.	■ Section 5.1.3
■ **Community Access to Infrastructure and Services**	■ A Marten Falls First Nation community member noted the need for post-secondary funding and funding for student housing and living expenses. They also noted other concerns about housing, namely the need for additional housing on the reserve and off reserve, especially for students attending post-secondary schools, people that get out of jail, and for people on the streets struggling with addictions.	■ Section 5.1.5
■ **Cultural Preservation and Change**	■ A Marten Falls First Nation community member noted the presence of traplines between Dusey Lake and Marten Falls First Nation.	■ Section 5.1.7
■ **Cultural Preservation and Change**	■ A Marten Falls First Nation community member noted a change in species while trapping. They had heard from other trappers and had experienced an overall decline of what is trapped, except for martens.	■ Section 5.1.7
■ **Cultural Preservation and Change**	■ Marten Falls First Nation advised that the younger generation does not actively participate in hunting due to high effort and low monetary reward.	■ Section 5.1.7
■ **Cultural Preservation and Change**	■ A Marten Falls First Nation community Member advised that their family has a trapline near the Community Access Road route and that they are concerned about the land, animals and lake / river.	■ Section 5.1.7
■ **Community and Public Health**	■ Marten Falls First Nations community members have spoken about concerns regarding substance use in the community.	■ Section 5.1.7.1.4
■ **Community and Public Health**	■ Aroland First Nation community members advised the Project that they have a number of concerns about substance use in the community.	■ Section 5.1.7.2.4
■ **Traditional Foods**	■ Marten Falls First Nation discussed children's rights and food insecurity. Out of 56 school-aged children, 10 attend school hungry. It was also noted that there is a food crisis in the community and nutritious food should be provided when hosting Project-related interviews, focus groups, or meetings with Marten Falls First Nation members at the school.	■ Section 05.1.10

3.3 Regulator and Public Stakeholder Input

The proponent engaged with regulators and public stakeholders with technical knowledge related to the valued components to inform aspects of this report. The information and how it informed the development of this report are described in **Table 3-3** below.

Table 3-3: Public, Agency and Other Input

Valued Component	Provided By	Details	Section Reference
■ **Business Environment** ■ **Regional Economy**	■ Interested Persons	■ A local outfitter provided information about their operations and their concerns about how the Community Access Road may affect their business.	■ Sections 7.1.1.9, 7.1.1.18, 7.2.1.10 and 7.2.1.18

4. Study Methods and Assessment Scope

This section contains excerpts from the Draft All Season Community Access Road: Work Plan - Economic Environment Plan (AECOM, 2022a), Social-Community Work Plan (AECOM, 2022b), and Human Health and Community Safety Plan (AECOM, 2022c), prepared for the Impact Assessment Agency of Canada (Agency) at the outset of this Project. The original Draft Study Plan and Work plan, including comments from regulators can be found in **Attachment B**. In some instances, the approach in this report deviated from the original Draft Study Plan; these deviations are outlined in **Section 4.7, Table 4-10**. General changes from the Draft Community Well-Being Report, such as changes to section headings, organization of sections and subsections and, changes to phrasing and tense, have been made throughout.

4.1 Study and Work Plan Purpose and Objectives

As required by the *Impact Assessment Act* (Government of Canada, 2019) and referenced in the Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020), Study Plans and Work Plans were developed for disciplines as required. The purpose of the Study Plan is to explain:

- An existing conditions study methodology that will result in a comprehensive description of the existing environment potentially impacted by the Project;
- The process for promoting efficient and transparent data management and analysis was completed; and
- Developing the discipline specific effects assessment methodology.

Work Plans included details on how to implement the study plans; containing information, such as location of sampling sites, scheduling, and sequencing.

As noted above the *Draft All Season Community Access Road: Work Plan - Economic Environment Plan* (AECOM, 2022a), *Social-Community Work Plan* (AECOM, 2022b), *and Human Health and Community Safety Plan* (AECOM, 2022c) can be found in **Attachment B**.

4.2 Study Scoping

4.2.1 Temporal Boundaries

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the Project will be considered. The Project is planned to occur in three phases, briefly described below.

- **Construction Phase:**
  The time from start of construction, including site preparation activities, to the start of Operations and Maintenance of the Community Access Road.

Decommissioning of construction works is included in the construction phase. The construction phase is anticipated to take approximately three to ten years to complete.

- **Operation and Maintenance Phase:**
  The operation and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The Operations and Maintenance phase of the Project is considered to be permanent based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.
- **Decommissioning Phase:** There are currently no plans to decommission the Community Access Road as there is no expected / known end date for its need. Therefore, future suspension, decommissioning, and eventual abandonment will not be considered in this report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long duration of Operations and Maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations.

4.2.2 Valued Components and Indicators

The Agency describes **valued components** as the environmental, health, social, economic, or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and area of concern or value to the public, Indigenous peoples, federal authorities and interested parties (Impact Assessment Agency of Canada, 2021).

Indicators represent the resource, feature, or issue related to the valued component that, if changed, may demonstrate an effect on the environment. Indicators may be characterized quantitatively or qualitatively. For example, effects from changes to the availability and distribution of valued components are often expressed through quantitative assessment of direct vegetation removals as well as predicted indirect effects on retained vegetation.

The Draft Study Plan presented valued components, indicators and rationale for selection known to the proponent at the time of drafting. The draft table and the factors that influenced it can be found in Section 9.2 of the *Draft All Season Community Access Road: Work Plan - Economic Environment Plan* (AECOM, 2022a), *Social-Community Work Plan* (AECOM, 2022b), and *Human Health and Community Safety Plan* (AECOM, 2022b) in **Attachment B**.

As a result of conducting research and community engagements, the valued components and indicators have been revised to provide an appropriate, community-defined assessment; those changes are noted in **Table 4-1** below. An updated list of community well-being indicators, revised following publication of the Draft Community Well-Being Report for public comment, can be found in **Table 4-1** below.

Table 4-1: Community Well-Being Indicators

Valued Component	Indicators	Rationale for Selection	Measures of Change
Sustainable Population Growth	■ Age distribution within the community	■ To understand the overall demographic of the community.	■ Percentage of youth, working aged adults, and seniors (65 yrs plus) living in the community
	■ Gender distribution within the community	■ To understand the balance in gender distribution	■ The percentage of male and female residents in community
	■ Change in community population	■ To provide insight into migration patterns and shifts in community composition.	■ Community population (e.g. on reserve, or in municipality).
Labour Market Dynamics	■ Labour force	■ Employment and unemployment rates are essential measures of labour market health. Breaking them down by gender allows for understanding of disparities and identification of barriers to employment in the community.	■ Employment, unemployment and participation rates by male / female
	■ Earnings	■ Assessing income by gender helps identify economic disparities and it can help identify mechanisms to support development project benefits for all genders. Gender-disaggregated income data can highlight inequalities and inform targeted interventions to promote gender equality and economic empowerment.	■ Income by male / female
	■ Educational attainment	■ Educational attainment directly impacts work force development and community capacity, and differential impacts by gender.	■ Education levels by male / female
Economy	■ Local businesses and commercial activities	■ This will measure the vitality and growth of the local economy highlighting how active and diverse local businesses are and tracking entrepreneurial activity over time.	■ Number and diversity of businesses operating in the community
	■ Public finances	■ This provides a snapshot of the community's fiscal health, including revenues, expenditures, and general financial stability. Understanding financial trends is key for assessing whether the community has the resources needed for sustainability and growth.	■ Change in community's financial reserves or debts
		■ The financial well-being of the community is affected by the direct, indirect, and induced effects on regional and national finances, especially if the community relies on government transfers or is a key economic driver in the region.	■ Impact on federal, provincial, local, and Indigenous public finances
	■ Regional economy	■ This offers a broader perspective of the economic environment in which the community operates. By examining the regional economy, you can assess how local factors fit within larger economic trends, including development plans and industry shifts.	■ Real Gross Domestic Product ■ Employment ■ Housing starts (singles and multiples) ■ Consumer Price Index ■ Major investments in the region
Community Access to Infrastructure and Services	■ Method of transportation in and out of the community	■ Changing from winter-road-only access to year-round, all-season road access will significantly increase transportation into and out of community.	■ Method of transportation e.g. Road, airport, navigable waters
	■ Essential infrastructure and services	■ Local infrastructure and services can support community needs during and after construction.	■ Infrastructure and services capacity e.g. Water, wastewater treatment plans, waste management services, power, education
Housing	■ Amount of suitable, housing within the community.	■ Suitable housing is measured and can be compared over time and can be a proxy for housing demand.	■ Percentage of suitable homes
	■ Amount of adequate housing within the community.	■ Adequate housing is measured and can be compared over time and can be a proxy for housing demand.	■ Percentage of adequate homes (not requiring major repair).
	■ Accessibility of home building materials	■ Road access will decrease costs and time associated with acquiring building materials for repair or new construction, which may enable improved housing conditions.	■ Availability for shipping building material e.g. Change in the number of days material can be shipped.
Cultural Preservation and Change	■ Traditional economy	■ This measures the level of active engagement in traditional economic practices, which are often tied to cultural identity, community well-being, and food sovereignty.	■ Qualitative assessment to understand the population engaged in subsistence activities (hunting, fishing, gathering).
	■ Participation in community cultural activities	■ Cultural activities play a vital role in preserving the community's identity and passing down traditions to future generations. Participation will help assess how active the community is in maintaining its cultural heritage.	■ Qualitative assessment to understand participation in cultural activities in the community.
	■ Use of Traditional language	■ Language is a core element of cultural preservation. Tracking the use of Cree over time will show how the community's language practices are evolving, especially given the importance of language revitalization efforts.	■ Change of Indigenous language use, for three census years to understand who speaks the language, by age and male / female.
Community and Public Health	■ Access to health programs and services	■ Improved road access can improve timely and consistent access to health services.	■ Ability to access health services and facilities
	■ Recreation	■ Recreation, organized or informal, contributes to physical and mental well being.	■ Access to more recreational programs.
	■ Mental health and well-being	■ Road access may reduce barriers to mental health resources. improve connectivity and reduce isolation. Alterations to landscape can increase feelings of distress.	■ Available mental health resources
	■ Substance Use	■ Identified as a key community concern; Improved road access may influence the availability of illicit substances.	■ Access to substance use supports
Access to Clean Water	■ Access to clean water	■ Improved infrastructure can increase water delivery reliability and efficiency and support repair and maintenance to the water treatment plant.	■ Change in access to clean water
	■ Quality of water (drinking water and recreational water)	■ Potential for contamination of drinking water sources and water used recreationally due to construction and operations activities. ■ Potential for improved maintenance and operation of the water treatment facility to allow for improved municipal water quality through access to licenced trained technicians, parts and equipment, and laboratory analysis.	■ Compare concentrations of contamination in drinking and recreational water from an existing conditions assessment to concentrations predicted through modelling and / or measured during monitoring.

Valued Component	Indicators	Rationale for Selection	Measures of Change
Traditional Foods	■ Accessibility of traditional foods	■ A Community Access Road could either enhance or hinder access to traditional food harvesting areas depending on infrastructure and vehicle access.	■ Ability to access locations for trapping, hunting, and gathering
	■ Availability of traditional foods	■ Traditional food availability could change due to habitat disturbance, or increased harvesting pressure.	■ Availability of traditional foods along the corridor
	■ Reliance on store-bought (non-traditional) foods	■ A Community Access Road may increase the volume and diversity of store-bought foods at lower prices, given road access vs. Flying in or winter-road deliveries.	■ Cost of non-traditional (store-bought) foods
	■ Quality of traditional foods	■ Potential for contamination of country foods due to construction and operations activities.	■ Compare concentrations of contamination in country foods from an existing conditions assessment to concentrations predicted through modelling and / or measured during monitoring.
Public Safety	■ Driver's Licence	■ Community interest in more safe, licenced drivers.	■ Number of community members with a Driver's Licence
	■ Road Safety	■ Increased traffic and road deterioration could lead to a rise in road-related incidents.	■ Number of reported road accidents occurring along the region.
	■ Emergency Services	■ Community concerns about strained emergency services and occupational hazards.	■ Number of emergency calls serviced by RCMP/ Police, Fire / health EMS / Medical transport.
	■ Violence and Harassment	■ Community concerns about increased access to the community and interactions with external populations, including safety of Indigenous women and girls.	■ Percent change in crime severity index and violent crime severity index
Biophysical Determinants of Human Health	■ Air quality	■ Project sites proximity to receptors determines level of air quality effects. ■ Construction equipment and activities will alter air quality. ■ Road traffic during operation will alter local air quality ■ Construction and operations could result in pollution of local air quality, through other construction and Operations and Maintenance activities including clearing, burning, blasting	■ Compare the potential for inhalation exposure and nuisance dust / dust contact due to project construction and operation and maintenance activities to existing conditions and / or concentrations measured during monitoring. ■ Compare existing versus predicted air concentrations due to project emissions during construction and / or concentrations measured during monitoring. ■ Compare existing versus predicted air quality concentrations based on actual number of vehicles per day, per hour, per season, per year using the road and / or concentrations measured during monitoring. ■ Compare existing versus predicted air concentrations due to other project construction and Operations and Maintenance activities and / or concentrations measured during monitoring.
	■ Noise and vibration	■ Road and construction noise and vibration levels could impact use of personal and community spaces. Project site proximity to receptors will determine noise and vibration levels. ■ Construction activities could result in temporary noise and vibration disturbances. ■ Higher traffic levels could contribute to increased noise and vibration levels.	■ Compare the potential for noise and vibration due to project construction and operation and maintenance activities to existing conditions and / or concentrations measured during monitoring if complaints. ■ Compare existing versus predicted and / or monitored noise and vibration levels during construction if complaints. ■ Compare existing versus predicted and / or monitored noise and vibration levels during operation phase if complaints.
	■ Soil quality	■ Construction and operations activities could result in contamination to soils through deposition of dust.	■ Compare existing versus predicted and / or monitored concentrations of project effects to soil in locations where soil impacts are expected based on dust deposition models.
	■ Sediment quality	■ Construction and operations activities could result in contamination to sediment through surface water runoff carrying solids, particulates and / or debris and through deposition of dust.	■ Compare existing versus predicted and / or monitored concentrations of project effects to sediment in locations where sediment impacts are expected based on dust deposition models.
	■ Land use	■ Use of the land for traditional and recreational activities could increase direct contact with soils and sediment, increase exposure to impacted outdoor air, increase consumption of traditional foods, increase direct contact with recreational water and alter sources of drinking water.	■ Compare existing versus predicted use of lands and recreational water bodies. ■ Qualitative assessment to understand the population engaged in traditional and / or recreational activities.
	■ Peatlands	■ Potential for contamination of sediments, drinking water, and recreational water.	■ Compare existing versus predicted and / or monitored levels of effects in other media or foods.
	■ Accidents and malfunctions	■ Potential for contamination of soils, sediments, air, drinking water, and recreational water after an accident or malfunction.	■ Compare existing versus predicted and / or monitored concentrations of project emissions in soil, sediment, air, drinking water and recreational water.

4.2.3 Spatial Boundaries

4.2.3.1 Project Study Areas

Study areas identify the geographic extents within which potential effects of the Project are likely to occur and will be considered in the Environmental Assessment / Impact Statement Report. General project boundaries were established for the scoping of field programs, and to delineate study areas for discipline specific surveys. These general project boundaries are described in **Table 4-2** below:

Table 4-2: Project Study Areas Definition and Description

Study Area	Definition	Description
Construction Disturbance Area	■ Area of expected direct disturbance.	■ 100 m wide Community Access Road right-of-way, temporary construction access roads, work areas, worker camps, and pits, quarries and associated access roads.
Project Study Area	■ Area where most of the direct effects of the Project are likely to occur.	■ The area within 2.5 km (total of 5 km) of the centreline of the route alternatives.

4.2.3.2 Community Well-Being Study Areas

Discipline-specific Local Study Areas and Regional Study Areas and the corresponding communities have been defined for the Project. In defining these areas and communities, the following was considered:

- Location and other characteristics of the discipline relative to the Project;
- The anticipated extent of the potential Project effects;
- Federal, provincial, regional, and local government administrative boundaries;
- Input from Indigenous Communities;
- Community knowledge and Indigenous Knowledge;
- Current or traditional land and resource use by Indigenous communities;
- Exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices; and
- Physical, ecological, technical, social, health, economic and cultural considerations.

While this report maintains the terminology of “Local Study Area” and “Regional Study Area” for consistency across discipline reports, it is important to note that, given the nature of the social environment discipline, the areas of study are communities themselves, as opposed to geographic defined areas. Definition of community and the potential effects that may be experienced by community, are not best defined by existing administrative boundaries or geographically bounded areas on a map, especially for Indigenous communities. The discipline-specific methodology applied in defining the Local Study Area and the Regional Study Area for the community well-being discipline is described below. Distinct approaches to the economic and human health study area definitions are also provided below.

Local Study Area

The Local Study Area is defined to capture the areas where primary pathways for effect on communities may occur as a result of Project activities. The Local Study Area focuses on communities with the greatest potential for interaction with the Project, given their proximity and the presence of direct spatial and functional linkages. Accordingly, the Local Study Area includes Marten Falls First Nation and Aroland First Nation, their traditional territories, as well as the surrounding traditional territories associated with other Indigenous communities in the vicinity of the proposed Project area. Given the remote location of the project area, and the nature of Indigenous community activities across their traditional territories, the Local Study Area is comprised only of Indigenous communities.

Regional Study Area Municipalities

The methodology for defining spatial boundaries also considered municipalities where there is a plausible pathway for effect associated with Project activities. Municipal communities were identified based on the potential for interaction between the Project and select valued components, specifically sustainable population growth and public safety. The Project is expected to increase regional accessibility and facilitate more frequent movement of people through adjacent regions, creating a potential pathway for effect for those regional communities related to population dynamics and community safety. Municipalities with both geographic proximity to the Project and existing or anticipated connections that could reasonably experience these interactions were therefore included in the Regional Study Area. Based on these criteria, the municipalities of Greenstone and Thunder Bay were identified as having a plausible pathway for effect and were included within the Regional Study Area for these valued components.

Regional Study Area Indigenous Communities

The Indigenous communities within the Regional Study Area are highlighted below:

- Animbiigoo Zaagi'igan Anishinaabek First Nation;
- Attawapiskat First Nation;
- Constance Lake First Nation;
- Eabametoong First Nation;
- Fort Albany First Nation.
- Ginoogaming First Nation;
- Kasabonika Lake First Nation;
- Kashechewan First Nation;
- Kitchenuhmaykoosib Inninuwug First Nation;
- Kingfisher Lake First Nation;
- Long Lake #58 First Nation;
- Mishkeegogamang First Nation;
- Neskantaga First Nation;
- Nibinamik First Nation;
- Red Sky Métis Independent Nation;
- Wapekeka First Nation;
- Wawakapewin First Nation;
- Webequie First Nation;
- Weenusk First Nation; and
- Wunnumin Lake First Nation.

The methodology for defining spatial boundaries considered Indigenous communities from the Regional Study Area where traditional practices occur within the Local Study Area and may interact with Project activities.

Areas of Interest are the area where an Indigenous community or group may hold or exercise Aboriginal and / or Treaty Rights and Interests relevant to the Project. Although the contents of the community-specific *Aboriginal and / or Treaty Rights and Interests: Impact Assessment Reports*, including the Areas of Interest, are confidential and cannot be reproduced in this report, each Regional Study Area community's Areas of Interest were compared with the Local Study Area to determine the extent of spatial overlap. Additionally, communities geographically downstream of the Local Study Area were also assessed for relevant indicators which may produce physical effects downstream. Communities with an overlapping Area of Interest, and communities downstream of the Local Study Area were identified as having a potential pathway for effect and were included in the assessment for the Local Study Area for relevant indicators (see **Section 4.3.5** for details on Regional Study Area communities with overlapping interests in the Local Study Area in relation to relevant indicators).

Activities such as hunting, fishing, and navigation of waterways were examined to determine whether they create a plausible pathway for effect for Indigenous communities from the Regional Study Area. Where such pathways exist, those communities were included in the socio-community and social determinants of health analysis.

Identification of pathways relied on the review of confidential Aboriginal and / or Treaty Rights and Interests reports prepared for Indigenous communities. While these reports are confidential and the contents cannot be reproduced in this appendix, each community's defined Area of Interest was compared to the Local Study Area to determine whether any spatial overlap existed. Communities with confirmed Areas of Interest overlap were included in the assessment.

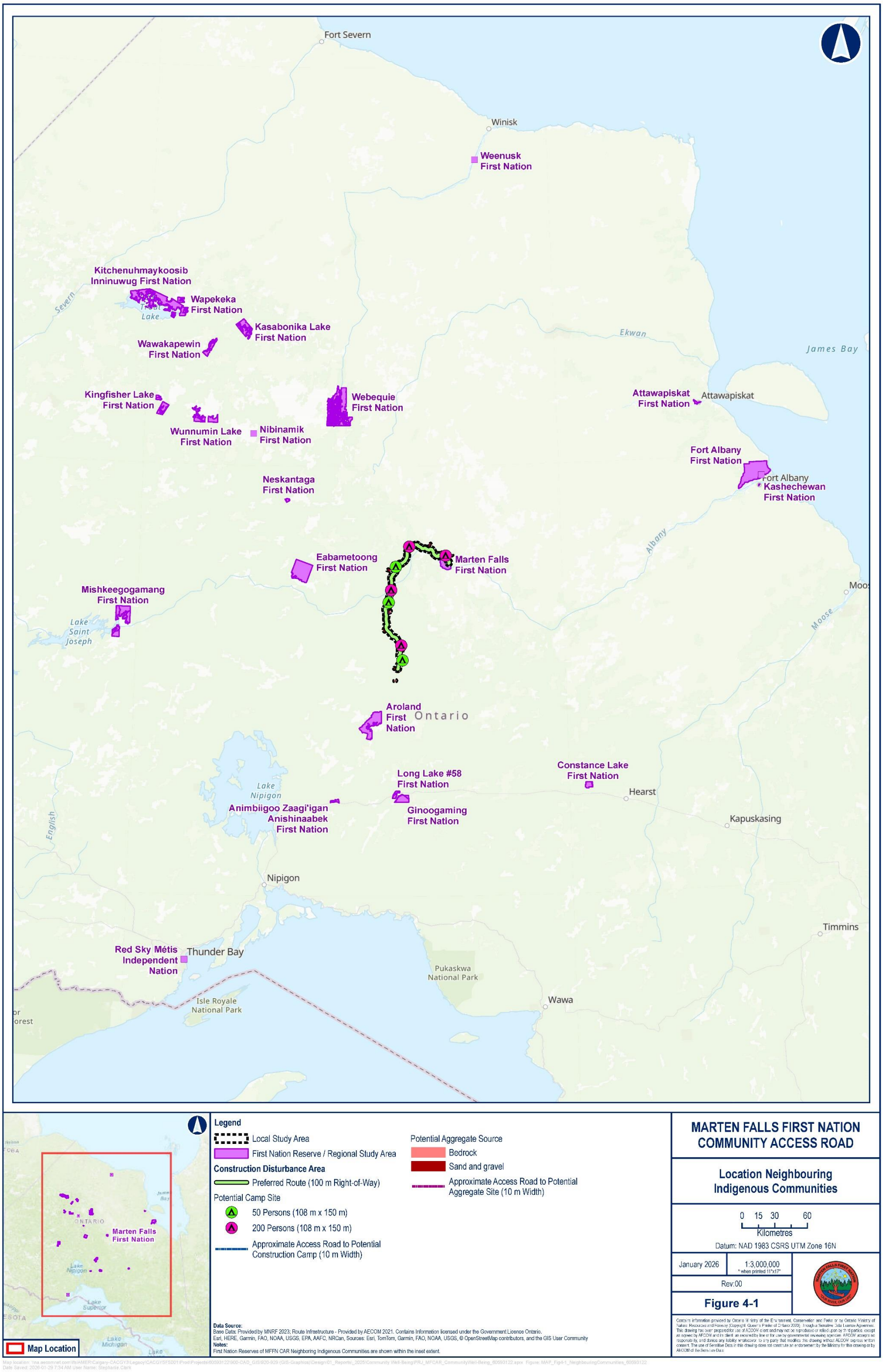
The Local and Regional Study Areas for community well-being and the rationale for their selection are described in **Table 4-3** and shown in **Figure 4-1**.

Table 4-3: Discipline Specific Study Areas Description and Rationale

Study Area	Geographic Extent	Rationale	Area Size
Local Study Area	■ Marten Falls First Nation ■ Aroland First Nation	■ Potential effects as a result of changing access to the Marten Falls First Nation Community due to the Project; and / or due to Project effects that could result to impacts to well-being (economic, socio-community, human health) of the community.	■ 28,707 ha

Study Area	Geographic Extent	Rationale	Area Size
	Regional Study Area Communities with a potential effect pathway in the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation ■ Attawapiskat First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Fort Albany First Nation ■ Ginoogaming First Nation ■ Kasabonika Lake First Nation ■ Kashechewan First Nation ■ Kitchenuhmaykoosib Inninuwug First Nation ■ Kingfisher Lake First Nation ■ Long Lake #58 First Nation ■ Mishkeegogamang First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Webequie First Nation ■ Weenusk First Nation ■ Wunnumin Lake First Nation	■ Regional Study Area Communities with traditional practices or cultural activities occurring within the Local Study Area, and where Project-related changes may create a potential pathway for effects, are treated as a Local Study Area community for the indicator(s) to which the interaction applies. See **Section 4.3.5** for details.	
Regional Study Area	**Municipalities** ■ Municipality of Greenstone ■ Municipality of Thunder Bay **Indigenous Communities** ■ Animbiigoo Zaagi'igan Anishinaabek First Nation ■ Attawapiskat First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Fort Albany First Nation ■ Ginoogaming First Nation ■ Kasabonika Lake First Nation ■ Kashechewan First Nation ■ Kitchenuhmaykoosib Inninuwug First Nation ■ Kingfisher Lake First Nation ■ Long Lake #58 First Nation ■ Mishkeegogamang First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Webequie First Nation ■ Weenusk First Nation ■ Wunnumin Lake First Nation ■ Red Sky Métis Independent Nation.	■ Capture potential overlapping impacts to surrounding Indigenous communities and potential impacts to local municipalities.	■ 71,036,317 ha

Figure 4-1: Discipline Local and Regional Study Area Communities



The study areas included in this document cover the extent to which readily available information suggests the Project may have noticeable effects on the environment. The size, nature and location of past, present and reasonably foreseeable projects will be taken into consideration in the development of the cumulative effects assessment study area(s) and are further discussed in **Section 8**.

4.2.4 Tailored Impact Statement Guidelines Requirements Mitigation and Enhancement Measures and Terms of Reference Requirements

The Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020) Section 20 requirements and Terms of Reference (AECOM Canada ULC, 2020) requirements for community well-being are provided below. The applicability of these requirements has been evaluated and will be adapted to the needs of the site, environment and Project activities.

Table 4-4: Tailored Impact Statement Guidelines Section 20 and Terms of Reference Requirements

TISG Requirement Section 20 Requirement	Section Addressed In
Describe mitigation measures that are specific to each environmental, health, social, or economic effect identified. Mitigation measures are to be written as specific commitments that clearly describe when and how the proponent intends to implement them, what decision-making criteria will be used, and the outcome these mitigation measures are designed to address.	■ Section 7
Describe mitigation measures proposed by Indigenous peoples and the consideration of those in the Project.	■ Section 7
Identify and describe residual effects.	■ Section 7
Identify the party responsible for the implementation of mitigation measures and the system of accountability.	■ Section 7
Propose differentiated mitigation measures for all potential adverse effects identified, if applicable, so that adverse effects do not fall disproportionately on vulnerable populations, certain Indigenous groups, or certain communities, and they are not disadvantaged in sharing any development benefits and opportunities resulting from the Project. These mitigation measures should be developed in collaboration with those who are vulnerable and / or disadvantaged.	■ Section 7
Propose mitigation measures to reduce all potential adverse effects to social conditions of all potentially impacted communities and Indigenous groups and present opportunities for enhancing positive effects.	■ Section 7
Document specific suggestions raised by each Indigenous group for avoiding, mitigating, or otherwise accommodating the Project's environmental, health, social, and economic effects, including potential effects and impacts on the exercise of rights of Indigenous peoples and: ■ For those mitigation measures intended to address effects of changes to the environmental, health, social, and economic conditions of Indigenous peoples or impacts on the exercise of rights of Indigenous peoples, provide a description of the consultation with Indigenous groups regarding the residual effects; and ■ Describe whether and how these measures will be incorporated in the Project design.	■ Section 3 ■ Section 7

TISG Requirement Section 20 Requirement	Section Addressed In
Identify opportunities for enhancing positive effects, such as creation of local employment and infrastructure improvements.	■ Section 7
Describe how disproportionate effects that were identified in the Gender-Based Analysis Plus results were used to inform mitigation and enhancement measures.	■ Section 7
Terms of Reference Requirement	**Section Addressed In**
Identify cultural practices not associated with a specific site that are undertaken anywhere with other community members and facilitate community well-being and strength. These practices may include crafting, language, and food consumption.	■ Section 5.1.7 ■ Section 5.1.10 ■ Section 5.1.11
Informing Criteria and Indicators: Indigenous Knowledge on key topics, issues, and concerns to help further identify, inform, and refine criteria and indicators. Indigenous Knowledge will provide difference perspectives on the physical and socio-economic environment, and ultimately on what might constitute a criterion and indicator.	■ Section 3 ■ Section 4 ■ Section 5
Environmental Components, including Social, Economy, Human Health and Community Safety	■ Section 5 ■ Section 7 ■ Section 8
Potential Environmental Effects - Social: ■ Change in population and demographics ■ Change in availability and use of public services and infrastructure ■ Changes to housing ■ Changes to community well-being	■ Section 7
Potential Environmental Effects - Economy: ■ Changes to employment and income ■ Changes to the regional economy ■ Changes to government finances ■ Change to industrial opportunities	■ Section 7
Potential Environmental Effects - Human Health and Community Safety: ■ Changes in air quality, noise levels, and water quality ■ Changes to public health and community safety ■ Changes to diet ■ Changes to access to health and emergency facilities and care	■ Section 7
Potential changes to the community (e.g., easier access to goods) may entice members of MFFN to return to or exit the community. Changes to population may affect the availability of housing for community members. If population increases or demographics change, strain on public services and infrastructure may also occur. These changes may also change use of Indigenous languages and affect the well-being of the community, including social cohesion.	■ Section 7
Changes in population and access to the Far North for recreational activities (e.g., fishing and hunting) may alter the ability of Indigenous communities to access country foods.	■ Section 7
Changes to human health by altering public safety (including potential increased illicit activities, conflicts and other potential harms to communities and their members), public health, diet and mental health. These changes may be facilitated by additional access to and from southern communities year-round.	■ Section 7
Changes to the regional economy including the labour market. Additional access may affect the local economy through new opportunities for businesses, a lower price of goods and new development.	■ Section 7

(AECOM Canada ULC, 2020)

4.3 Existing Conditions Study Design and Methods

4.3.1 Desktop Assessment Methodology

A desktop review of existing information sources was completed to identify existing community features, issues, and activities within the Project Local and Regional Study Areas. The desktop review to understand the existing environment and assess effects included federal and provincial guidance, community websites, Statistics Canada data, news outlets, academic articles, journal articles, and municipal and regional plans. These sources were reviewed in development of this approach. A full list of sources is included in **Section 11** of this report.

In general, census data has limitations with respect to Indigenous and small communities. Lower participation rates in the census from these communities can result in "undercounting." For the 2021 Census, it was estimated that Indigenous communities across Canada had an 85% response rate, compared to 92% in 2016, likely attributed to a lack of trust upon the discovery of unmarked residential school graves (Taylor, 2022). Many community members may feel uncomfortable responding to surveys, which can impact the completeness and reliability of the data.

As a result, census data from smaller population communities can overstate changes (e.g., fluctuations in populations) as compared to large populations. Additionally, census tabulations are rounded up or down by the nearest multiple of '5' or '10' which can cause skewing in small sample sizes, and in some cases, the sum of population percentage proportions may not add to 100%.

To address gaps in publicly available data, information was supplemented with findings gathered through the engagement program, Indigenous Knowledge Program, Story Beads, and the Country Foods sampling program. This data was integrated to further contextualize the socio-community existing conditions. Perspectives shared by community members and Indigenous Knowledge Holders helped to identify key social and cultural factors relevant to the assessment, promoting local knowledge and lived experience incorporation into the understanding of community well-being.

Statistical analysis and desktop research provided a foundation for the Gender-Based Analysis Plus analysis, which was integrated throughout each section of the report to identify key social and cultural factors relevant to the assessment. By incorporating existing data and research, the analysis supported consideration of gendered perspectives and experiences in the understanding of community well-being, emphasizing the diverse needs within the community.

Municipalities were considered in the Regional Study Area based on whether there is a plausible pathway for effect associated with Project activities. Municipalities were identified based on the potential for interaction between the Project and select valued components,

specifically sustainable population growth and public safety. Based on these criteria, the municipalities of Greenstone and Thunder Bay were identified as having a plausible pathway for effect and were included within the Regional Study Area for these valued components.

Regional Study Area Indigenous communities were considered in the Local Study Area based on whether their Areas of Interest overlapped with the Local Study Area and created a plausible pathway for effect. Inclusion is indicator-specific, meaning communities were assessed only for those socio-community or health indicators for which a pathway was identified using confidential community-specific Aboriginal and / or Treaty Rights and Interests: Impact Assessment Reports, or based on the community's location geographically downstream from the Local Study Area. For more information for which Indigenous communities were included by indicator, refer to **Section 4.3.5** Regional Study Area Communities .

4.3.2 Socio-Community and Social Determinants of Health Methodology

Using the collected data, socio-community and social determinants of health baseline conditions were determined for the valued components below and their indicators for the Local Study Area communities and, for the Regional Study Area where a potential pathway for effect or regional Indigenous or municipal communities was identified. Assessment approaches by socio-community value component are detailed below.

Sustainable Population Growth

Reviewed census data to provide an understanding of population age distribution, gender distribution, and community population totals for LSA communities.

Through our assessment of Regional Study Area communities, it was determined there is a potential pathway for effect on regional municipal communities; therefore, this indicator is developed for the regional municipal communities.

Community Access to Infrastructure and Services

Reviewed existing infrastructure and service capacity as relevant, including transportation infrastructure, and essential services for LSA communities. No pathway to effect for RSA communities, Indigenous or municipal.

Housing Adequacy and Suitability

Reviewed census data to provide an understanding of the adequacy (physical quality) and suitability (size based on the National Occupancy Standard) of the housing stock in LSA communities. Described housing characteristics as experienced by LSA community members.

No pathway to effect for RSA communities, Indigenous or municipal.

Cultural Preservation and Change

Described current and historical uses of the land which support the traditional economy and cultural activities on the land; reviewed census data to provide an understanding of traditional language use for LSA communities.

Through our assessment of Regional Study Area communities, it was determined there is a potential pathway for effect on regional Indigenous communities that engage in the traditional economy e.g. trapping in the Local Study Area; therefore, this indicator is developed for these communities

No pathway to effect for regional municipal communities.

Community and Public Health

Described existing health services and programs accessible; reviewed health trends from Public Health Ontario related to substance use for the LSA communities.

The information presented in this section draws upon a combination of qualitative insights from community engagement, quantitative regional emergency service data, and available historical reports to provide psychosocial context for understanding health conditions in a remote northern First Nation community.

No pathway to effect for RSA communities, Indigenous or municipal.

Access to Clean Water

Reviewed the status of local water treatment systems, historical issues such as boil water advisories, and how project activities could affect water quality and availability.

Through our assessment of Regional Study Area communities, it was determined there is a potential pathway for effect on regional Indigenous communities that rely on waterways within or downstream of the LSA; therefore, this indicator is developed for these communities.

No pathway to effect for regional municipal communities.

Traditional Foods

Reviewed current and historical information related to accessing and consuming traditional foods, including accessibility, availability, quality and reliance on store-bought foods.

Through our assessment of Regional Study Area communities, it was determined there is a potential pathway for effect on regional Indigenous communities that harvest traditional foods within the Local Study Area or hunt species (e.g., caribou) connected to the Local Study Area; therefore, this indicator is developed for these communities.

No pathway to effect for regional municipal communities.

Public Safety

Reviewed available public safety related data, including Nishnawbe Aski Police Service Central Region data on the number of offenses by type including violent offenses, theft, alcohol and drug related offenses, mental health related incidents, traffic related incidents, missing persons, and all other crime or violations; reviewed potential risks associated with gender-based violence and psychosocial safety.

The information presented in this section draws upon a combination of qualitative insights from community engagement, quantitative regional crime statistics data, and available historical reports to provide psychosocial context for understanding public safety conditions.

Through our assessment of Regional Study Area communities, it was determined there is a potential pathway for effect on regional municipal and Indigenous communities; therefore, this indicator is developed for these communities.

Story Beads Activity Methodology

The Story Beads activity was developed by AECOM as part of engagement for the community well-being report. The activity was designed to provide a non-technical, accessible way for community members to share insights relevant to socio-community, economic, health, and cultural well-being which would help verify or augment existing conditions findings and as evidence for some predicated effects. This approach also supported gender-based analysis plus considerations by creating space for diverse participation, including Elders, youth, men, women, and other identities, to contribute perspectives that might otherwise be underrepresented.

During engagement sessions with Marten Falls First Nation and Aroland First Nation, participants were invited to select from a range of coloured beads, with each colour representing a theme connected to the assessment (e.g., land, water, youth, healing, challenges) and share stories from the past, present and future aspirations. The activity was facilitated and the themes, stories, and values shared by participants were recorded, focusing on the meaning associated with each bead rather than personal identifiers. This format supported comfort and inclusivity by allowing participants to share information at their own pace and in a way that aligns with their cultural experiences.

Information gathered through the Story Beads activity was documented in real time and organized by thematic category and reviewed to identify patterns. This information has been integrated into the relevant sections of the existing conditions chapter of this report and referenced as “Story Beads Program, 2025” to protect the identity of participants. To further preserve the identify of participants, the information collected along with participant names, will not be provided in an Appendix.

Eighteen participants in four Community Information Sessions held in May 2025 (one in Marten Falls First Nation, one in Aroland First Nation, and two community-focused sessions in Thunder Bay), took part in the beading activity.

4.3.3 Economic Analysis Methodology

The economic assessment of existing conditions for each valued component below was completed based on reviewing data from 2011 to 2024 based on available data derived from Statistics Canada. Any estimates for 2024 are derived based on the latest data and observed economic relationships.

Local Study Area

The sections below outline the components of the development of existing conditions for the Local Study Area which Marten Falls First Nation and Aroland First Nation are within. As the two First Nations that are the most directly impacted by the Project, Marten Falls First Nation and Aroland First Nation represent the Local Study Area. Data for the two First Nations is sourced from Statistics Canada for the years 2011, 2016, and 2021. Furthermore, for the year 2024 where actual data is only available for the larger economies (provincial and national), robust economic relationships between the smaller economies of First Nations and the larger provincial economy can be used to generate estimates for 2024.

Labour Market Dynamics

Labour market profile: An overview of the working-age population, labour force, employment, participation rate, employment rate, and unemployment rate.

Earnings: A display of average after-tax income, median after-tax income, and inequality of after-tax income (as captured by the average-to-median after-tax income ratio).

Educational Attainment: A breakdown of educational attainment by community.

Economy

Local Businesses and Commercial Activities: An overview of local business environment and commercial activities.

Public Finances: Publicly available financial statements from each community that shows revenues, expenditures, and balance.

It is important to note that the public finances measures rely largely on proxy indicators. Overview of community finances provides insight to level of government transfers and funds. If there is a First Nation Development corporation, it may not show up on the Council ledger. Furthermore, the tax structure is not the same on a reserve as on other regions. Businesses on Indigenous reserves have specific tax rules. Generally, First Nation-owned businesses operating on reserves are exempt from certain taxes

under Section 87 of the *Indian Act*. This exemption applies to business income earned on a reserve and to goods bought on or delivered to a reserve.

Regional Study Area

The sections below outline the components of the assessment development of existing conditions of the Regional Study Area for Kenora District, Thunder Bay District, Cochrane District, and Greenstone Municipality. Ontario and Canada are used as a basis of comparison. This wider geographic context is included because economic effects often extend beyond local boundaries, influencing regional, provincial, and even national economic systems.

Labour Market Dynamics

Labour market profile: An overview of the working-age population, labour force, employment, participation rate, employment rate, and unemployment rate.

Labour force by industry: A breakdown of labour force by industry as given by Statistics Canada (20 North American Industry Classification System industries), showing how many people are in the labour force (either employed or unemployed) in each industry.

Earnings: A display of average after-tax income, median after-tax income, and inequality of after-tax income (as captured by the average-to-median after-tax income ratio).

Education: A breakdown of educational attainment by community.

Regional Economy

Economic Overview: an annual display of real Gross Domestic Product, employment, housing starts (singles and multiples), and Consumer Price Index.

4.3.4 Biophysical Factors Influencing Human Health Analysis Methodology

Biophysical factors influencing human health potential contaminant exposures to humans were determined, both under existing conditions and during the development of Project.

Contaminants of concern may be present in drinking and recreational water (including surface water and groundwater), sediment, soil, air, and traditional (country) foods. Exposure through country foods occurs when these foods come into contact with contaminated water, sediment, soil, or air.

The biophysical research and primary data collection were based on technical studies completed for the project, including the following:

- *Surface Water Technical Support Document [Appendix F];*
- *Fish and Fish Habitat Technical Support Document [Appendix G];*

- *Groundwater Technical Support Document [Appendix H];*
- *Peatlands Existing Conditions & Effects Assessment [Appendix I]*
- *Vegetation Technical Support Document [Appendix J];*
- *Wildlife Technical Support Document [Appendix K];*
- *Birds Technical Support Document [Appendix L];*
- *Ungulates Technical Support Document [Appendix M];*
- *Physiography, Terrain, and Soils Technical Support Document [Appendix N];*
- *Acoustic and Vibration Environment Technical Support Document [Appendix P];*
- *Land and Resource Use Technical Support Document [Appendix U];* and
- *Air Quality and Greenhouse Gas Technical Support Document [Appendix S].*

Each technical discipline was responsible for identifying, assessing, and evaluating the potential effects of the Project within its area of expertise. The analysis also incorporated Indigenous Knowledge, particularly related to traditional foods and Indigenous Land and Resource Use.

The Local and/or Regional Study Area boundaries for each technical study were maintained to capture potential project effects on the biophysical environment.

The Problem Formulation examines the specific biophysical effects of the Project on human health. It is the first step in a human health risk assessment to qualitatively assess potential risks, which can be followed by a quantitative assessment in a full human health risk assessment if deemed necessary. This report addresses specific interactions with community well-being.

For a more comprehensive analysis, the complete biophysical analysis was completed in the Problem Formulation for Human Health Risk Assessment report included as **Attachment A**.

Country Foods Sampling

The Country Foods and Water Use study was incorporated into the existing conditions data collection program to gather community-identified information on traditional food harvesting, preparation, and consumption in the Local Study Area. This approach provided a culturally grounded and accessible method for collecting data relevant to the Human Health, Country Foods, and socio-community valued components. This program also supported gender-based analysis plus considerations by creating an opportunity for participation from Elders, youth, men, women, caregivers, harvesters, and others that hold distinct roles in food harvesting and preparation to give an understanding of how traditional foods contribute to the overall well-being in the community.

During engagement sessions with Marten Falls First Nation and Aroland First Nation, community members were invited to bring samples of locally harvested foods, including

moose, Canada Goose, beaver, walleye, and blueberries. Information was shared by participants regarding food preparation methods, seasonal availability, frequency of consumption, and cultural significance. Information was recorded in a non-technical, conversational format to support comfort, encourage participation from diverse age and gender groups, and reduce barriers associated with traditional technical survey approaches. Community members were compensated for each sample provided that met program requirements. All samples and associated information were documented in real time and organized by species.

Laboratory analysis of tissues and berries was conducted for substances of interest. Laboratory analyses of samples were paired with qualitative insights to support a more complete understanding of potential exposure pathways and the cultural importance of traditional foods. A total of 37 samples were collected in Aroland First Nation and Marten Falls First Nation, including 14 samples of blueberries, 5 samples of Canada goose, 8 samples of moose, and 10 samples of walleye. There were no samples of beaver collected.

The data collected as part of the Country Foods and Water Use study has not been posted within this report to preserve confidentiality of community data. The data collected has been shared with Aroland First Nation and Marten Falls First Nation and may be shared in the future with community approval.

The qualitative information collected through the Country Foods Sampling Program has been integrated into the Human Health and Socio-Community existing conditions sections of this report.

Drinking Water Sampling

Surface water in the Albany River adjacent to Marten Falls First Nation is used as a drinking water source. Therefore, four surface water samples were collected from two locations in the Albany River adjacent to the community, None of the surface water samples collected, May 28, 2025, from the Albany River exceeded the human health screening criteria for metals, polycyclic aromatic hydrocarbons, or volatile organic compounds. However, microbial testing indicates that the water from the Albany River must be treated before it is safe to drink to meet the Ontario Drinking Water Quality Standards and Health Canada's Canadian Drinking Water Quality Guidelines. Additional Information on these samples is included in the Country Foods and Water Use Assessment.

4.3.5 Regional Study Area Communities

Regional Municipalities

There is a plausible pathway for effect for regional municipal communities associated with Project activities. Regional municipal communities were identified based on the potential for

interaction between the Project and select valued components, specifically sustainable population growth and public safety. The Project is expected to increase regional accessibility and facilitate more frequent movement of people through adjacent regions, creating a potential pathway for effect related to population dynamics and community safety.

Regional municipalities with geographic proximity to the Project and existing or anticipated connections that could reasonably experience these interactions were therefore included as Regional Study Area communities. Based on these criteria, the municipalities of Greenstone and Thunder Bay were identified as having a plausible pathway for effect and were included within the Regional Study Area for the Sustainable Population Growth and Public Safety valued components.

Regional Indigenous Communities

Regional Study Area Indigenous communities were included in the assessment based on whether their Areas of Interest overlapped with the Local Study Area and created a plausible pathway for effect. Inclusion is indicator-specific, meaning communities were assessed only for those indicators for which a pathway was identified using confidential community-specific *Aboriginal and / or Treaty Rights and Interests: Impact Assessment Reports*, or based on the community's location geographically downstream from the Local Study Area. The *Aboriginal and / or Treaty Rights and Interests: Impact Assessment Reports* identify each community's Area of Interest, which are locations where traditional practices, land use, or cultural activities occur. While these confidential reports are primarily used within the Aboriginal and / or Treaty Rights and Interests assessment, they were also referenced here to inform the Community Well-Being assessment.

Regional Indigenous communities whose Areas of Interest did not overlap with the Local Study Area were still considered where a plausible pathway for effects existed, such as with the Cultural Preservation and Change and Traditional Foods Valued Components. Additionally, communities who overlap with the Caribou Regional Study Area (Ungulates Technical Support Document [Appendix M]) were given consideration due to the potential impacts on the Traditional Foods Valued Component. These communities were therefore assessed for impact to the Traditional Economy and Availability of Traditional Foods indicators.

In addition, Indigenous communities located downstream of the Local Study Area were identified for the Access to Clean Water Valued Component, including the potential impacts to the Quality of Recreational Water and the Quality of Drinking Water indicators. Where these potential pathways to impact were identified, any biophysical factors Influencing human health were also assessed. Pathways to effects related to air quality, noise and vibration, land use, and accidents and malfunctions related to contamination were assessed for Indigenous communities whose Areas of Interest overlapped with the Local Study Area, while pathways to effects related soil quality, sediment quality were assessed for Indigenous communities that have overlapping interests in, or are located downstream of, the Local Study Area.

This approach helped capture potential interactions between project activities and Indigenous traditional practices within the Local Study Area by linking Areas of Interest defined by communities with available desktop information and input from Indigenous consultation. This approach was engaged on and supported by representatives from Marten Falls First Nation. See **Table 4-5** for a summary of which Regional Study Area communities were assessed for each indicator.

Table 4-5: Overview of the Potential Impact Pathways for Regional Communities

Valued Components	Indicator with Potential Pathway to Effect	Regional Communities
Sustainable Population Growth	■ Age Distribution ■ Gender Distribution ■ Community Population	Municipal communities: ■ Greenstone ■ Thunder Bay
Cultural Preservation and Change	■ Traditional Economy	Indigenous communities: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.
Access to Clean Water	■ Quality of Drinking / Recreational Water	Indigenous communities: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Attawapiskat First Nation; ■ Constance Lake First Nation; ■ Fort Albany First Nation; ■ Kashechewan First Nation; and ■ Neskantaga First Nation.
Traditional Foods	■ Availability of Traditional Foods ■ Quality of Traditional Foods	Indigenous communities: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Attawapiskat First Nation; ■ Constance Lake First Nation; ■ Eabametoong First Nation; ■ Fort Albany First Nation; ■ Ginoogaming First Nation; ■ Kasabonika Lake First Nation; ■ Kashechewan First Nation; ■ Kitchenuhmaykoosib Inninuwug First Nation; ■ Kingfisher Lake First Nation; ■ Long Lake #58 First Nation; ■ Mishkeegogamang First Nation; ■ Neskantaga First Nation; ■ Nibinamik First Nation; ■ Wapekeka First Nation; ■ Wawakapewin First Nation; ■ Webequie First Nation; ■ Weenusk First Nation; and ■ Wunnumin Lake First Nation.

Valued Components	Indicator with Potential Pathway to Effect	Regional Communities
Public Safety	■ Road Safety ■ Violence and Harassment	Municipal communities: ■ Greenstone ■ Thunder Bay Communities that have overlapping interests in the Local Study Area: ■ Animbiigoo Zaagi'iga ■ Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; ■ Neskantaga First Nation.
Biophysical Factors Influencing Human Health	■ Air Quality	Indigenous Communities that have overlapping interests in the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.
	■ Noise and Vibration	Communities that have overlapping interests in the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.
	■ Soil Quality	Communities that have overlapping interests in the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.
	■ Sediment Quality	Communities that have overlapping interests in, or are located downstream of, the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Attawapiskat First Nation; ■ Constance Lake First Nation; ■ Fort Albany First Nation; ■ Ginoogaming First Nation; ■ Kashechewan First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.
	■ Land Use	Communities that have overlapping interests in the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Constance Lake First Nation; ■ Ginoogaming First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.

Valued Components	Indicator with Potential Pathway to Effect	Regional Communities
	■ Accidents and Malfunctions Related to Contamination	Communities that have overlapping interests in, or are located downstream of, the Local Study Area: ■ Animbiigoo Zaagi'igan Anishinaabek First Nation; ■ Attawapiskat First Nation; ■ Constance Lake First Nation; ■ Fort Albany First Nation; ■ Ginoogaming First Nation; ■ Kashechewan First Nation; ■ Long Lake #58 First Nation; and, ■ Neskantaga First Nation.

4.4 Effects Assessment Methodology

The following is a high-level overview of the approach for the identification, assessment and evaluation of the potential effects:

- Review construction and operations activities to identify potential interaction(s) that could result in environmental effects;
- Characterize the existing environment for both route alternatives;
- Identify potential environmental effects of the Preferred Route and recommend mitigation measures to avoid or minimize identified effects, as well as identify opportunities to enhance benefits to the environment;
- Compare the Preferred Route against the Do Nothing alterative;
- Predict and determine potential negative environmental effects remaining after taking into consideration the recommended mitigation measures (i.e., residual effects) considering variables including direction, magnitude, geographic extent, duration, frequency, reversibility and likelihood;
- Predict cumulative effects that may result from a combination of the residual effects of the Preferred Route with the effects of other past, present and reasonably foreseeable projects; and
- Identify a follow-up program for the Preferred Route that includes monitoring to verify the prediction of the effects assessment and effectiveness of the mitigation measures, and a requirement for monitoring of the commitments made in the Terms of Reference and Environmental Assessment / Impact Statement Report.

The following sections provide discipline-specific input and considerations as they pertain to the methodology for effects assessment. For detailed descriptions of the methodology used to inform this study refer to the Environmental Assessment / Impact Statement Report. Refer to **Section 6** for details related to the Preferred Route, including revised Study Areas which have been used in the effects assessment.

4.4.1 Project-Environment-Interactions

The Project activities that may result in changes to the environment are described within the identified temporal and spatial boundaries (**Section 4.2**). This includes identification of both direct and indirect changes to the environment by comparing the existing condition to the effects anticipated to occur as a result of the Project. The likely Project-environment interactions were identified based on professional judgment, activities planned to occur, and as described in the Marten Falls First Nation Community Access Road Project Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020) as well as projects of similar magnitude and / or location.

An analysis of Project-environment interactions for community well-being that are likely to have a potential effect is provided in **Table 4-6.**

Table 4-6: Project – Environment Interactions

Project Phases	Project Activities	Community Well-Being
Construction Phase	Mobilization of Equipment and Supplies	X
	Temporary Construction Staging Areas	X
	Temporary Access Roads and Trails	X
	Temporary Construction Camps	X
	ROW Clearing and Grubbing	X
	Brush and Timber Disposal	X
	Pits and Quarries	X
	Temporary Concrete Batch Plants	X
	Drilling / Blasting / Aggregate Production	X
	Road Construction (stripping, subgrade excavation, embankment fill placement, grading, ditching)	X
	Bridge and Culvert Installation (approach embankments, foundations, substructures, superstructures, traffic protection, erosion controls)	X
	Construction Site Restoration	X
Construction Phase: Decommissioning	Pits and Quarries	X
	Temporary Camps, Roads / Trails and Staging Areas	X
Operation and Maintenance Phase	Road Usage	X
	Maintenance	X

4.4.2 Assessing Potential Effects

Following the identification of the Project-Environment Interactions noted in **Table 4-6** above, a comparative analysis of the existing conditions for the Preferred Route has been conducted to determine the potential effects of the Project. The potential effects are described as either direct or indirect. Following the identification of direct and indirect effects, any adverse residual effects are described. Residual effects were then carried forward into the cumulative effects assessment, which is described in **Section 8**.

A **direct effect** is an immediate change to an environmental or community components that caused by a project activity at the same time and place as the activity. Direct effects may result in either positive effects, or negative effects.

The identification of potential direct effects, both **positive** and **negative**, resulting from the Project-environment interactions has been based on input received through the Indigenous Knowledge Program and Consultation and Engagement Program, regulatory agency guidance, and professional judgement.

An **indirect effect** occurs when a change resulting from a project activity leads to subsequent changes in other environmental or community components, which may occur later in time or at a different location but are reasonably foreseeable. Indirect effects may result in either **positive** or **negative** effects.

Discipline interactions occur when a change to one Valued Component resulting from a project activity causes a change to another Valued Component in another discipline. **Table 4-7** provides a preliminary identification of how changes to community well-being may result in effects to other environmental disciplines.

Residual effects are the effects that remain after the application of mitigation measures. Where a potential effect has been identified, but implementation of mitigation measures is likely to avoid or sufficiently minimize the potential for an effect, the result is no residual effect, and no further analysis is required. These effects are described in **Section 7** and include descriptions in detail of the potential adverse and positive residual effects in relation to each temporal phase of the Project as outlined in **Section 4.2.3**.

4.4.3 Mitigation and Enhancement Measures Methodology

Following the identification of potential effects, the effects assessment has explored technically and economically feasible mitigation measures to avoid or minimize the identified negative effects. In addition, enhancement measures to increase positive effects beyond those that are already inherent to the design have been considered where appropriate. These measures consist of industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, Indigenous and community recommendations and recommendations from environmental professionals, scientific publications, experience and judgement.

It is important that mitigation and enhancement measures are achievable, measurable and verifiable and monitored for compliance and effectiveness during all temporal phases as part of the Project follow-up monitoring plan. Recommended environmental monitoring will verify the potential environmental effects predicted, evaluate the effectiveness of mitigation and enhancement measures, and identify the process the proponent will follow if mitigation and enhancement measures are not effective.

Table 4-7: Potential Discipline Indirect Interactions

Valued Component - Effect	Aboriginal Treaty Rights and Interests	Atmospheric Environment	Climate Change Adaptation	Acoustic Environment	Physiology, Terrain and Soils	Surface Water	Groundwater	Vegetation	Wildlife	Fish and Fish Habitat	Social	Economy	Land and Resource Use	Human Health and Community Safety	Visual Aesthetics	Archaeological and Cultural Heritage
Sustainable Population Growth	-	-	-	-	-	-	-	-	-	-	x	x	x	x	-	-
Labour Market Dynamics	-	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-
Economy	-	-	-	-	-	-	-	-	-	-	x	x	-	-	-	-
Community Access to Infrastructure and Services	-	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-
Housing	-	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-
Cultural Preservation and Change	x	-	-	-	-	-	-	x	x	x	x	x	x	x	-	-
Community and Public Health	-	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-
Access to Clean Water	-	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-
Traditional Foods	x	-	-	-	-	-	-	x	x	x	x	x	x	x	-	-
Public Safety	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-
Biophysical Factors Influencing Human Health	-	x	x	x	x	x	x	x	x	x	x	-	x	x	-	-

4.4.4 Residual Effects Characteristics

The characteristics used to complete the effects assessment are described in detail in the Environmental Assessment / Impact Assessment Report. The section that follows outlines how these characteristics were applied and provides discipline specific definitions where applicable. The effects assessment characteristics have been described in **Table 4-8**.

Table 4-8: Residual Effects Characteristics

Effects Characteristic	Definition	Description
Context	■ Social context ■ Timing of effect in relation to sensitive activities	■ Qualitative discussion ■ See Description in **Section 4.4.5**
Direction	■ Direction of change from existing conditions	■ **Positive**: net gain or positive effect. ■ Neutral: no change to existing condition. ■ **Negative**: net loss or adverse effect.
Magnitude	■ Magnitude is the expected change from existing conditions	■ Negligible, low, moderate, high. ■ See description in **Section 4.4.5**
Geographic Extent	■ The spatial area that the effect is expected to occur	■ Construction Disturbance Area: effect is confined within the direct physical disturbance of the Project. ■ Local: effect extends into the Local Study Area. ■ Regional: effect extends into the Regional Study Area. ■ Beyond Regional: effect extends beyond the Regional Study Area.
Duration	■ The period of time that the effect is expected to occur	■ Short-term: effect ends before the end of construction. ■ Medium-term: the effect occurs during construction and ends soon after operation begins and / or maintenance ends soon after the activity causing the effect ends. ■ Long-term: the effect occurs during construction and persists into operation and / or the effect is considered permanent or the likelihood of reversibility is low or uncertain.
Frequency	■ How often the effect is expected to occur	■ Infrequent: The effect is expected to occur rarely. ■ Frequent: The effect is expected to occur regularly. ■ Continuous: the effect is expected to occur continuously.
Reversibility	■ The ability to return to existing conditions	■ Reversible: the effect is not permanent. ■ Irreversible: the effect is permanent.
Likelihood	■ Probability that the effect will occur	■ Unlikely: the effect is not likely to occur. ■ Possible: the effect may occur, but is not likely. ■ Probable: the effect is likely to occur. ■ Certain: the effect will occur.
Uncertainty	■ The potential for observed results to deviate from predictions made	■ See description in **Section 4.4.5**
Direct / Indirect	■ Nature of the pathway through which the effect occurs.	■ Direct effects are typically immediate and spatially aligned with the activity. Indirect effects may be delayed or spatially removed but are causally linked and predictable.

4.4.5 Discipline Specific Characteristics

In addition to the residual effects characteristics described in **Table 4-8** above, discipline-specific definitions are defined to help determine the level Project effects on community well-being.

4.4.5.1 Ecological and Social Context

Effects assessment has considered potential or existing effects or pressures on social, economic and health conditions affecting the sensitivity or resilience of a valued component. The social context of the effect includes a discussion of the social and cultural consequences of the predicted effect. The current and future sensitivity and resilience of the valued component to change caused by the project has also been considered. The ecological context of effects has been considered in developing the effects criteria, such as species sensitivity and resilience, and includes Indigenous Knowledge (where available). The ecological context of the effect includes a discussion of the environmental consequences of the predicted effect. The effects assessment also considers timing, such as when the effect could occur during a species lifecycle window, or culturally significant period of time.

4.4.5.2 Magnitude

Magnitude refers to the amount of change in a measurable parameter relative to the existing conditions of a valued component, with and without the project in place, or to other standards or guidelines. When evaluating the magnitude of effects this study considers both the proportion of the valued component affected within identified spatial boundaries and the relative effect. For magnitude, community well-being discipline-specific definitions are required. These and the directionality of change are provided below in **Table 4-9**.

4.4.5.3 Uncertainty

All impact assessments involve some level of uncertainty, often over many geographic, biophysical and social dimensions, and observed results may deviate, to some degree, from predictions made in the assessment. Uncertainty could be related to a number of factors, such as project design and components, existing conditions, spatial and temporal scope, valued component response, effectiveness of mitigation measures, overall scope of factors considered, cumulative effects, and natural and human causes of accidental events. It is important to note that all uncertainties related to the effectiveness of mitigation measures must be considered when determining residual effects. Transparency in describing sources of uncertainty is critical to understanding the confidence that can be attributed to the analysis of effects and is important to decision-making. Efforts to address uncertainties has been focused on those uncertainties that are most meaningful to decision-making, such as how the biophysical and human environment will respond to changes and the efficacy of mitigation measures.

Table 4-9: Community Well-Being Magnitude Definition

Valued Component	Negligible	Low Magnitude	Moderate Magnitude	High Magnitude
Sustainable Population Growth	■ No measurable change in population trends	■ Minor population fluctuations, absorbed by existing infrastructure	■ Some in-migration or out-migration requiring housing or service adjustments	■ Population changes straining infrastructure, housing, and services
Labour Market Dynamics	■ No measurable effect on employment or job market	■ Small, temporary changes in job opportunities	■ Noticeable shifts in job availability, requiring training or new policies	■ Permanent work force restructuring, creating dependence on external labour or job displacement
Economy	■ No measurable impact on local businesses, community budgets, revenues or regional economy.	■ Minor new opportunities or challenges, minor shifts in expenditures or revenues, easily absorbed; minor regional economic fluctuations.	■ Business growth or decline requiring investment, adaptation, or policy changes; noticeable budgetary impacts requiring reallocation of funds or new revenue sources; moderate regional growth (or decline) requiring policy intervention.	■ Permanent economic restructuring, leading to dominance of external businesses or loss of local enterprises; large-scale financial burden or revenue loss; permanent economic shifts increasing disparities between communities.
Community Access to Infrastructure and Services	■ No measurable change in access or service levels	■ Slight measurable change in access or service levels, absorbed by existing infrastructure	■ Measurable change in access or service levels, requiring slight infrastructure adjustments	■ Measurable change prompting consideration of infrastructure expansion
Housing	■ No measurable change in housing adequacy and suitability	■ Minor repairs or upgrades become more feasible (e.g., more frequent maintenance, better insulation).	■ Some improvements in housing adequacy and suitability, but issues like overcrowding may persist in certain areas.	■ Improved match between housing supply and community needs, addressing long-standing shortages.
Cultural Preservation and Change	■ No measurable change in cultural practices, identity, or language use	■ Some opportunities for increased participation in cultural activities, traditional economy, or language use	■ Noticeable increase in access to cultural activities, traditional economy, and language use, leading to stronger community connections	■ Greater access and participation in cultural traditions, land-based practices, and language use, supporting long-term continuity
Community and Public Health	■ No measurable decline in community mental health outcomes or change in substance abuse.	■ Minor decrease in negative mental health and minor increase in substance abuse, despite improved access to healthcare and treatment	■ Moderate decrease in mental health in and moderate increase in substance abuse, despite improved access to healthcare and treatment.	■ Widespread decrease in mental health and increase in substance abuse, leading to noticeable decline in overall health outcomes for individuals and community well-being over time despite improved access to healthcare and treatment
Access to Clean Water	■ No measurable impact on water quality or availability	■ Minor improvements or disruptions in water availability or quality, with limited impact on costs or access	■ Reduced transportation costs for bottled water and increased access to water testing and repairs to the water treatment plant, resulting in more reliable access to clean water	■ Consistent and affordable supply of clean water, driven by improved water infrastructure, including long-term reductions in bottled water costs and improved water testing and treatment plant repairs, supporting sustainable access to clean water
Traditional Foods	■ No measurable impact on access, availability, access to store-bought foods, or quality of traditional foods.	■ Improved access to traditional foods, but no significant change in availability or quality of traditional foods. ■ No change in reliance on store-bought foods.	■ Improved access to traditional foods, observed decline in availability and/or quality of traditional foods.	■ Improved access to traditional foods, significant and measurable decline in availability and/or quality of traditional foods. ■ Improved access (including reduced costs) associated with store-bought foods.
Public Safety	■ No measurable impact on crime rates, emergency response, or safety concerns	■ Minor and short-term safety concerns	■ Continuous increased safety risks requiring some mitigation measures	■ Ongoing safety concerns requiring major interventions
Biophysical Factors Influencing Human Health	■ No measurable effect on air quality, noise and vibration, soil, or water	■ Minor, temporary degradation in air quality, noise and vibration, soil, or water	■ Moderate degradation in air quality, noise and vibration, soil, or water requiring mitigation	■ Long-term degradation of environmental quality affecting health (e.g., respiratory conditions)

Much of the Community Well-being report relies on information collected by Statistics Canada. In general, census data has limitations with respect to Indigenous and small communities. Lower participation rates in the census from these communities can result in "undercounting." For the 2021 Census, it was estimated that Indigenous communities across Canada had an 85% response rate, compared to 92% in 2016, attributed by some to a lack of trust due to the discovery of unmarked residential school graves (Taylor, 2022). Additionally, the data may be subject to rounding due to small population sizes, resulting in slight discrepancies. Statistics Canada rounds data to a multiple of '5' or '10'.

4.4.6 Determination of Significance

A conclusion on significance will be made using the characteristics described in **Section 4.4.5** as well as taking into consideration professional judgement.

Explanation of Significance:

Using the overall residual effects characteristics, provided in Table 4-8, each of the potential residual effects was assigned a significance level as a means of ranking the potential effects on vegetation Valued Components. Significance was generally as follows (with consideration of context):

- **Significant:** When a valued component's residual effect (after implementation of mitigation measures) has high magnitude effects, long duration, low reversibility, and a regional or local extent, with ongoing or recurring frequency, it is considered "Significant". These valued components often have far-reaching consequences for community health, culture, or infrastructure that require careful and continuous management.
- **Not Significant:** Valued components that have minimal magnitude, short-term effects, or that are reversible are considered to be "Not Significant". These do not require extensive mitigation and have limited long-term effects.

4.4.7 Methods for Predicting Future Conditions

The methods to predict future conditions for the community well-being report will include the following steps:

- Qualitative Review: This assessment has included a qualitative review of community well-being prior to project development (existing conditions) and predicted effects post-development.
- Identify Potential Residual Effects: Assess and predict potential residual effects on the valued components and their associated indicators, considering both direct and indirect effects of the project.

- Review Existing Conditions and Relevant Data: Consider existing data related to biophysical, land and resource use, and Aboriginal and Treaty Rights and Interests, as well as impact assessment criteria from other relevant disciplines. This will help develop a comprehensive understanding of current conditions and any potential changes.
- Alignment with Community Plans and Goals: Assess the relevance of the project in relation to existing community plans, priorities, and goals to determine how the project may influence community well-being.
- Consider Disproportionate Effects on Diverse Subgroups: Evaluate how different subgroups within the community (such as gender, age, and other relevant factors) might experience disproportionate effects from the project. This will support consideration of impacts on vulnerable or marginalized groups.
- Define Mitigation and Enhancement Measures: Identify and define potential mitigation and enhancement measures that could address or reduce any adverse effects on community well-being and enhance positive outcomes.
- Assess Future Indirect Effects: Consider future indirect effects related to community well-being that could result from the project, including long-term social and economic changes.

4.4.7.1 Prediction Confidence and Uncertainty

Confidence is the level of certainty in the predicted effect, based on the quality and consistency of the available data, the robustness of the methodology used, and professional judgment. It is categorized as low (uncertain or unreliable), moderate (some degree of certainty but with room for variability), and high (high level of certainty with reliable data and methods).

The prediction confidence will be assessed based on the following key factors:

- Quality and Availability of Data: The confidence in predictions will depend on the quality, consistency, and completeness of data used in the assessment. Reliable and current data from reputable sources (e.g., local government, research studies, community feedback) will provide higher confidence in predictions.
- Consistency of Results: Where possible, multiple sources of data sources will be used to validate predictions. A high degree of consistency across data sources or methodologies will increase confidence in the outcomes.
- Modelling and Assumptions: The prediction models used to forecast future conditions will be assessed for their accuracy, transparency, and relevance to the community context. Confidence will be higher when models are based on proven methodologies and the assumptions made are well-supported by data or professional judgment.

- Uncertainty and Variability: Recognizing that predictions may involve uncertainty due to variability in future conditions (e.g., economic shifts, policy changes, climate events), confidence will be lower in areas with high uncertainty. Sensitivity analysis may be conducted to understand how uncertainty affects the predictions.
- Professional Judgment and Stakeholder Input: The inclusion of professional judgment and community or stakeholder input, particularly from local Indigenous groups and subject-matter experts, will help to refine the predictions and increase confidence in the results. Local knowledge and community priorities will be considered alongside technical data.
- Stakeholder Consultation: Continuous engagement with affected communities and stakeholders will provide an additional layer of confidence that predictions align with community concerns, aspirations, and potential changes not captured by quantitative methods alone.

4.4.8 Economic Analysis Methodology

The methodology for calculating economic impacts is founded on the application of input-output models. The input-output models have been used extensively since the 1950s and are well-suited for estimating the effects of the Project. The analysis is in line with the current guidelines and methodologies of Statistics Canada for measuring economic effects.

In an economic input-output analysis, the effects are comprehensively divided into direct, indirect, and induced components:

- Direct economic effects are initial effects from spending associated with the Project. This includes the Project's expenditures on initial construction, as well as ongoing operation and maintenance.
- Indirect economic effects are due to sector interdependence, deriving from expenditures associated with goods and services that support the Project. Indirect effects represent impacts that would not occur if it were not for the direct effects. Thus, stemming from the direct effects, the indirect effects represent multiplier effects of inter-industry linkages. They capture the supply chain relationships and interdependencies.
- Induced economic effects are multiplier effects that occur from repeated reactionary spending due to income creation. Higher spending creates higher economic activity and income creation, which leads to more spending in the region, thus generating induced effects to the economy.

Input-output multipliers capture a snapshot of the relationships of the economy. They provide a measure of the interdependence between an industry and the rest of the economy. If some new spending on goods/services is made, then the industries involved in providing those goods/services will feel the effects of that new spending. Those effects are

projections from the initial spending, and those projections are captured by the input-output multipliers, which show the direct, indirect, and induced effects on the economy.

For instance, in the case of output (economic activity), $100 of new spending by a firm on some product / service will have:

- A direct effect on economic activity of $100 (direct multiplier of 100 divided by 100 = 1);
- An indirect effect of $80 on economic activity due to linkages with industries providing that $100 of initial spending (indirect multiplier of 80 divided by 100 = 0.8); and
- An induced effect of $60 on economic activity due to income creation from repeated reactionary spending following that $100 of initial spending (induced multiplier of 60 divided by 100 = 0.6).

Therefore, the firm's initial spending of $100 has resulted in $240 of total economic activity (total multiplier of 240 divided by 100 = 2.4).

The main economic impacts include employment, earnings, economic activity, economic value, and tax revenues. These measures are not additive; each measure captures different dimensions of economic effects, and can be described as direct, indirect, and induced effects:

- Employment captures jobs related to the Project and its effects. Employment accounts for the total full-time and part-time local jobs of individuals, on a permanent or seasonal basis.
- Earnings include profits, as well as incomes (payroll) earned from the salaries, wages, and benefits associated with the jobs created by the Project and its effects. This can be captured by labour income and gross operating surplus.
- Economic activity, or output, or business revenues, or total spending, or total demand, represents the total sales of goods and services generated by the Project and its effects, which is calculated as the value added plus intermediate expenditures. This captures the Project's effects on local spending, which also includes visitor spending within the region.
- Economic value, or value added, or Gross Domestic Product (GDP), or final demand, captures the total value of goods and services created by the Project and its effects, which is calculated as the difference between business revenues (total demand) and intermediate expenditures (intermediate demand).
- Tax revenues represent the federal, provincial, local, and Indigenous tax revenues generated by the economic activity associated with the Project and its effects. Given the available Statistics Canada input-output data, standard tax revenue effects capture taxes on products and taxes on production. Using the latest economic data on income taxes, the effects on income tax revenue can also be estimated.

Note that the effects on tax revenues and the public finances measures rely largely on proxy indicators. Overview of community finances provides insight to level of government transfers and funds. If there is a First Nation Development corporation, it may not show up on the Council ledger. Furthermore, the tax structure is not the same on a reserve as on other regions. Businesses on Indigenous reserves have specific tax rules. Generally, First Nation-owned businesses operating on reserves are exempt from certain taxes under Section 87 of the *Indian Act*. This exemption applies to business income earned on a reserve and to goods bought on or delivered to a reserve.

Overall, the study uses a consistent methodology to avoid over- or under-estimating the contributions from the Project. Effects are not double-counted and appropriate adjustments are applied for economic effects that are realized outside the region. Special consideration is also taken into account given the nature of the Project and its location, in supporting that the results are consistent and relatable with the existing conditions.

While input-output multipliers are useful standard measures for capturing economic effects, it is worthy to mention that input-output models and their multipliers are limited by:

- Assumption of fixed prices (prices do not change as supply or demand changes);
- Linear fixed relation between inputs and outputs (how many inputs are required to produce a unit of output does not change as output changes);
- Lack of structural changes in production technologies (technology does not change over time, such that machinery and skills for instance all remain the same);
- Assumption of constant returns to scale (increasing the inputs by a specific number will increase the output by the same number, such as doubling the inputs will double the output);
- Use of industry averages (effects by and on specific firms within the same industry are measured by industry averages, and variations in effects are ignored);
- Assumption of industries operating at capacity (any new demand requires new employment, so that existing employment is not lost or displaced due to the change in the economy);
- Lack of capacity constraints (any new required inputs are available without limits in supply, so that there are no labour shortages in any occupation for instance); and
- Static framework that ignores the dynamic feedback (ignores economic changes that may occur in time due to changes in influences such as preference, technology, and price).

4.4.9 Regional Study Area Communities Assessment Methodology

Regional Municipal Communities

The community well-being assessment considered whether a plausible pathway of effect to regional municipal communities could arise from Project activities. Where such a pathway was identified, as outlined in **Section 4.3.5**, regional municipal communities were assessed for potential interactions between the Project and selected valued components, specifically Sustainable Population Growth and Public Safety.

The Project is anticipated to enhance regional accessibility and facilitate more frequent movement of people through adjacent regions, creating a potential pathway for effect related to population dynamics and community safety.

Regional municipalities with geographic proximity to the Project that could result in these interactions, were therefore included as Regional Study Area communities. Based on these criteria, the municipalities of Greenstone and Thunder Bay were identified as having a plausible pathway for effect and were included within the Regional Study Area for the Sustainable Population Growth and Public Safety valued components.

Regional Indigenous Communities

The community well-being assessment considered whether Indigenous communities Areas of Interest or location downstream from the Local Study Area created a plausible pathway for interaction with the project. Inclusion was indicator-specific and informed by confidential *Aboriginal and / or Treaty Rights and Interests: Impact Assessment Reports* written for each Indigenous community, which identify locations where traditional practices, land use, and cultural activities occur. These reports, while primarily used for Aboriginal and / or Treaty Rights and Interests assessments, also supported the evaluation of community well-being. See **Section 4.3.5** for more information.

Where a potential pathway to impact the Regional Study Area Indigenous communities was found as outlined in **Section 4.3.5**, a pathway specific assessment was completed for relevant Valued Component indicators. These indicators included impacts to the traditional economy, quality of drinking and recreational water, traditional foods, air quality, noise and vibration, soil and sediment quality, land use, and accidents and malfunctions. Refer to **Table 4-5** for the full Indicator inclusion list by Indigenous Community.

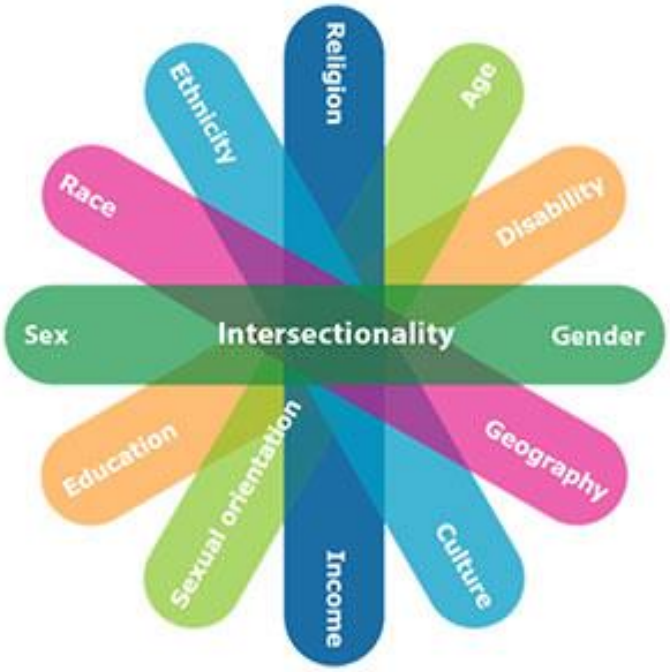
Assessing these indicators based on community-specific Areas of Interest is important because they identify where traditional activities and resource use occur, which informs the effects assessment for community well-being. For example, communities whose Areas of Interest overlap with the Caribou Regional Study Area may rely on caribou harvesting as part of their traditional economy and diet. Similarly, communities located downstream of the Local Study Area may depend on clean water sources. Using Areas of Interest provides a geographic context for these practices and resources, supporting a more fulsome assessment.

4.5 Gender-Based Analysis Plus

The *Impact Assessment Act* of Canada (Government of Canada, 2019) requires Gender-Based Analysis Plus to be applied to Impact Assessments in Canada. This is also a requirement of the Tailored Impact Statement Guidelines. Gender-Based Analysis Plus is not a specific set of methods for Impact Assessments, but rather an approach that is adapted to the Project and the communities potentially impacted and / or being engaged.

A Gender-based Analysis Plus approach assesses inequalities and impacts of policies, programs, projects on diverse groups and identities. These identities could include (but are not limited to): gender, sexual orientation, age, race, ethnicity, class, religion, and mental or physical disability (Women and Gender Equality Canada, 2022). These identities can also intersect or overlap; for example, where an individual identifies as being both Indigenous and an Elder or youth.

Figure 4-2: Gender Based Analysis Plus Intersecting Identity Factors



Source: (Canadian institutes of Health Research, 2022)

The Gender-Based Analysis Plus approach involves understanding how certain vulnerable groups, such as Indigenous peoples, women, Elders, youth, Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, and Asexual persons experience, and could be disproportionately impacted by a project. Understanding how these groups could be affected by projects allow for more targeted, sensitive, and appropriate enhancement measures, mitigations, monitoring, and follow-up (Impact Assessment Agency of Canada, 2021).

It is important to understand that vulnerability in impact assessment is understood primarily, but not solely, as a structural vulnerability. This means that in many cases it is the systems and power structures that make certain groups more vulnerable (Impact Assessment Agency of Canada, 2021). For Indigenous peoples this includes historic and ongoing colonialism, loss of lands and culture, intergenerational trauma, and the residential school system that have resulted in significant social, economic, health and well-being disparities relative to the non-Indigenous Canadian population (Kim, 2019). Exceptions to this are where vulnerability may be associated with biological sex, pregnancy, or age in relation to biophysical factors influencing human health and exposure to contaminants, for example.

For each discipline of the Impact Assessment, a Gender-Based Analysis Plus approach was employed. This approach and extent of its application also varied depending on the type of study, and the relevance of Gender-Based Analysis Plus to that study. The details of the approach for the community well-being discipline are outlined below.

4.5.1 Community Well-Being Gender-Based Analysis Plus Approach

To fulfill requirements of the *Impact Assessment Act* and the Tailored Impact Statement Guidelines, the community well-being data collection program considered diverse perspectives from marginalized, vulnerable, and / or at-risk sub-populations who often experience inequality and barriers. Engagement efforts included, at a minimum, ongoing opportunities for participation from::

- Indigenous peoples;
- Visible minorities;
- Women;
- Youth;
- Elders;
- Members of the Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, and Asexual community; and
- People with disabilities.

Input from sub-populations informed data collection and supported the identification of potential disproportionate effects across disciplines.

Specialized knowledge was gathered through other disciplines such as Land and Resource Use and Aboriginal and / or Treaty Rights and Interests. These diverse populations included the identity groups listed above, which are also referenced in the Environmental Assessment / Impact Statement Consultation and Engagement Plan, and those identified by communities during consultation and engagement. The importance of soliciting inputs and perspectives from diverse subgroups has also been factored into the Indigenous Knowledge Program and associated materials.

Although primary data was limited, inequities were assessed through data triangulation of available information sources, combining community engagement feedback, information from the Indigenous Knowledge program, secondary socio-economic and health data, and community-identified priorities. Where community-level data was unavailable, regional or district-level context data (e.g., crime rates) was used to describe potential conditions at a broader scale. This approach allowed the team to identify patterns of differential access to services, income, and opportunities among Indigenous sub-populations, and to contextualize these within broader determinants of well-being.

The proponent acknowledges that different communities and sub-populations may experience project impacts in distinct ways. Therefore, baseline data collection was designed to support the assessment of differential effects and inform appropriate mitigation measures (see **Section 4.4**). Gender-Based Analysis Plus considerations extended beyond direct community feedback to include secondary sources to support a comprehensive understanding of sub-population dynamics.

Gender-Based Analysis Plus has been embedded throughout the Community Well-being Assessment. The analysis is grounded in a structured baseline data collection process designed to identify differential effects across sub-populations. This process involved organizing and analyzing both quantitative and qualitative data from multiple sources, including community engagement, Indigenous Knowledge, existing literature, and professional judgement. Through this process, inequities were identified through statistical differences and interpreted through community perspectives and intersectional analysis. This approach applies an intersectional lens that recognizes diverse experiences and identities throughout the assessment.

Data management included quality assurance and quality control, to minimize potential for data entry and analysis errors, prepare data sets for analysis, and limit sensitive data distribution in accordance with established agreements.

4.6 Data Analysis and Management

4.6.1 Data Analysis

Where existing conditions data are available in Geographic Information Systems (GIS) format, this information will be provided to the Agency as electronic geospatial data file(s) compliant with the International Organization for Standardization 19115 standard. This will support the Government of Canada's commitment to Open Science and Data and will facilitate the sharing of information with the public through the Canadian Impact Assessment Registry Internet Site and the Government's Open Science and Data Platform. The Agency intends to make the geospatial data files available to the public under the terms of the Open Government License – Canada as applicable with exclusion of sensitive species at risk and Indigenous Knowledge.

Complete data sets from all survey sites will be provided upon finalization of this report. They will be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation / visit information and with observations and measurements in un-summarized form. Databases and Geographic Information Systems files will be accompanied by detailed metadata that meets International Organization for Standardization 19115 standards. Documentation and digital files will be provided for all results of analyses that allow for a clear understanding of the methods and a replication of the results. All geographic data, along with accompanying metadata, pertaining to species at risk will be provided to Natural Heritage Information Centre and the Ministry of the Environment, Conservation and Parks - Species at Risk Branch.

4.6.2 Data Management

As part of the Problem Formulation of the Human Health Risk Assessment process, a country foods assessment was completed during the Project in Community Meeting # 6 held in May 2025. During community meetings in Marten Falls and Aroland, community members were offered the opportunity to provide country food samples from their freezers to be analysed as part of the country foods assessment. These samples were submitted to Bureau Veritas Analytical Laboratories, a Standards Council of Canada accredited laboratory. Laboratory data remains the property of the Marten Falls and Aroland First Nations. All project members required specific NHIC training prior to acknowledging the Indigenous knowledge confidentiality and data sharing protocol prior to accessing the server.

The data collected was used to compile a Country Foods Report which was distributed to the Marten Falls and Aroland Communities only. Redacted copies of the report were submitted as attachments to the Problem Formulation report which is Attachment A or this report.

4.7 Deviations from Draft Study Plan and Tailored Impact Statement Guidelines

Deviations from the Draft All Season Community Access Road: Work Plan - Economic Environment Plan (AECOM, 2022a), Social-Community Work Plan (AECOM, 2022b), and Human Health and Community Safety Plan in **Attachment B** were developed in response to Project evolution, challenges encountered in the field, alternative methodologies being developed, comments from regulators, and as updated guidance became available. **Table 4-10** below outlines these deviations. General changes such as changes to section headings, organization of sections and subsections and, changes to phrasing and tense have been made throughout. These administrative changes have not been documented in **Table 4-10**.

Table 4-10: Deviations from Draft Study Plan and Tailored Impact Statement Guidelines

Section Reference	Description of Change	Rationale
Report Name	■ Initially, three separate study plans were developed with the intention of producing three reports. However, these have been consolidated into a single report titled *Community Well-Being.*	■ This consolidation streamlines the reporting process by eliminating redundancies and repetitive content. It also provides a more comprehensive and holistic understanding of the Local Study Area.
3.2.3 Spatial Boundaries	■ The Draft Study Plan previously used the term 'Local Study Area' to define the 5 km corridor, which is being studied in the existing conditions section, and within which the footprint of the project will be further refined. This area has been retitled as the 'Project Study Area'.	■ This change eliminates confusion between the Project Study Area and the Discipline Specific Local Study Area.
3.4 Data Management	■ In Section 3.4.1, the Study Plan previously identified that data would be backed up on a 'daily basis.' This wording has been revised to state that data would be backed up on a 'regular basis.'	■ This change brings alignment with the proponent's various data backup policies.
3.4 Data Management	■ In Section 3.4.2 wording was updated to note that data sets from all survey sites will be provided upon report finalization. No timeline had been previously identified.	■ The revision provides added clarity around when the data would be provided.
Section 4.1.2 Valued Components and Indicators	■ Population and demographics valued component changed to " sustainable population growth."	■ Valued component was changed to represent the values of the community, to population growth at a sustainable pace to align with infrastructure and housing development. ■ Indicators for population distribution in the community and change in community / on- and off- reserve population provides us with information on population growth and growth rates. ■ Indicators have shifted to now be measurable, feasible, appropriate to the project scope. Data are comparable and supported by reliable data sources (e.g., Statistics Canada, Indigenous Services Canada First Nation Community Profiles- INSTAT).
Section 4.1.2 Valued Components and Indicators	■ Housing and accommodation valued component/indicators changed to "housing adequacy and suitability."	■ Valued component was changed to be more representative and specific to align with Statistics Canada's housing suitability and adequacy measures. ■ Indicators have shifted to now be measurable, feasible, appropriate to the project scope. Data are comparable and supported by reliable data sources (e.g., Statistics Canada, Indigenous Services Canada First Nation Community Profiles - INSTAT). Indicators are community goals, and have measures of change that can be compared over time.
	■ "Community services and infrastructure" and "transportation" valued component changed to "community access to infrastructure and services" valued component.	■ Valued component includes as indicators components from the former transportation, community service and infrastructure, refined to the impacts a road may have on the community, while being measurable and valuable to the community. ■ Indicators have shifted to now be measurable, feasible, appropriate to the project scope. Data are comparable to existing conditions and comparable over time. Indicators are community goals, and have measures of change that can be compared over time.
Section 4.1.2 Valued Components and Indicators	■ "Traditional Food" and "Access to Water" valued component added.	■ Indicators align with community goals, and have measures of change that can be compared over time Indicators have shifted to now be measurable, feasible, appropriate to the project scope.
Section 4.1.2 Valued Components and Indicators	■ Removal of "community well-being" valued component and updated to be included within "cultural preservation and change," "community and public health," and "biophysical determinants of health."	■ In combining the Economic, Socio-Community, and Human Health Reports, repetitive valued components were integrated with effects for each discussed.
Section 4.1.2 Valued Components and Indicators	■ Update of "community and public health" Indicators and measures of change.	■ Indicators have shifted to now be measurable, feasible, appropriate to the project scope. Data are comparable to existing conditions and comparable over time. Indicators are community goals, and have measures of change that can be compared over time.
Section 4.1.2 Valued Components and Indicators	■ Update of "diet" valued component to "traditional foods"	■ Indicators have shifted to now be measurable, feasible, appropriate to the project scope. Data are comparable to existing conditions and comparable over time. Indicators are community goals, and have measures of change that can be compared over time.
Section 4.1.2 Valued Components and Indicators	■ The "traditional economy" valued component has reclassified as an indicator under the "cultural preservation and change" valued component.	■ Due to the interconnectedness of the traditional economy with cultural preservation and change, the traditional economy is now discussed within the context of this valued component.
Section 4.1.2 Valued Components and Indicators	■ Added an "access to clean water" valued component	■ Exposure to contaminants of potential concern through recreational activities has not previously been considered. Water has been identified as high importance by community members.
Section 4.1.2 Valued Components and Indicators	■ Under the "biophysical environmental effects influencing human health" valued component, sediment and land use have each been added as indicators.	■ Sediment had previously been assessed with surface water. ■ Human exposure to potential contaminants of concern is linked directly to land use.
Section 4.2.3	■ The Local Study Area has been updated to include Marten Falls First Nation and Aroland First Nation, while the Municipality of Greenstone has been reclassified to the Regional Study Area.	■ The expected effects on the Municipality of Greenstone align more closely with those anticipated for the Regional Study Area, with more indirect impacts expected due to the municipality's distance from the Project Area and anticipated Project activities.
Existing Conditions Data Collection	■ A socio-community and human health Survey were conducted, but information was not integrated into the report.	■ Due to data collection limitations, information from key-person interviews, engagement activities in the community, including community-led meetings and information sessions were relied upon instead.
Existing Conditions Data Collection	■ Focus groups were identified in the study plan as part of the Gender-Based Analysis Plus approach. Due to logistics were unable to be scheduled.	■ Due to logistical constraints, focus groups were not conducted.

Section Reference	Description of Change	Rationale
Existing Conditions Data Collection Section 4.3.2	■ Introduction of “Story Beads” engagement to collect socio-community information.	■ Due to previous data collection limitations, a new engagement method was introduced to collect information in a culturally grounded method, non-technical, and accessible format, to gather qualitative information related to our valued component
Existing Conditions Data Collection	■ A country foods sampling program and drinking water sampling program were implemented.	■ These programs were introduced to supplement data for the bio-physical determinants of health program. Data gathered included community-identified information on traditional food harvesting, preparation, and consumption. Country foods and water samples were collected and analyzed to human health guidelines to provide context of existing conditions.
Table 4-8 Community Well-Being Magnitude Definition	■ Refined magnitude definitions	■ To better align with the specific assessment criteria of each valued component
Section 4.4.6.1 Economic Analysis Methodology	■ Updated Economic Analysis Methodology	■ To support consistency with the updates to the Community Well-being report.
Deviations from the Tailored Impact Statement Guidelines		
Section 10, Page 71	■ The Community Well-Being Report does not describe: access, ownership and use of resources (e.g., land tenure, forestry, minerals, aggregate, food, water, social infrastructure, current road systems and seasonal roads), including ownership of land surrounding water crossings	■ This can be found in the Land Resource Use Technical Support Document [Appendix U] of the Environmental Assessment / Impact Statement Report.
Section 10, Page 73	■ The Impact Statement for Community Well-Being does not include the following social conditions: Navigation: existing navigable waterways and navigation use including type, volume, seasonality, manoeuvrability, and physical characteristics (e.g., width, depth, etc.), bank/bottom features, biological components, flow/tides, etc.; o describe past, current, and anticipated future use of all waterways and waterbodies, including recreational uses by Indigenous groups and the public (including special events, fishing, cottagers, etc.); o describe the use of water-ways with Indigenous cultural importance (e.g., Albany River, Ogoki River and Attawapiskat Rivers); and o potential of obstructions, restrictions, or expansions of access to navigable waterways (e.g., portage routes and access roads).	■ This can be found in the Land Resource Use Technical Support Document [Appendix U] of the Environmental Assessment / Impact Statement Report.
Section 10, Page 73	■ The Community Well-Being Report does not include information on the following social conditions: Culture: structures, sites and things of historical, archaeological, paleontological, cultural, spiritual or architectural significance.	■ This can be found in the Cultural Heritage Technical Support Document [Appendix Q] and Archaeological Assessments [Appendix R] of the Environmental Assessment / Impact Statement Report.
Section 12, Pages 76-77	■ Rather than include in each sub-discipline, including the Community Well-Being Report, where possible, the contextual information, both historic and current, regarding an Indigenous group’s history and cultural practices, land use, as well as the manner in which rights of Indigenous peoples are, or may be, exercised and impacted by the Project, as identified by the Indigenous groups is presented in the Aboriginal and Treaty Rights Impact Reports. The contextual information may include the following: - the physical and cultural heritage of each Indigenous group; - the current use of lands and resources for traditional purposes (including those uses that may have ceased due to external factors); - the health, social, and economic conditions of Indigenous peoples; and - nature and extent of the rights exercised.	■ This can be found in the Aboriginal and / or Treaty Rights and Interests [Appendix O] of the Environmental Assessment / Impact Statement Report.
Section 12.1, Page 77	■ The Community Well-Being report does not include descriptions of the baseline for Indigenous physical and cultural heritage to include, but is not limited to, any site, structure or thing of archaeological, paleontological, historical or architectural significance.	■ This can be found in the Cultural Heritage Technical Support Document [Appendix Q] and Archaeological Assessments [Appendix R] of the Environmental Assessment / Impact Statement Report.
Section 12.2, Page 77	■ The Community Well-Being Report does not include complete information on the current use of lands and resources for traditional purposes (e.g., hunting, fishing, trapping, plant gathering, ceremonial or spiritual practices) of all potentially impacted Indigenous groups. Proponents are encouraged to refer to guidance on the Agency’s website on how to consider the current use of lands and resources for traditional purpose.	■ This can be found in the Land Resource Use Technical Support Document [Appendix U] of the Environmental Assessment / Impact Statement Report.
Section 12.4, Page 79	■ The Impact Statement should document the nature and extent of the exercise of rights of Indigenous peoples, potentially impacted by the Project, as identified by the Indigenous group(s). Indigenous groups may also provide their perspective through consultations with the Agency.	■ This can be found in the Aboriginal and / or Treaty Rights and Interests [Appendix O] of the Environmental Assessment / Impact Statement Report.
Section 17.2, Page 107	■ The Community Well-Being Report does not describe predicted effects to overall experience when undertaking recreational activities, including noise, odours/air quality, and effects on visual landscapes.	■ This can be found in the Visual Environment Technical Support Document [Appendix V], Acoustics and Vibration Technical Support Document [Appendix P], and Atmospheric Environment Technical Support Document [Appendix S] of the Environmental Assessment / Impact Statement Report.
Section 17.2, Page 107	■ The Community Well-Being Report does not describe effects to community well-being due to changes to viewscapes and soundscapes resulting from the Project	■ This can be found in the Visual Environment Technical Support Document [Appendix V] of the Environmental Assessment / Impact Statement Report.
Section 17.2, Page 108	■ The Community Well-Being Report does not describe the potential interactions of the Project with local and regional land use and resource activities, including adverse and positive effects to residential land use; forestry and logging operations; mining operations; mineral exploration activities; commercial outfitters; and agriculture and other land uses.	

Section Reference	Description of Change	Rationale
Section 17.3, Page 108	■ The Community Well-Being Report does not describe effects to navigable waterways, including to physical characteristics (e.g., width, depth, etc.), bank/bottom features, biological components, flow/tides, etc.; ancillary project components that will be constructed in, on, under, over, through or across navigable waterways to support the Project; or project effects to navigation and navigation safety, including potential obstructions to navigation (natural/man-made, other works, navigation aids, etc.).	■ This can be found in the Land Resource Use Technical Support Document [Appendix U] of the Environmental Assessment / Impact Statement Report.
Section 17.6, Page 110	■ The Community Well-Being Report does not assess changes to structures, sites or things of historical, archaeological, paleontological or architectural significance and associated effects on other social and economic conditions, specifically burial sites.	■ This can be found in the Cultural Heritage Technical Support Document [Appendix Q] and Archaeological Assessments [Appendix R] of the Environmental Assessment / Impact Statement Report.
Section 17.6, Page 110	■ The Community Well-Being Report does not assess: culturally significant plants or wildlife.	■ This can be found in the Vegetation Technical Support Document [Appendix J] and Wildlife Technical Support Document [Appendix K] of the Environmental Assessment / Impact Statement Report.
Section 19.1, Page 115	■ The Community Well-Being Report was informed by Indigenous engagement and consultation including for the collection of baseline and the assessment of effects, however, the report does not include detailed description or records related Indigenous engagement and consultation activities, specifically including records demonstrating: ■ Engagement should involve ongoing information sharing and collaboration between the proponent and other Indigenous groups potentially affected by the Project. This collaboration will help validate the assessment findings. ■ The proponent must provide an opportunity for Indigenous groups potentially impacted by the Project to review the information prior to submission of the Impact Statement. The Impact Statement must indicate where input from Indigenous groups has been incorporated, including Indigenous knowledge. Information should be specific to the individual Indigenous group(s) involved in the assessment, and describe contextual information about the members within an Indigenous group (e.g., women, men, Elders and youth). ■ Where Indigenous groups do not wish to participate, the proponent is to encouraged to continue sharing information and analysis with the Indigenous groups of the potential effects of the Project, and to use available public sources of information to support the assessment. The proponent must show evidence that effort to engage with all Indigenous groups potentially impacted was made.	■ The fulsome Record of Engagement can be found in Appendix X of the Environmental Assessment / Impact Statement Report
Section 19.2, Page 117-118	■ The Community Well-Being does not have a fulsome description of the level of engagement with Indigenous groups regarding potential impacts of the project on the exercise of rights, the Project's potential interference with the exercise of rights.	■ The fulsome Record of Engagement can be found in Appendix X of the Environmental Assessment / Impact Statement Report

5. Existing Environment Description

The existing conditions are described based on a combination of information obtained through desktop review, engagement, and consultation. Community well-being (**Figure 5-1**) encompasses various interconnected aspects that contribute to the overall quality of life for communities within the Local Study Area. These aspects—economy, socio-community, culture, and human health and community safety—are interconnected and affect each other and community well-being.

Figure 5-1: Community Well-Being

From an Anishinaabe perspective, these dimensions of well-being align closely with the concept of *mino-bimaadiziwin*, or "living a good life." *Mino-bimaadiziwin* is a guiding principle that emphasizes balance, respect, and harmony with all of Creation. It is not limited to physical health or economic prosperity; rather, it encompasses spiritual, emotional, cultural, and environmental well-being. Living a good life means ensuring that decisions support the health of the land, water, and people together, recognizing that these elements are interconnected and inseparable.

The economy includes economic activities and opportunities within the community, such as employment, income levels, and local businesses. A strong economy supports the financial stability and growth of the community, providing residents with the means to meet their needs and improve their standard of living. Within the framework of *mino-bimaadiziwin*, economic development is pursued in ways that respect the land and uphold cultural values, ensuring that prosperity does not come at the expense of future generations.

Socio-community and culture focus on the social and cultural dynamics within the community. This includes access to social services, social and cultural connectivity and preservation, traditional economy, and public safety. These are essential for maintaining identity and pride, and they reflect the teachings of *mino-bimaadiziwin*, which call for nurturing relationships, sharing knowledge, and practicing traditions that sustain life in a good way.

Socio-community and cultural well-being support a strong sense of identity, pride, and cultural continuity among residents. Human health and community safety involve the social, safety, and environmental health of the community. Access to healthcare, safe living conditions, and emergency services are critical components. In the context of *mino-bimaadiziwin*, health is interconnected and includes all aspects, such as mental, physical, and spiritual well-being, supported by clean water, healthy ecosystems, and strong community bonds.

By integrating these aspects into a single framework, the complex and interrelated nature of community well-being can be described. This approach allows for a more nuanced analysis and a clearer depiction of how various factors contribute to the quality of life in the community while also honouring the concept of *mino-bimaadiziwin*.

As described in **Section 4**, the regional Indigenous communities that have been assessed as having a potential pathway to effect due to activities or connections to the Local Study Area. As such, the existing conditions for those regional Indigenous communities have been described under the valued components and indicators with the potential pathway to effect. Please see **Section 4.3.5** for further explanation.

5.1 Local Study Area

5.1.1 Sustainable Population Growth

The age and gender distribution as well as on-reserve versus off-reserve populations of Marten Falls and Aroland First Nations are described below to establish the existing conditions related to the Sustainable Population Growth valued component. This section relies on information collected by Statistics Canada, which may be subject to rounding due to small population sizes, resulting in slight discrepancies. Statistics Canada rounds data to a multiple of ‘5’ or ‘10’. Community feedback also indicates that individuals aged 85 plus in the community may not be accurately represented in the Census.

5.1.1.1 Marten Falls First Nation

5.1.1.1.1 Age Distribution

Between 2011 to 2021, Marten Falls First Nation’s population grew from 190 to 243 residents, according to Statistics Canada (Statistics Canada, 2011e; 2016e; 2021e). A slight decline in population can be seen between 2016 (252 people) and 2021 (243 people). This could indicate a true change in population, such as the movement of one or

two families out of community, or it may reflect census data collection challenges during the 2021 census. The 2021 census took place during the COVID-19 pandemic, which likely reduced opportunities for community members to participate and may have affected response rates. Indigenous communities across Canada had an 85% response rate, compared to 92% in 2016, and, as a result, population shifts in small communities may be exaggerated or under-reported due to variations in participation (Taylor, 2022).

For context, Marten Falls First Nation is situated in the census district of Kenora. The District of Kenora experienced a 14.6% population increase from 2011 to 2021, growing from 57,607 to 66,000 residents. Over the same period, the population of Ontario increased by 10.7%, from 12.9 million to 14.2 million (**Table 5-1**).

With respect to age distribution, Marten Falls First Nation's population has a relatively young age profile, with 35% of the population aged 0 to 14 in the 2021 census, reflecting a high proportion of children and youth. The adult population or working-aged population, aged 15 to 64 years, accounts for 56% of the population, while older adults (65 and older) account for approximately 8% of the population (**Table 5-1**).

Overall, the Marten Falls First Nation age distribution suggests a youthful community with a moderate working-age population and a smaller proportion of older adults. The total small size of the population makes it important to interpret age-specific statistics with caution, as a difference of just a few individuals can result in substantial percentage changes.

5.1.1.1.2 Gender Distribution

The Statistics Canada 2021 population data for Marten Falls First Nation show a small population of 240 individuals, with 130 men and 115 women residents, reflecting a relatively balanced distribution. Gender-disaggregated data are unavailable for 2011; however, in 2016 Statistics Canada reported a total population of 252, comprised of approximately 140 men and 110 women (due to rounding numbers, this does not add up to the total). This allows a partial view of gender trends over time. Due to data collection challenges in the 2021 Census, actual population counts, including gender distribution, may differ from what is reported.

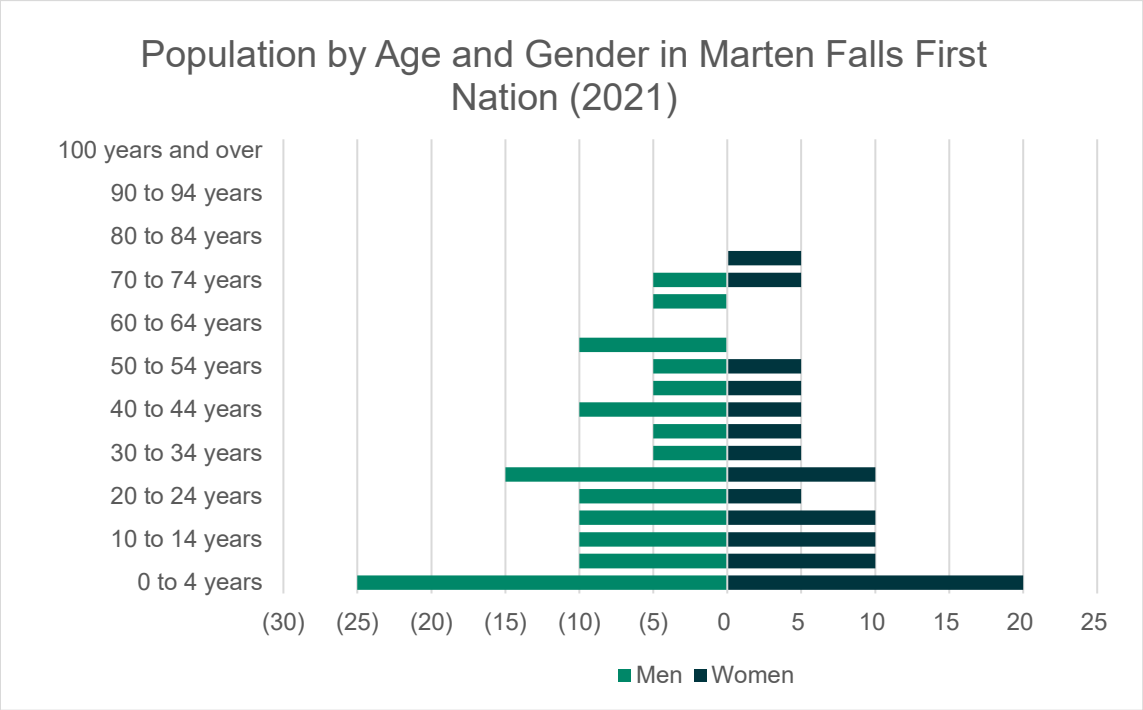
Within age groups, men and women are generally balanced, although minor differences do exist in specific cohorts. For example, there are slightly more men in the age 25 to 29 age group (15 men to 10 women) and slightly more women in the age 55 to 59 group (10 women, no men). However, given the small population and rounding to the nearest "0" and "5" by Statistics Canada, these differences are not understood to be evidence of broader demographic trends (**Figure 5-2**).

Table 5-1: Percent of Population by Age and Gender in Marten Falls, District of Kenora and Ontario (2011-2021)*

Population	2011			2016			2021		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Marten Falls Total Population	190	N/A	N/A	252	140	110	243	130	115
Ages 0 to 14 Percent of Total Population	N/A	N/A	N/A	35	36	36	35	39	35
Ages 15 to 64 Percent of Total Population	N/A	N/A	N/A	59	57	59	56	54	57
Ages 65 and over Percent of Total Population	N/A	N/A	N/A	6	7	5	8	8	9
Median Age of Population	N/A	N/A	N/A	21.2	20.3	21.6	23.4	22.6	24.6
Kenora District Total Population	57,607	28,930	28,680	65,533	32,895	32,640	66,000	33,400	32,600
Ages 0 to 14 Percent of Total Population	21	22	21	22	22	22	21	22	21
Ages 15 to 64 Percent of Total Population	62	63	62	64	64	64	62	63	62
Ages 65 and over Percent of Total Population	16	16	17	14	14	15	16	16	17
Median Age of Population	38.6	38.2	38.9	36.5	35.8	37.1	37.6	36.8	38.4
Ontario Total Population	12,851,821	6,263,140	6,588,685	13,448,494	65,59,390	6,889,105	14,223,942	6,970,855	7,253,085
Ages 0 to 14 Percent of Total Population	17	18	16	16	17	16	16	17	15
Ages 15 to 64 Percent of Total Population	68	69	68	67	67	66	66	66	65
Ages 65 and over Percent of Total Population	15	13	16	17	16	18	19	17	20
Median Age of Population	40.4	39.4	41.3	41.3	40.2	42.4	41.6	40.0	42.8

(Statistics Canada, 2011d; 2011e; 2011f) (Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f)
**N/A indicates where data was not available.*

Figure 5-2: Population Pyramid reflecting Population by Age and Gender in Marten Falls First Nation (Statistics Canada, 2021)



(Statistics Canada, 2021e)

5.1.1.1.3 Community Population

As seen in **Table 5-2**, as of December 2025, the First Nations Profiles, Marten Falls First Nation has a total registered population of 908 members. The main settlement is located on the Marten Falls 65 reserve, with 354 living on-reserve and 554 living off-reserve (Government of Canada, 2025d). Many First Nations communities have members that live off-reserve due to housing constraints, employment, education opportunities and other factors (InterGroup, 2012). Some members from Marten Falls First Nation have never lived on-reserve, as their parents moved off-reserve prior to their birth. The current distribution indicates that a larger proportion of the population lives off-reserve (61%) than on-reserve (39%). On-reserve, there are slightly more men (53%) compared to women (47%), whereas off-reserve, there is a slightly higher proportion of women (52%) compared to men (48%). Given the small population size, these differences are minor and should be interpreted cautiously.

Applying a Gender-Based Analysis Plus lens highlights socio-economic and psychosocial factors that may influence on-reserve and off-reserve residency patterns. Housing availability, education and employment opportunities, access to social support networks, safety considerations, and caregiving responsibilities can affect community members' decisions to live off-reserve. Community feedback from the engagement program suggests that some families currently relocate, either temporarily or permanently, when their children leave for secondary education (grades 9 to 12). Working age adults may also seek

employment opportunities outside the community, which may contribute to slightly smaller working-aged adults living in-community.

Table 5-2: Registered Population of Marten Falls First Nation Living On and Off Reserve by Gender (INSTAT 2025)

Marten Falls First Nation	Men	Women	Total
Registered On-Reserve	187	167	354
Registered Off-Reserve	264	290	554
Total Community Members	451	457	908

(Government of Canada, 2025d)

5.1.1.2 Aroland First Nation

5.1.1.2.1 Age Distribution

Statistics Canada reports that Aroland First Nation had 361 members in-community in 2011, 366 in 2016, and 178 in 2021 (**Table 5-3**). However, census population figures may not accurately reflect true community population due to response rates; for example, Indigenous communities across Canada had an estimated 85% response rate in 2021, compared to 92% in 2016 (Taylor, 2022). In addition, the 2021 census took place during the COVID-19 pandemic, which likely reduced opportunities for community members to participate and may have affected response rates. Furthermore, in contrast to Statistics Canada data, Aroland First Nation reports a population of approximately 400 residents in 2022 (Aroland First Nation, 2022). The engagement program similarly identified approximately 740 members with approximately 400 living on reserve (Indigenous Knowledge Program see **Table 3-1**).

For context, as Aroland First Nation is situated within the broader census district of Thunder Bay, the declining population Aroland First Nation presented by Statistics Canada data (2011 to 2021) is inconsistent with broader regional patterns; the population of the District of Thunder Bay remained stable over the same period, while Ontario's population grew by 10.7% (**Table 5-3**).

According to Statistics Canada, with respect to age distribution, Aroland First Nation's population has a relatively young age profile, with 33% of the population aged 0 to 14, reflecting a high proportion of children and youth. The adult population or working-aged population aged 15 to 64 years, accounts for 56% of the population, while older adults (65 and older) account for approximately 11% of the population (**Table 5-3**).

Overall, the Aroland First Nation age distribution suggests a youthful community with a moderate working-age population and a smaller proportion of older adults. The total small size of the population, as well as the data-challenges noted above, means age-specific statistics should be interpreted with caution, as a difference of just a few individuals can result in substantial percentage changes.

5.1.1.2.2 Gender Distribution

Statistics Canada data presented in **Table 5-3** were used to produce the population pyramid for Aroland First Nation (**Figure 5-4**).

The Statistics Canada 2021 population data for Aroland First Nation show a small population of 178 individuals, with 80 men and 95 women* residents, reflecting a relatively balanced distribution. Gender-disaggregated data are unavailable for 2011; however, in 2016 Statistics Canada reported a total population of 366, comprised of approximately 195 men and 170 women* (due to rounding numbers, this does not add up to the total) (**Table 5-1**). This allows a partial view of gender trends over time. Due to data collection challenges in the 2021 Census, actual population counts, including gender distribution, may differ from what is reported.

Within age groups, men and women are generally balanced, although minor differences do exist in specific cohorts. For example, there are slightly more men in the age 25 to 29 age group (15 men to 10 women) and slightly more women in the age 55 to 59 group (10 women, no men). However, given the small population and rounding to the nearest “0” and “5” by Statistics Canada, these differences are not understood to be evidence of broader demographic trends (**Table 5-3, Figure 5-4**).

While the figure provides a basic visualization of the age and gender distribution reported through the census, these data have notable limitations, including low response rates, the community’s non-reserve settlement status, and inconsistencies with population counts provided directly by Aroland First Nation. As a result, the population pyramid should be interpreted with caution, and no reliable demographic observations can be made from this dataset.

5.1.1.2.3 Community Population

Indigenous Services Canada First Nation Community Profiles show that as of December 2025, Aroland First Nation has a total registered population of 770 people, with 42 individuals residing on-reserve (23 men and 19 women) and 728 members living off-reserve (**Table 5-4**). Aroland First Nation gained reserve status under the *Indian Act* on April 15, 1985; however, the community settlement itself is not a reserve (Native Ministries International, 2022), meaning that census “on-reserve” counts may not reflect the full number of residents living in the settlement.

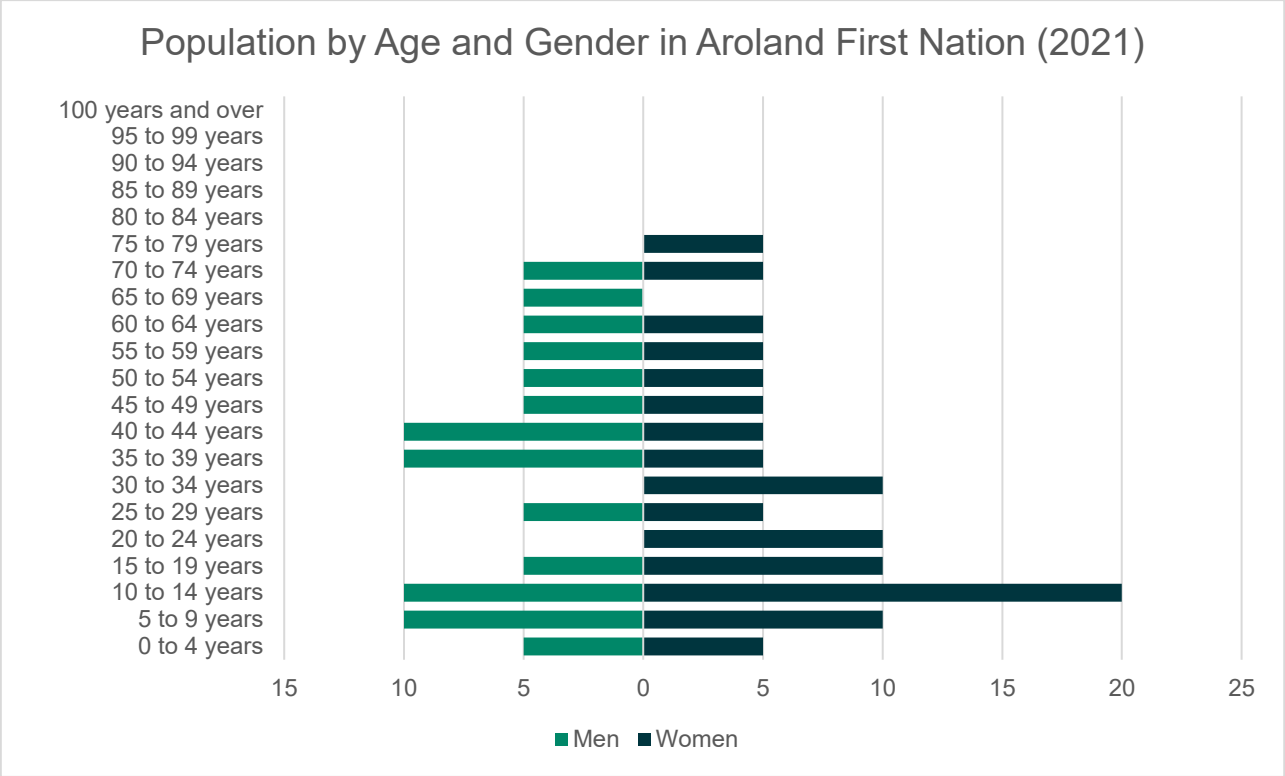
The difference between Statistics Canada’s reported on-reserve population (178) and the Indigenous Services Canada First Nation Community Profiles (42) raises further concerns about data reliability. These variations emphasize the need for careful interpretation of demographic data.

Table 5-3: Percent of Population by Age and Gender in Aroland, Thunder Bay Census District, and Ontario (2021 - 2011)

Population	2011			2016			2021		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Aroland Total Population	115	50	55	366	195	170	178	80	95
Ages 0 to 14 Percent of Total Population	29	26	32	36	31	38	33	31	32
Ages 15 to 64 Percent of Total Population	64	69	65	62	67	56	56	56	58
Ages 65 and over Percent of Total Population	4	5	6	4	5	3	11	13	11
Median Age of Population	28.1	32	70.8	24.3	27.2	21.3	29.8	35.6	25.6
Thunder Bay Census District Total Population	146,055	71,840	74,220	146,050	72,325	73,725	146,860	73,090	73,775
Ages 0 to 14 Percent of Total Population	15	16	15	15	16	14	15	15	14
Ages 15 to 64 Percent of Total Population	68	69	67	66	66	65	63	64	63
Ages 65 and over Percent of Total Population	17	15	18	19	18	21	22	21	23
Median Age of Population	38.6	38.2	38.9	36.5	35.8	37.1	37.6	36.8	38.4
Ontario Total Population	12,851,821	6,263,140	6,588,685	13,448,494	65,59,390	6,889,105	14,223,942	6,970,855	7,253,085
Ages 0 to 14 Percent of Total Population	17	18	16	16	17	16	16	17	15
Ages 15 to 64 Percent of Total Population	68	69	68	67	67	66	66	66	65
Ages 65 and over Percent of Total Population	15	13	16	17	16	18	19	17	20
Median Age of Population	40.4	39.4	41.3	41.3	40.2	42.4	41.6	40.0	42.8

(Statistics Canada, 2011d; 2011f; Statistics Canada, 2011a) (Statistics Canada, 2016d; 2016f; Statistics Canada, 2016a) (Statistics Canada, 2021d; 2021f; Statistics Canada, 2021a)

Figure 5-3: Population Pyramid reflecting Population by Age and Gender in Aroland First Nation (Statistics Canada, 2021)



(Statistics Canada, 2021a)

Table 5-4: Registered Population of Aroland First Nation Living On and Off Reserve by Gender (INSTAT 2025)

Aroland	Men	Women	Total
Registered on Reserve	23	19	42
Registered off Reserve	372	356	728
Total Community Members	395	375	770

(Government of Canada, 2025c)

5.1.2 Labour Market Dynamics

5.1.2.1 Marten Falls First Nation

Labour Force

This section presents the labour market profile of Marten Falls First Nation. Labour market data are limited due to the community's relatively small size and remote location. The available Census and National Household Survey data provide key labour market

indicators that reveal important insights. The Census and National Household Survey data are not available on an annual basis, with the latest data available for 2021. However, recent Ontario 2024 labour market data available from Statistics Canada can be used to estimate 2024 values for Marten Falls First Nation based on present and past relationships with the Ontario data.

Table 5-5 below shows key labour market indicators, disaggregated by gender. Given the data availability, the figures are approximations and may not sum due to rounding. Also, in some cases Statistics Canada rounds down low values and reports them as zeros, even though the actual values may be above zero.

Table 5-5: Labour Market Indicators for Marten Falls First Nation (2011, 2016, 2021, 2024)

Marten Falls First Nation	2011			2016			2021			2024[e]		
Labour Market Indicators	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**
Population 15+	110	55	55	160	85	75	155	85	80	170	95	85
Labour Force	55	30	25	80	40	40	65	35	35	70	40	40
Participation Rate (%)	50	55	46	50	47	53	42	41	44	hu	42	47
Employment Rate (%)	46	46	36	41	41	47	29	24	25	29	26	29
Employment Rate - Full Time (%)	41	36	36	22	24	20	16	12	13	16	13	16
Unemployment Rate (%)	0	0	0	19	25	0	31	29	43	30	29	46

(Statistics Canada, c; e) (Statistics Canada, 2011l; 2016e; 2021e), AECOM Analysis
Note: e: estimate based on most recent labour force data

The working-age population (15 years and older) in 2024 was estimated to be approximately 170 individuals, with slightly over half being men. Approximately 41% of this population participated in the labour force, actively seeking employment. This percentage has declined slightly over time. In 2024, an estimated 29% of the working-age population was employed, with 16% working full-time; a decline from 46% Employment rate noted for 2011. The unemployment rate for 2024, which represents the proportion of the labour force unable to find work, was estimated at 30% overall, with a higher rate of 46% among women.

Table 5-6 highlights the latest (2024) labour market profiles for Marten Falls First Nation, Kenora, and Ontario. Marten Falls First Nation has a lower participation rate and lower employment rate comparted to the Kenora District and the province. As noted above, within Marten Falls, the unemployment rate is higher among women than men, whereas in Kenora and Ontario overall, the unemployment rates for men and women are very close or equal.

Table 5-6: Labour Market Indicators for Marten Falls First Nation, Kenora District, and Ontario (2024)

Regional	Marten Falls First Nation[e]			Kenora District[e]			Ontario		
Labour Market Indicators	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total (million)**	**Men (million)**	**Women (million)**
Population 15+	170	95	85	55,345	28,020	27,335	13.4	6.6	6.8
Labour Force	70	40	40	31,765	16,680	15,090	8.8	4.6	4.1
Participation Rate (%)	41	42	47	57	60	55	65	70	61
Employment Rate (%)	29	26	29	52	54	51	61	65	57
Employment Rate - Full Time (%)	16	13	16	35	37	32	50	56	44
Unemployment Rate (%)	30	29	46	9	9	8	7	7	7

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2011l; 2011m) (Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f), AECOM Analysis

Note: e: estimate based on most recent labour force data

Labour market profiles for the Kenora District and Ontario are discussed further in **Section 5.2.2**.

Analyzing the labour force by industry, as shown in **Table 5-7** provides valuable insight into the economic structure of Marten Falls First Nation. The industries are categorized according to the North American Industry Classification System, which aligns with the subsequent analysis of economic impacts across sectors. The table reveals that the Marten Falls First Nation labour force has declined over the years in sectors such as agriculture, forestry, fishing and hunting, utilities, construction, manufacturing, and administrative / support and waste / remediation services. The labour force has grown in the accommodation and food services sector. Educational services, along with healthcare and social assistance, have remained stable in recent years. The largest sector in 2024 for Marten Falls First Nation was public administration, which accounted for nearly half of the labour force.

Table 5-7: Labour Force by Industry for Marten Falls First Nation (2011, 2016, 2021, 2024)

Marten Falls First Nation	2011			2016			2021			2024[e]		
Labour Force by Industry	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	0	0	0	10	0	0	0	0	0	0	0	0
21 Mining, quarrying, and oil and gas extraction	0	0	0	0	0	0	0	0	0	0	0	0
22 Utilities	0	0	0	10	0	0	0	0	0	0	0	0
23 Construction	0	0	0	10	0	0	0	0	0	0	0	0
31-33 Manufacturing	0	0	0	10	10	0	0	0	0	0	0	0
41 Wholesale trade	0	0	0	0	0	0	0	0	0	0	0	0
44-45 Retail trade	0	0	0	0	0	0	0	0	0	0	0	0
48-49 Transportation and warehousing	0	0	0	0	0	0	0	0	0	0	0	0
51 Information and cultural industries	0	0	0	0	0	0	0	0	0	0	0	0
52 Finance and insurance	0	0	0	0	0	0	0	0	0	0	0	0
53 Real estate and rental and leasing	0	0	0	0	0	0	0	0	0	0	0	0
54 Professional, scientific and technical services	0	0	0	0	0	0	0	0	0	0	0	0
55 Management of companies and enterprises	0	0	0	0	0	0	0	0	0	0	0	0
56 Administrative and support, waste and remediation services	0	0	0	10	0	10	0	0	0	0	0	0

Marten Falls First Nation	2011			2016			2021			2024[e]		
Labour Force by Industry	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
61 Educational services	0	0	0	10	0	0	10	10	10	10	10	10
62 Health care and social assistance	0	0	0	10	10	10	10	0	10	10	0	10
71 Arts, entertainment and recreation	0	0	0	0	0	0	0	0	0	0	0	0
72 Accommodation and food services	0	0	0	0	0	0	10	0	10	10	0	10
81 Other services (except public administration)	0	0	0	0	0	0	0	0	0	0	0	0
91 Public administration	35	20	15	25	10	10	30	15	10	30	15	10
Unclassified / Adjustment	20	10	10	-15	10	10	5	10	-5	10	15	0

(Statistics Canada, c; e) (Statistics Canada, 2011l; 2016e; 2021e), AECOM Analysis

Note: e: estimate based on most recent labour force data

The addition of the Community Access Road is expected to boost the local economy by creating new labour force opportunities across various industries. The vacant positions in **Table 5-8** highlight the potential impact of investment in the region. Note that some figures are rounded, so individual numbers may appear as less than 5, but their sum may be greater than 5. There is availability in the regional labour force across industries to fill potential economic opportunities created by the project.

Table 5-8: Labour Force by Industry for Marten Falls First Nation, Kenora District, and Ontario (2024)

Regional	Marten Falls First Nation[e]			Kenora District[e]			Ontario (thousands)[e]		
Labour Force by Industry	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	0	0	0	785	590	200	125	80	45
21 Mining, quarrying, and oil and gas extraction	0	0	0	1,060	890	175	40	35	5
22 Utilities	0	0	0	440	415	25	65	50	15
23 Construction	0	0	0	2,555	2,290	270	635	565	85
31-33 Manufacturing	0	0	0	1,075	875	195	775	550	230
41 Wholesale trade	0	0	0	300	250	55	290	190	100
44-45 Retail trade	0	0	0	3,465	1,820	1,645	945	465	480
48-49 Transportation and warehousing	0	0	0	1,615	1,275	345	450	340	115
51 Information and cultural industries	0	0	0	230	145	80	200	120	80
52 Finance and insurance	0	0	0	460	120	350	470	225	250
53 Real estate and rental and leasing	0	0	0	375	240	135	180	95	85
54 Professional, scientific and technical services	0	0	0	830	400	440	805	465	345
55 Management of companies and enterprises	0	0	0	10	0	0	30	15	15
56 Administrative and support, waste and remediation services	0	0	0	865	510	350	385	220	165
61 Educational services	10	10	10	3,305	995	2,300	630	200	425
62 Health care and social assistance	10	0	10	6,625	1,640	4,965	1,015	195	805
71 Arts, entertainment and recreation	0	0	0	315	205	115	155	80	75
72 Accommodation and food services	10	0	10	1,630	745	885	460	205	255
81 Other services (except public administration)	0	0	0	1,060	565	490	335	160	175
91 Public administration	30	15	10	4,010	2,230	1,775	505	260	250
Unclassified / Adjustment	10	15	0	755	480	295	259.7	122.4	117.3

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2011l; 2011m) (Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f), AECOM Analysis

Note: e: estimate based on most recent labour force data

Labour force by industry for the Kenora District and Ontario are discussed further in **Section 5.2.2.**

Earnings

Using the available Census / National Household Survey earnings data, along with the most recent employment data, estimated figures for Marten Falls First Nation are

presented in **Table 5-9** below. To better understand income, it is useful to focus on after-tax income, which represents the amount remaining after taxes, available for spending or saving. Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

Table 5-9: After-tax Income for Marten Falls First Nation (2011, 2016, 2021, 2024)

Marten Falls First Nation	2011			2016			2021			2024[e]		
Earnings	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	20.6	18.6	22.7	22.9	20.6	25.5	27.0	23.6	31.2	29.9	26.0	34.5
Median after-tax income (thousands $)	13.7	12.3	18	14.9	13.1	20	18.1	15.1	25.6	20.1	16.7	28.3
Average-to-median after-tax income ratio	1.5	1.5	1.3	1.5	1.6	1.3	1.5	1.6	1.2	1.5	1.6	1.2

(Statistics Canada, d) (Statistics Canada, 2011l; 2016e; 2021e), AECOM Analysis
Note: e: estimate based on most recent labour force data

Average and median are both useful measures, and they both have limitations. The average disposable income is a typical economic measure that attempts to capture the average standard of living. The average overlooks the distribution across the population. Two very different distributions of income can have the same average. The median disposable income is the middle value in the distribution, where half of the population is below the median and half above. The median is sometimes insensitive to changes in a particular segment of the distribution. The combined use of both the average and the median can help address the limitations of both measures. Specifically, the ratio of the average to the median is a practical measure of inequality; the mean tends to be higher than the median, and the further away it is from the median, the higher the inequality in the region. It implies that the high incomes in the upper half of the distribution are higher than incomes in the lower half.

The above earnings table for Marten Falls First Nation shows that the average after-tax income in 2024 was higher for women ($34,500) than for men ($26,000). After-tax income includes government transfers, which for Marten Falls First Nation have been roughly three times higher for women on average relative to men. The average after-tax income for men grew 40% since 2011, or 2.6% per year, while for women it grew 52%, or 3.3% annually. The total figure was around $29,900. This represents a 45% increase from its 2011 level of $20,600, which translates to a 2.9% annual average increase (same as Ontario) This is a low increase in purchasing power, given that Ontario's average inflation rate was 2.4% during this period (as discussed in **Section 5.2.3**).

The median after-tax income for Marten Falls First Nation in 2024 was $20,100 overall, which was also higher for women ($28,300) than for men ($16,700). The median after-tax income in 2024 represents a 46% increase since 2011, or 3.0% per year (same as

Ontario). The median after-tax income for men grew 36%, or 2.4% per year, while for or women it grew 57%, or 3.6% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.5, signaling the presence of high inequality, which has remained stable over the years. The income inequality is more pronounced among men, which implies that men were in more diverse jobs with greater variation in pay, while women were more concentrated in relatively higher-paying jobs.

Table 5-10 below is a comparison of the latest (2024) earnings for Marten Falls First Nation, Kenora District, and Ontario. While Marten Falls First Nation's earnings for women are higher than the earnings for men (unlike its district and province), all the incomes are lower than the incomes for the district and province. Furthermore, income inequality is higher than in the district and the province.

Table 5-10: Earnings for Marten Falls First Nation, Kenora District, and Ontario (2024)

Regional Earnings	Marten Falls First Nation[e]			Kenora District[e]			Ontario[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	29.9	26.0	34.5	47.2	51.1	43.4	51.2	57.4	45.3
Median after-tax income (thousands $)	20.1	16.7	28.3	42.0	45.1	39.4	41.1	45.5	37.6
Average-to-median after-tax income ratio	1.5	1.6	1.2	1.1	1.1	1.1	1.2	1.3	1.2

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2011l; 2011m) (Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f), AECOM Analysis

Note: e: estimate based on most recent labour force data

Earnings for the Kenora District and Ontario are discussed further in **Section 5.2.2**.

Educational Attainment

Educational attainment refers to the highest level of education that individuals have completed. It is a key indicator of socioeconomic development, employment opportunities, and community well-being. However, when analyzing data from Statistics Canada, it is important to acknowledge certain limitations. In the 2021 Census, the response rate was 85%, which is lower than the 92% recorded in 2016 (Taylor, 2022). This lower response rate may impact the accuracy and representativeness of the data, particularly in smaller communities such as Marten Falls First Nation.

As seen in **Table 5-11**, according to Statistics Canada data from 2021, the percentage of individuals in Marten Falls First Nation without a certificate, diploma, or degree remained high compared to broader regions, with 50.0% of men and 68.8% of women in this category. This represents an improvement from 2016, where 88.2% of men and 56.3% of women lacked formal educational credentials. However, these figures remain significantly higher than those for Kenora Census District (32.5% of men, 29.3% of women) and Ontario (15.8% of men, 14.8% of women) (Statistics Canada, 2011e; Statistics Canada, 2016e; Statistics Canada, 2021e).

In terms of secondary education, Marten Falls First Nation has shown steady improvement but remains lower than provincial averages. In 2021, 27.8% of men and 18.8% of women in Marten Falls First Nation had a high school diploma, compared to 29.6% of men and 28.4% of women in Kenora Census District and 28.0% of men and 26.4% of women across Ontario. Postsecondary educational attainment in Marten Falls First Nation is still notably lower than in larger regions, with only a small percentage of residents holding college or university credentials. For instance, in 2021, 11.1% of men and 12.5% of women in Marten Falls First Nation had a college diploma, compared to 15.3% of men and 21.9% of women in Kenora Census District and 18.3% of men and 22.2% of women in Ontario. Additionally, no individuals in Marten Falls First Nation reported holding a bachelor's degree or higher in 2021, whereas 9.7% of men and 15.2% of women in Kenora Census District, and 28.4% of men and 31.4% of women in Ontario, had achieved this level of education (Statistics Canada, 2011e; Statistics Canada, 2016e; Statistics Canada, 2021e).

Table 5-11: Highest Attained Education for the Population Aged 15 and Older in Marten Falls First Nation, Kenora, and Ontario (Statistics Canada, 2011, 2016, 2021)

Highest attained certificate, diploma or degree for the population aged 15 years and over (%)	Year	Marten Falls First Nation		Kenora Census District		Ontario	
		Men	Women	Men	Women	Men	Women
No certificate, diploma or degree	**2011**[1]	100	81.8	33.3	29.2	18.9	18.4
	2016	88.2	56.3	36.8	33.7	18.0	17.1
	2021	50.0	68.8	32.5	29.3	15.8	14.8
High (secondary) school diploma or equivalency certificate	**2011**[1]	0	0	23.7	26.1	26.4	27.1
	2016	11.8	18.8	24.0	24.6	27.8	27.1
	2021	27.8	18.8	29.6	28.4	28.0	26.4
Apprenticeship or trades certificate or diploma	**2011**[1]	0	18.2	16.8	5.4	10.3	4.6
	2016	0	0	13.9	3.7	8.8	3.4
	2021	11.1	0	11.7	3.3	7.4	2.7
College, CEGEP or other non-university certificate or diploma	**2011**[1]	0	0	14.7	22.7	17.7	21.8
	2016	0	0	15.2	22.4	18.4	23.1
	2021	11.1	12.5	15.3	21.9	18.3	22.2
University certificate or diploma below bachelor level	**2011**[1]	0	0	2.4	3.4	3.8	4.3
	2016	0	12.5	1.5	2.5	2.0	2.4
	2021	0	0	1.2	1.9	2.1	2.5
Bachelor's degree or higher	**2011**[1]	0	0	9.2	13.2	23.0	23.8
	2016	0	12.5	8.6	13.2	25.0	27.0
	2021	0	0	9.7	15.2	28.4	31.4

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2011l; 2011m) (Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f)

Note: 1. The 2011 National Household Survey did not provide information on percentages. The information displayed here has been calculated based on the counts provided by the 2011 National Household Survey.

5.1.2.2 Aroland First Nation

Labour Force

As with Marten Falls First Nation, labour market data are unfortunately limited, given that Aroland First Nation is also relatively small and remote. **Table 5-12** below shows key labour market indicators for Aroland First Nation. Given the data availability, the figures are approximations and may not sum due to rounding. Also, in some cases Statistics Canada rounds down low values and reports them as zeros, even though the actual values may be above zero.

Table 5-12: Labour Market Indicators for Aroland First Nation (2011, 2016, 2021, 2024)

Aroland First Nation Labour Market Indicators	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+	215	115	100	240	135	100	120	55	70	130	60	75
Labour Force	125	70	55	125	75	55	45	20	25	50	20	25
Participation Rate (%)	58	61	55	52	56	55	38	36	36	38	33	33
Employment Rate (%)	35	39	25	42	41	45	33	36	29	35	33	27
Employment Rate - Full Time (%)	35	39	30	27	26	30	29	27	23	30	25	22
Unemployment Rate (%)	40	29	55	20	20	18	0	0	0	0	0	0

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2016a; 2021a), AECOM Analysis
Note: e: estimate based on most recent labour force data; Due to Statistics Canada rounding, numbers do not add to Total.

In 2024, the working-age population (15 years and older) of Aroland First Nation was estimated at approximately 130 individuals, with over half being women. This represents a decline from 240 individuals in 2016. Labour force participation in 2024 was 38%, down from 58% in 2011. About 35% of the working-age population was employed in 2024, with around 30% working full time. The unemployment rate in 2024 was near 0%, a significant decrease from 40% in 2011, which had been largely driven by a 55% unemployment rate among women. While the low participation rate indicates that a relatively small share of the population was seeking work, the low unemployment rate signifies that many seeking work were able to find employment, resulting in a near 0% unemployment rate.

Table 5-13 below compares the latest (2024) labour market profiles for Aroland First Nation, Thunder Bay District, and Ontario. With the unemployment rate at near 0%, it should be noted that Aroland First Nation has a much lower participation rate and a much lower employment rate than its district and province.

Table 5-13: Labour Market Indicators for Aroland First Nation, Thunder Bay District, and Ontario (2024)

Regional Labour Market Indicators	Aroland First Nation[e]			Thunder Bay District[e]			Ontario		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+	130	60	75	133,225	66,360	66,865	13.4 m	6.6 m	6.8 m
Labour Force	50	20	25	77,045	39,960	37,075	8.8 m	4.6 m	4.1 m
Participation Rate (%)	38	33	33	58	60	55	65	70	61
Employment Rate (%)	35	33	27	52	54	49	61	65	57
Employment Rate - Full Time (%)	30	25	22	30	33	27	50	56	44
Unemployment Rate (%)	0	0	0	11	11	11	7	7	7

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2011m; 2011n) (Statistics Canada, 2016a; 2016f; 2016g) (Statistics Canada, 2021a; 2021f; 2021g), AECOM Analysis
Note: e: estimate based on most recent labour force data

Labour market profiles for the Thunder Bay District and Ontario are discussed further in **Section 5.2.2**.

Table 5-14 shows that Aroland First Nation's shrinking labour force has persisted in industries such as agriculture, forestry, fishing and hunting, educational services, health care and social assistance, and public administration. While public administration was the dominant sector in 2011, it has since driven the labour force decline alongside a reduction in economic activity.

Table 5-14: Labour Force by Industry for Aroland First Nation (2011, 2016, 2021, 2024)

Aroland First Nation Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	10	10	0	15	15	0	10	10	0	10	10	0
21 Mining, quarrying, and oil and gas extraction	0	0	0	0	0	0	0	0	0	0	0	0
22 Utilities	0	0	0	0	10	0	0	0	0	0	0	0
23 Construction	0	0	0	0	10	0	10	0	10	10	0	10
31-33 Manufacturing	0	0	0	0	0	0	0	10	0	0	10	0
41 Wholesale trade	0	0	0	0	0	0	0	0	0	0	0	0
44-45 Retail trade	0	0	0	10	0	0	0	0	0	0	0	0
48-49 Transportation and warehousing	0	0	0	0	0	0	0	0	0	0	0	0
51 Information and cultural industries	0	0	0	0	0	0	0	0	0	0	0	0
52 Finance and insurance	0	0	0	0	0	0	0	0	0	0	0	0
53 Real estate and rental and leasing	0	0	0	0	0	0	0	0	0	0	0	0
54 Professional, scientific and technical services	0	0	0	0	0	0	0	0	0	0	0	0
55 Management of companies and enterprises	0	0	0	0	0	0	0	0	0	0	0	0
56 Administrative and support, waste and remediation services	10	0	0	10	0	0	0	0	0	0	0	0
61 Educational services	0	0	0	25	10	15	15	0	10	15	0	10
62 Health care and social assistance	15	0	15	25	0	20	10	0	0	10	0	0
71 Arts, entertainment and recreation	0	0	0	10	0	0	0	0	0	0	0	0
72 Accommodation and food services	0	0	0	10	0	0	0	0	0	0	0	0
81 Other services (except public administration)	0	0	0	0	0	0	0	0	0	0	0	0
91 Public administration	60	40	15	30	20	10	10	10	0	10	10	0
Unclassified / Adjustment	30	20	25	-10	10	10	-10	-10	5	-5	-10	5

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2016a; 2021a), AECOM Analysis

Note: e: estimate based on most recent labour force data

Table 5-15 below is a comparison of the latest (2024) labour force for Aroland First Nation, Thunder Bay District, and Ontario.

Table 5-15: Labour Force by Industry for Aroland First Nation, Thunder Bay District, and Ontario (2024)

Regional Labour Force by Industry	Aroland First Nation[e]			Thunder Bay District[e]			Ontario (thousands)[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	10	10	0	1,820	1,280	535	125	80	45
21 Mining, quarrying, and oil and gas extraction	0	0	0	2,065	1,810	260	40	35	5
22 Utilities	0	0	0	1,055	850	205	65	50	15
23 Construction	10	0	10	5,630	5,020	625	635	565	85
31-33 Manufacturing	0	10	0	2,980	2,375	610	775	550	230
41 Wholesale trade	0	0	0	1,520	1,205	325	290	190	100
44-45 Retail trade	0	0	0	9,325	4,535	4,785	945	465	480
48-49 Transportation and warehousing	0	0	0	4,590	3,665	935	450	340	115

Regional Labour Force by Industry	Aroland First Nation[e]			Thunder Bay District[e]			Ontario (thousands)[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
51 Information and cultural industries	0	0	0	1,115	675	440	200	120	80
52 Finance and insurance	0	0	0	1,470	540	925	470	225	250
53 Real estate and rental and leasing	0	0	0	800	500	290	180	95	85
54 Professional, scientific and technical services	0	0	0	4,040	2,265	1,770	805	465	345
55 Management of companies and enterprises	0	0	0	45	35	10	30	15	15
56 Administrative and support, waste and remediation services	0	0	0	2,565	1,700	865	385	220	165
61 Educational services	15	0	10	6,790	2,225	4,550	630	200	425
62 Health care and social assistance	10	0	0	14,580	2,885	11,660	1,015	195	805
71 Arts, entertainment and recreation	0	0	0	1,130	595	540	155.0	80	75
72 Accommodation and food services	0	0	0	4,890	2,165	2,720	460.0	205	255
81 Other services (except public administration)	0	0	0	3,230	1,750	1,475	335.0	160	175
91 Public administration	10	10	0	5,815	2,955	2,855	505.0	260	250
Unclassified / Adjustment	-5	-10	5	1,590	930	695	259.7	122.4	117.3

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2011m; 2011n) (Statistics Canada, 2016a; 2016f; 2016g) (Statistics Canada, 2021a; 2021f; 2021g), AECOM Analysis

Note: e: estimate based on most recent labour force data

Labour force by industry for the Thunder Bay District and Ontario are discussed further in **Section 5.2.2**.

Earnings

The earnings data in **Table 5-16** indicate that the average after-tax income in Aroland First Nation in 2024 was $26,600, approximately $3,300 lower than the average for Marten Falls First Nation. Women in Aroland First Nation had a higher average after-tax income ($30,800) compared to men ($23,600). After-tax income includes government transfers, which for Aroland First Nation have been roughly two times higher for women on average relative to men. The average after-tax income for men grew 39% since 2011, or 2.6% per year, while for women it grew 73%, or 4.3% annually. The 2024 average after-tax income represents a 53% increase from the 2011 level of $17,300, equating to a 3.3% annual growth. This increase in purchasing power is relatively low compared to Ontario's average inflation rate of 2.4% during the same period (as discussed in **Section 5.2.3**).

The median after-tax income for Aroland First Nation in 2024 was approximately $18,700, with women earning a higher median ($29,200) than men ($14,700). The median after-tax income in 2024 represents a 17% increase since 2011, or 1.2% per year (significantly lower than Ontario's growth of 3.0%). The median after-tax income for men grew just 8%, or 0.6% per year, while for or women it grew 79%, or 4.6% annually.

The overall average-to-median income ratio in 2024 was 1.4, slightly lower than Marten Falls First Nation's ratio of 1.5. Income inequality is more pronounced among men, with a ratio of 1.6.

Table 5-16: Earnings for Aroland First Nation (2011, 2016, 2021, 2024)

Aroland First Nation Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	17.3	17.0	17.8	20.4	18.7	22.8	24.1	21.4	27.9	26.6	23.6	30.8
Median after-tax income (thousands $)	15.9	13.6	16.3	13.9	11.5	20.7	16.9	13.3	26.4	18.7	14.7	29.2
Average-to-median after-tax income ratio	1.1	1.2	1.1	1.5	1.6	1.1	1.4	1.6	1.1	1.4	1.6	1.1

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2016a; 2021a), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

The following comparison in **Table 5-17** of the latest (2024) earnings for Aroland First Nation, Thunder Bay District, and Ontario shows that women in Aroland First Nation earn more than men. This is in contrast to the census district and province, where men earn more than women. However, all income levels in Aroland First Nation are lower than those in the Thunder Bay district and Ontario. Income inequality in Aroland First Nation is more pronounced, particularly among men, compared to both the district and province.

Table 5-17: Earnings for Aroland First Nation, Thunder Bay District, and Ontario (2024)

Regional Earnings	Aroland First Nation[e]			Thunder Bay District[e]			Ontario[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	26.6	23.6	30.8	48.8	53.9	43.7	51.2	57.4	45.3
Median after-tax income (thousands $)	18.7	14.7	29.2	42.9	47.8	38.9	41.1	45.5	37.6
Average-to-median after-tax income ratio	1.4	1.6	1.1	1.1	1.1	1.1	1.2	1.3	1.2

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2011m; 2011n) (Statistics Canada, 2016a; 2016f; 2016g) (Statistics Canada, 2021a; 2021f; 2021g), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings for the Thunder Bay District and Ontario are discussed further in **Section 5.2.2**.

Educational Attainment

Educational Attainment in Aroland First Nation refers to the highest level of education that individuals have completed. It is a key indicator of socioeconomic development, employment opportunities, and community well-being. However, when analyzing data from Statistics Canada, it is important to acknowledge certain limitations. In the 2021 Census, the response rate was 85%, which is lower than the 92% recorded in 2016 (Taylor, 2022). This lower response rate may impact the accuracy and representativeness of the data, particularly in smaller communities such as Aroland First Nation.

In 2021, educational attainment in Aroland First Nation showed mixed trends (see **Table 5-18**). While the percentage of men without a certificate, diploma, or degree decreased from 50.0% in 2016 to 40.0% in 2021, the percentage of women without formal credentials

increased from 43.5% to 61.5%. Despite some progress for men, overall educational attainment in the community remains lower than in broader regions. In comparison, Thunder Bay District had significantly lower rates of individuals without a formal credential (18.7% of men and 17.2% of women), and Ontario's rates were even lower (15.8% of men and 14.8% of women) (Statistics Canada, 2011a; Statistics Canada, 2016a; Statistics Canada, 2021a).

Levels of secondary educational attainment have risen but remain lower than provincial averages. In 2021, 33.3% of men and 23.1% of women in the community had a high school diploma, compared to 28.1% of men and 27.6% of women in Thunder Bay District, and 28.0% of men and 26.4% of women across Ontario. Postsecondary educational attainment in Aroland First Nation is still notably lower than in larger regions, with only a small percentage of residents holding college or university credentials. In 2021, 13.3% of men and 15.4% of women in Aroland First Nation had a college diploma, compared to 21.1% of men and 27.1% of women in Thunder Bay District, and 18.3% of men and 22.2% of women in Ontario. Additionally, there were fewer than five individuals in the community with a bachelor's degree or higher in 2021, whereas 17.8% of men and 23.2% of women in Thunder Bay District, and 28.4% of men and 31.4% of women in Ontario, had achieved this level of education (Statistics Canada, 2011a; Statistics Canada, 2016a; Statistics Canada, 2021a).

Table 5-18: Highest Attained Education for the Population Aged 15 and Older in Aroland First Nation, Thunder Bay, and Ontario (Statistics Canada, 2011, 2016, 2021)

Highest attained certificate, diploma or degree for the population aged 15 years and over (%)	Year	Aroland		Thunder Bay District		Ontario	
		Men	Women	Men	Women	Men	Women
No certificate, diploma or degree	**2011**[1]	71.4	70.0	22.5	22.9	18.9	18.4
	2016	50.0	43.5	21.8	20.7	18.0	17.1
	2021	40.0	61.5	18.7	17.2	15.8	14.8
High (secondary) school diploma or equivalency certificate	**2011**[1]	14.3	20.0	24.4	25.7	26.4	27.1
	2016	28.6	21.7	25.2	26.5	27.8	27.1
	2021	33.3	23.1	28.1	27.6	28.0	26.4
Apprenticeship or trades certificate or diploma	**2011**[1]	14.3	0	17.6	5.3	10.3	4.6
	2016	10.7	0	14.5	3.4	8.8	3.4
	2021	13.3	0	12.5	2.9	7.4	2.7
College, CEGEP or other non-university certificate or diploma	**2011**[1]	0	10.0	18.7	25.9	17.7	21.8
	2016	10.7	17.4	21.0	27.1	18.4	23.1
	2021	13.3	15.4	21.1	27.1	18.3	22.2
University certificate or diploma below bachelor level	**2011**[1]	0	0	2.4	2.6	3.8	4.3
	2016	0	8.7	1.8	2.1	2.0	2.4
	2021	0	0	1.7	2.0	2.1	2.5
Bachelor's degree or higher	**2011**[1]	0	0	14.5	17.6	23.0	23.8
	2016	0	8.7	15.7	20.3	25.0	27.0
	2021	0	0	17.8	23.2	28.4	31.4

(Statistics Canada, c; e) (Statistics Canada, 2011h; 2011m; 2011n) (Statistics Canada, 2016a; 2016f; 2016g) (Statistics Canada, 2021a; 2021f; 2021g)

Note: 1. The 2011 National Household Survey did not provide information on percentages. The information displayed here has been calculated based on the counts provided by the 2011 National Household Survey.

5.1.3 Economy

5.1.3.1 Marten Falls First Nation

Local Businesses and Commercial Activities

Marten Falls First Nation, Aroland First Nation, and Eabametoong First Nation signed a co-operation agreement in March 2015 to work together on forest management and business ventures. This led to the establishment of the Agoke Development Limited Partnership, which was incorporated in September 2015. It is equally owned by all three First Nations and is designed as a vehicle to focus on business and to pursue forest management (Agoke Development Corporation, n.d.).

High transportation costs and limited infrastructure access remain as major obstacles to large mining and forestry development projects. The absence of reliable electricity and transportation networks increases operational expenses and reduces the feasibility of business ventures. The construction of the Community Access Road could help lower transportation and logistics costs by providing a direct reliable access to the area.

Within the community there are a few small private businesses including a convenience store, community grocery store, fuel supply business, and a lodging business. The cost of living in the community is high due to the lack of access with high costs for electricity and goods due to the transportation costs of fuel and goods. The small population size of the community and lack of a road limits private businesses in Marten Falls First Nation. Resource based tourism operations are also operated by community members.

Marten Falls First Nation community members are hopeful about new economic opportunities from the Community Access Road, particularly the potential for quality employment, emphasizing the need for community readiness and address concerns about systemic issues that may hinder progress without significant healing efforts.

Marten Falls First Nation has an Economic Development Department with the following responsibilities and initiatives (211 Ontario North, 2024b):

- Provides information, training, and educational workshops to enhance employability skills;
- Responsible for development of plans for the use of traditional lands for community members;
- Works to access funding for band-owned business ventures;
- Provides coaching in areas such as business plan development and assistance in obtaining financial support for people wanting to start their own business;
- Maintains local business directory;

- Provides advisory for local businesses including the grocery store and a fuel supply business;
- Assists in the study of connecting the community by road to the permanent highway system; and
- Develops a comprehensive community profile to determine community assets, labour force inventory and land inventory for new business development as these all relate to opportunities from the Ring of Fire mining venture.

Marten Falls First Nation Economic Development Department also provides employment counselling and coaching services and is actively participating in the Marten Falls First Nation Community Access Road (211 Ontario North, 2024b).

Marten Falls First Nation is also supported by Matawa Economic Development.

> "*Matawa Economic Development works with the Matawa First Nations to develop, promote and support a diverse private sector and entrepreneurial culture. It works to create 'opportunity-ready' communities and foster economic growth through economic and business development. It assists Matawa First Nations develop infrastructure, businesses and human capital to grow local economies. It also works with Matawa First Nation community development corporations to build capacity and develop projects and business opportunities to become more self-sufficient"* (Matawa First Nations, n.d.).

Ministry of Labour, Immigration, Training and Skills Development is providing funding to enable the Marten Falls First Nation and Webequie First Nation to develop a comprehensive workforce development strategy that outlines the diversity of employment readiness and training pathways needed to help prepare community members for potential future employment opportunities. This is intended to develop priority recommendations and build community capacity related to workforce development by leveraging community-based workforce developer trainee positions for Marten Falls First Nation and Webequie First Nation. The North Superior Workforce Planning Board is providing subject matter expertise, project management assistance, and financial accountability stewardship, while the Ministry of Energy and Mines is facilitating relationship development and assisting with advancing project objectives. Additional community training partners may be engaged to provide input to the workforce development strategy (North Superior Workforce Planning Board, n.d.).

The Ontario government, Marten Falls First Nation, and Webequie First Nation have signed the Community Development Agreement to develop community infrastructure projects that could support future development opportunities in the area, including building all-seasons roads to the mineral-rich Ring of Fire region. The agreement commits the province to supporting shovel-ready infrastructure projects. Those could include construction of health and training facilities, recreation centres, commercial buildings and

labour force development programs. These projects would help improve the well-being and readiness of the First Nations to participate fully in the construction of road projects that would connect the Ring of Fire critical mineral deposits with manufacturing hubs in the south.

Marten Falls First Nation and Webequie First Nation are working together to accelerate project timelines and prepare communities to participate in future economic development opportunities in the region. This collaboration is focused on enhancing the communities' well-being and livelihoods, including an emphasis on long-term sustainability to protect the land and the people's future.

Together, Marten Falls First Nation Community Access Road, Webequie Supply Road, and Northern Road Link would connect these two First Nation communities to the Ontario highway network and provide access to the mineral deposits in the Ring of Fire. Economic development in the Ring of Fire area will create opportunities to share economic benefits and support the long-term prosperity of Marten Falls First Nation and Webequie First Nation (Ontario, 2024f).

Public Finances

The latest financial statement for Marten Falls First Nation was done for the 2018 / 2019 fiscal year, as displayed in **Table 5-19**. It showed revenues of $25.1 million, led by $9.9 million from the federal government's Indigenous and Northern Affairs Canada and $7.5 million from the provincial government's Ministry of Northern Economic Development and Growth. Expenditures totalled $22.8 million, mostly due to $11.5 million by Public Works and $2.6 million by Educational Programs. The annual balance was a surplus in the amount of $2.2 million. After accounting for $5.4 million of Inter-fund Transfers, the total annual balance was a surplus of $7.6 million. The transfers were from the Capital Funds to the Operating Funds, representing tangible capital assets purchased and capital asset projects that were developed by Marten Falls First Nation during the year from various capital projects. This total surplus added to the accumulated surplus of $20.9 million at the start of the 2018 / 2019 fiscal year to result in the accumulated surplus of $28.5 million at the end of the fiscal year.

Table 5-19: Financial Statement for Marten Falls First Nation (2018 / 2019)

Financial Statement for Marten Falls First Nation (2018 / 2019)	Amount ($)
Revenues	25,072,102
Expenditures	22,841,267
Annual Balance	2,230,835
Inter-fund Transfers	5,361,502
Total Annual Balance	7,592,337
Accumulated Balance at Start of Year	20,872,297
Accumulated Balance at End of Year	**28,464,634**

(Grant Thornton, 2019); AECOM Analysis

5.1.3.2 Aroland First Nation

Local Businesses and Commercial Activities

Aroland First Nation is engaged in a variety of economic development activities. Currently, small businesses operate within Aroland First Nation including a gas bar, convenience store, taxi company, and tourist outfitters (Marten Falls First Nation, 2023b). Aroland First Nation engages in a variety of small resource harvesting activities for commercial purposes including harvesting blueberries and small-scale agriculture.

Aroland First Nation also engages in industrial development managed through Aroland Industrial LP which pursues forestry and mining contracts regionally (211 Ontario North, 2024a). Aroland First Nation is part of two forest management partnerships: Agoke Lumber and Nedaakiimenaan Inc. Agoke Lumber is a partnership between Aroland First Nation, Marten Falls First Nation, and Eabametoong First Nation. In 2018, Agoke signed a joint venture with Nakina Lumber to restart a Nakina sawmill which will provide forestry opportunities for all parties involved including a goal of 75% Indigenous employment (Working Forest, 2018). Nedaakiimenaan Inc. is a partnership consisting of Aroland Constance Lake, Ginoogaming, and Long Lake #58 First Nations with a goal of building capacity in the Forest Management of the Kenogami Forest. Aroland First Nation signed a memorandum of understanding with Noront Development which provided shares and "entails the establishment of an ongoing working and communication protocol and the initiation of a dialogue regarding economic development opportunities" (Mining.com, 2019).

Aroland First Nation does not have a publicly available economic development plan for the community. Aroland First Nation is a signatory with other Matawa First Nations and Ontario to a regional framework agreement outlining how communities will benefit from development of the proposed Ring of Fire. This would support ensuring that both parties will work together in the areas of regional long-term environmental monitoring and enhanced participation in environmental assessment processes, resource revenue sharing, economic supports, as well as regional and community infrastructure.

Aroland First Nation has an Economic Development Department with the following responsibilities and initiatives:

- Provides information, training, and educational workshops to enhance employability skills;
- Responsible for development of plans for the use of traditional lands for community members;
- Works to access funding for band-owned business ventures;
- Provides coaching in areas such as business plan development and assistance in obtaining financial support for people wanting to start their own business;

- Provides advisory for local area businesses such as the gas bar, convenience store, tourist outfitters, and taxi company;
- Develops Aroland Industrial LP, an industry which pursues forestry and mining contracts in the area;
- Harvests blueberries and sells to markets in Thunder Bay, Hearst, Kapuskasing, and other southern communities; and
- Establishes community garden with the possibility of exporting produce to northern communities (211 Ontario North, 2024a).

There are small-scale commercial enterprises such as a gas bar, convenience store, taxi company, and tourism outfitters. O'Sullivan Lake Gas Bar is a self-service gas station, which includes a small convenience store and houses a Canada Post postal station. Shopping and services such as Northern Store, gas bar, restaurant, arena and church are available in Nakina, which is located 15 minutes from the community (NorthWesthealthline, 2024a).

Public Finances

The latest financial statement for Aroland First Nation was done for the 2023 / 2024 fiscal year, as displayed in **Table 5-20**. Revenues totalled $16.8 million, led by $9.3 million from the federal government's Indigenous Services Canada and $1.6 million from the provincial government's Ministry of Children, Community and Social Services. Expenditures were $13.6 million, mostly due to $4.1 for wages and benefits, and $2.9 million for Contract Services. The total annual balance was a surplus in the amount of $3.2 million. This total surplus added to the accumulated surplus of $19.7 million at the start of the 2023 / 2024 fiscal year to result in the accumulated surplus of $22.8 million at the end of the fiscal year.

Table 5-20: Financial Statement for Aroland First Nation (2023 / 2024)

Financial Statement for Aroland First Nation (2023 / 2024)	Amount ($)
Revenues	16,795,293
Expenditures	13,607,285
Annual Balance	3,188,008
Inter-fund Transfers	-
Total Annual Balance	3,188,008
Accumulated Balance at Start of Year	19,659,544
Accumulated Balance at End of Year	**22,847,552**

(MNP LLP, 2024); AECOM Analysis

5.1.4 Community Access to Infrastructure and Services

5.1.4.1 Marten Falls First Nation

5.1.4.1.1 Methods of Transportation in and out of the community

5.1.4.1.1.1 Road

There is no current Community Access Road connection to Marten Falls First Nation. “It’s going to be a huge transformation for our community,” Chief Achneepineskum said. “It’s going to improve access to services, and improve access to the outside world,” (Indigenous Watchdog, 2023).Winter roads are temporary routes that lack paving and gravel. They are constructed over frozen earth, wetlands, lakes, and rivers, allowing heavy vehicles (that can weigh tens of thousands of kilograms) to travel over frozen terrain. While winter roads are regulated under the Highway Traffic Act, First Nations are responsible for planning, permitting, construction, maintenance and monitoring of winter roads, each responsible for specific segments (NorthWinds Environmental Services, 2023).

Marten Falls First Nation is connected to Nakina by a winter road approximately 135 kilometres in length, which takes approximately five hours to travel. The road is open for six to 11 weeks (NorthWinds Environmental Services, 2023) between January to March, weather dependent (Indigenous Watchdog, 2023; Teach for Canada, 2024). The winter road access to Marten Falls First Nation has been experiencing increasingly shorter seasons due to climate change, which complicates the transportation of goods and services to the community (Achneepineskum, 2023; NorthWinds Environmental Services, 2023).

> “*Driving to Marten Falls is impossible except in January and February, when the winter road to Nakina is open; the rest of the time, fly-in travel is the only option. Chief Achneepineskum says a Community Access Road would make public services much better*,” (Indigenous Watchdog, 2023).

The winter road transportation link allows for shipment of items that would be prohibitively expensive or challenging to transport by plane to remote First Nations across northern Ontario. Winter roads provide remote fly-in communities with access to more affordable food, building materials, fuel, and seasonal supplies. Many communities transport a year’s supply of diesel on the winter roads prior to spring thaw. The winter road network also facilitates cost-effective travel during the winter months for personal activities, such as visiting friends and family, vehicle maintenance, shopping and recreation (NorthWinds Environmental Services, 2023).

The operational period of the winter road has been decreasing over the years. In 2023, the road was only open for six weeks. Chief Achneepineskum has highlighted the growing concern over the diminishing operational time, noting that the cost of supply shipments

would double if they had to be transported by air (CBC News, 2023). Current funding for winter road construction and maintenance has not kept up with rising inflation rates, and with the increased cost of fuel, equipment, and maintenance (NorthWinds Environmental Services, 2023). Community members have indicated a strong preference for traveling at night on the winter road, as lower temperatures help maintain ice stability and reduce the risk of weakened road conditions (Three Roads Forum, personal communication, Feb 27 2025).

5.1.4.1.1.2 Airport

Marten Falls Airport is a small, remote airstrip serving Marten Falls First Nation. It features a gravel runway and basic facilities, primarily supporting scheduled passenger flights and cargo services (**Table 5-21**).

Table 5-21: Air Transportation in Marten Falls First Nation

Airline	Origin	Departure Day	Time of Day	Cost ($)
North Star Air	Thunder Bay	Monday	Evening	500
North Star Air	Thunder Bay	Wednesday	Evening	500
North Star Air	Thunder Bay	Friday	Evening	500
North Star Air	Thunder Bay	Sunday	Morning	500
ZAM Air	Nakina Airport	Tuesday	Noon	240-265
ZAM Air	Nakina Airport	Thursday	Noon	240-265
ZAM Air	Nakina Airport	Saturday	Noon	240-265
Nakina Air Service	Nakina Airport	Discontinued in 2017	N/A	N/A

(Kiikenomaga Kikenjigewen Employment and Training, 2017; North Star Air, 2025; Teach for Canada, 2024)

Chartered flights from Nakina, Thunder Bay, and other nearby airports occur regularly, providing essential connectivity for the community.

5.1.4.1.2 Essential Infrastructure and Services

5.1.4.1.2.1 Water Treatment Plant

Marten Falls is under a long-term boil water advisory, which began in 2005 (Government of Canada, 2025a). In response, the community, with support from Indigenous Services Canada (ISC), replaced their water treatment system and completed associated facility upgrades. Construction of the new system was completed in March 2019, and it was commissioned in June 2019. The infrastructure can now produce clean water. There is a project is currently underway to address issues with the raw water intake, with completion anticipated in spring 2025 (Government of Canada, 2025a). These upcoming changes are expected to resolve the outstanding issues with the water treatment plant, ensuring a reliable supply of safe water for the community.

5.1.4.1.2.2 Wastewater Treatment Plant

Marten Falls First Nation has an aging wastewater treatment facility that urgently requires upgrades. A study completed in October 2023 highlighted the critical need for further investment in wastewater infrastructure. In December 2024, the community was forced to declare a state of emergency when raw sewage began spewing into the creek that feeds directly into the Albany River. This sewage spill was reported to be a direct result of the prolonged lack of investment in the wastewater treatment facility (Cision, 2021). The incident has raised additional concerns about the potential impact on the water treatment plant, as the intake for the water treatment plant could be affected by the sewage spill, potentially resulting in contaminated water being delivered to homes (Achneepineskum, 2024; McGee, 2023).

5.1.4.1.2.3 Waste Management Services

The Marten Falls First Nation solid waste disposal site is approximately 3.5 km north of the community. The community does not offer waste collection services (Marten Falls First Nation, 2023c).

5.1.4.1.2.4 Power

Marten Falls First Nation currently relies on a diesel generator for its power needs. Despite a recent upgrade to the diesel generation system, which increased capacity to one megawatt of electricity, the system reached its capacity soon after completion (Dunick, 2024). There has been a recent provincial announcement to connect the community to the power grid. Marten Falls First Nation Chief Bruce Achneepineskum has emphasized Marten Falls First Nation and the other communities want to shift away from relying on diesel for power (Dunick, 2024). There are plans for new housing developments, but the community relies diesel-powered generators that are at maximum capacity and cannot support new housing, creating a bottleneck for expansion (Indigenous Watchdog, 2023). This limitation affects not only residential growth but also the broader development of community services, such as healthcare facilities, schools, and recreational spaces, all which require reliable electricity.

5.1.4.1.2.5 Educational Facilities

Marten Falls First Nation has limited access to educational facilities within the community. Henry Coaster Memorial School serves students from kindergarten to grade 8. The school is equipped with a cultural learning teepee, a gym, and a baseball diamond, providing a well-rounded environment for young learners (Teach for Canada, 2024).

Marten Falls First Nation does not have any formal daycare facilities. However, community members have observed that informal childcare arrangements may exist among residents. In many cases, grandparents play a significant role in caring for children within the

community. The lack of formal daycare options can be a barrier for parents, particularly those who need reliable childcare to pursue employment, education, or other opportunities.

When students reach high school, they must leave the community to continue their education for grades 9-12, typically attending schools in Thunder Bay or Geraldton (Indigenous Watchdog, 2023). While at school, students often live with host families, which can be challenging for the families they leave behind. As a result, many families choose to relocate when their children enter high school. Many students who leave the community for education do not return to live on-reserve permanently due to a lack of opportunities (Indigenous Watchdog, 2023). As of September 2024, students can take online high school courses through Matawa (Three Roads Forum, personal communication, Feb 27 2025) although at the time of writing, it is unclear if students can graduate with the online courses through Matawa.

The closest post secondary institutions are Lakehead University and Confederation College, both in Thunder Bay.

The Kiikenomaga Kikenjigewen Employment and Training Services serves as the Aboriginal Skills Employment Training Agreement organization, through Service Canada, for the Matawa Nations, including Marten Falls First Nation, to provide essential employment and training services to support the economic development and self-sufficiency of the Matawa First Nations communities. Programs include an adult education program to help students get their high school diploma and the credits they need to pursue college, trades, or university training, the Harvesters Support Grant, the Mashkosii Ojibik Apprenticeship Program to get members employment ready, Indigenous Skills and Employment Training, and driver training (Kiikenomaga Kikenjigewen Employment & Training Services, 2023).

5.1.4.2 Aroland First Nation

This section provides an overview of the existing transportation infrastructure, water and wastewater treatment facilities, power generation, educational and recreational facilities, and health infrastructure in Aroland First Nation.

5.1.4.2.1 Methods of Transportation in and out of the community

5.1.4.2.1.1 Road

Aroland First Nation is connected to the Ontario road system on Highway 643, which links to Highway 584 and Highway 11. Recent agreements with the Ontario government have secured funding for upgrades to Anaconda and Painter Lake Roads, improving access to the community and supporting regional economic development (Ontario Newsroom, 2025; Ross, 2025).

5.1.4.2.1.2 Airport

Aroland First Nation does not have an airport but use the R. Elmer Ruddick Nakina Airport located approximately 20 kilometres from the community. The airport has a 3,500-foot runway, modern terminal buildings and fuelling amenities (Municipality of Greenstone, 2021a). It is considered an important hub for remote tourism, First Nations and the resource-based industry in Ontario's Far North.

In 2017 Nakina Air Service, operating out of the Nakina Airport, discontinued service to Marten Falls First Nation. This route was regularly used for daytrips to Thunder Bay (Kiikenomaga Kikenjigewen Employment and Training, 2017).

5.1.4.2.1.3 Rail

Aroland First Nation is located along the Canadian National Railway Line, which runs approximately 750 m south of highway 643 (Railway Association of Canada, 2025).

5.1.4.2.2 Essential Infrastructure and Services

5.1.4.2.2.1 Water Treatment Plant

Aroland First Nation has a water treatment plant that was constructed in 1993 and uses three wells / groundwater sources. The community has been under several boil water advisories including three between 1999 to 2001 (CBC News, 2006), a long-term boil water advisory between 2008 to 2021 (First Nations Drinking Water Settlement, 2024), and one from July to September, 2024 (Water Today, 2024). The community resolved its long-term boil water advisory in June 2021 and now provides a reliable supply of safe water for its residents (First Nations Drinking Water Settlement, 2024).

5.1.4.2.2.2 Wastewater Treatment Plant

The Aroland Wastewater System, constructed in 1995, is classified as a Level I treatment system and discharges into a wetland. It has a design capacity of 3.0 m^3 / day. Operational and reporting challenges contribute to the system's medium risk rating on a 1-10 scale, where 1-4 is low risk, 4.1-7 is medium risk, and 7.1-10 is high risk. Specifically, the effluent risk is 3.0, operations risk is 9.0, reporting risk is 10.0, and operator risk is 7.0, resulting in a final risk score of 5.5 (Neegan Burnside, 2011). In 2017, The Government of Canada's Clean Water and Wastewater Fund approved for $49,125 in funding ($32,750 in federal funding and $16,375 in provincial funding) for the Aroland First Nation Sewage Lagoons Remediation project (Infrastructure Canada, 2017).

These challenges highlight the need for improvements in operations and reporting to mitigate potential environmental and health risks.

5.1.4.2.2.3 Waste Management Services

The Aroland First Nation solid waste disposal site is approximately 1 km northeast of the Band Office (Marten Falls First Nation, 2023c). The Municipality of Greenstone maintains a landfill in Nakina which has approximately 50 years of capacity remaining. The Municipality is conducting an Environmental Assessment process to reduce and manage waste within the region and has engaged with several First Nations in the area, including Aroland First Nation (Greenstone, 2024).

5.1.4.2.2.4 Power

Aroland First Nation currently relies on a diesel generator for its power needs. Aroland First Nation is set to connect to the Ontario power grid for the first time, thanks to a recent agreement with the provincial government (Ross, 2025). This connection will reduce the community's reliance on diesel generators.

In addition to the grid connection, Aroland First Nation is working with Hydro One on a pilot battery energy storage project. This project aims to supply the community in the event of upstream outages, with an expected reduction in outage duration by 60% (Zemanek, Helbronner, & Ren, 2021). The battery energy storage system, introduced in 2019, will improve the reliability of electricity for Aroland First Nation. Between 2013 and 2017, Aroland First Nation averaged 11 outages and 57 hours of power interruptions per year. The new system will allow the community to be supplied by the battery during upstream supply interruptions, providing extensive insights into the technology and enhancing the overall reliability of the power supply (Hydro One, 2019).

5.1.4.2.2.5 Educational Facilities

Johnny Therriault Memorial School is in Aroland First Nation. The building was constructed in 2007 and has an area of 1,760 square meters. The school ranges from junior kindergarten to grade nine. High school students attend Geraldton Composite High School (approximately 70 km away). The student body is currently approximately 75 students, but the school can accommodate up to 120 students. There are no daycare facilities in, although there may be informal daycare arrangements that exist between community members.

The closest post secondary institutions are Lakehead University and Confederation College, both located in Thunder Bay.

The Kiikenomaga Kikenjigewen Employment and Training Services serves as the Aboriginal Skills Employment Training Agreement organization through Service Canada for the Matawa Nations, including Aroland First Nation, providing essential employment and training services to support the economic development and self-sufficiency of the Matawa First Nation communities. Programs include: an adult education program to help students earn a high school diploma and the necessary credits for college, trades or university

training; the Harvesters Support Grant; the Mashkosii Ojibik Apprenticeship Program prepare members for employment; Indigenous skills and employment training; and driver training (Kiikenomaga Kikenjigewen Employment & Training Services, 2023).

5.1.5 Housing

This section provides an understanding of the Valued Component relating to housing adequacy and suitability within the two Local Study Area communities: Marten Falls First Nation and Aroland First Nation. The section examines key aspects of housing in the community, including housing and household characteristics. Housing is commonly assessed using three key indicators as defined by Statistics Canada: suitability, adequacy and affordability (Statistics Canada, 2023). For the purposes of this analysis, affordability is not included, as housing on reserve is managed by the band and is not subject to market-driven pricing.

Analysis of these factors will provide an overview of the current housing conditions and help identify areas of targeted interventions to improve residents' quality of life.

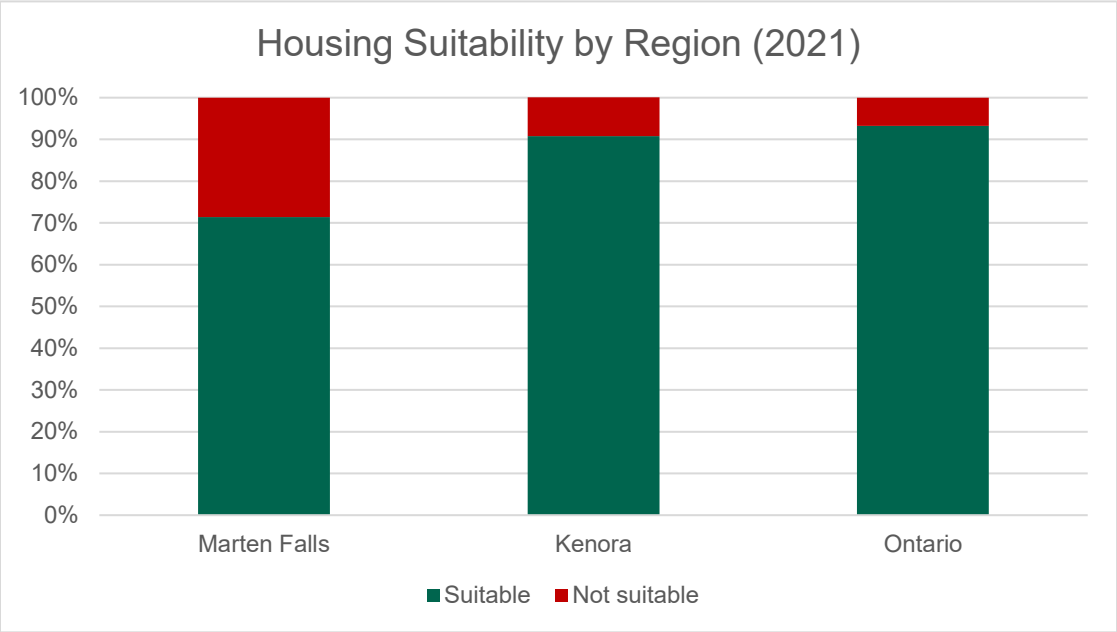
5.1.5.1 Marten Falls First Nation

The housing situation in Marten Falls First Nation presents both distinct challenges and opportunities for improvement. This section examines key aspects of housing in the community, including housing suitability and adequacy and accessibility of home building and repair materials.

5.1.5.1.1 Housing Suitability

Housing suitability refers to whether a private household has adequate accommodations based on the National Occupancy Standard. This standard, developed by Canada Mortgage and Housing Corporation (CMHC) in consultation with provincial housing agencies, determines the required number of bedrooms for a household based on its size and composition, considering factors such as age, sex and relationships among household members (CMHC, 2022). Statistics Canada defines housing suitability as whether a home has an appropriate number of bedrooms (Statistics Canada, 2021d; 2021e; 2021f). Data gathered from the 2021 Census regarding housing suitability indicates a disparity between Marten Falls First Nation and other regions. In 2021, only 71.4% of homes in Marten Falls First Nation met suitability standards, compared to 90.8% in Kenora and 93.3% in Ontario, as seen in **Figure 5-4**. This gap suggests that residents in Marten Falls First Nation are more likely to experience overcrowded living conditions, with multiple people sharing bedrooms due to the lack of suitable housing.

Figure 5-4: Percent of Suitable Housing by Region for Marten Falls, Kenora, and Ontario (Statistics Canada, 2021)



(Statistics Canada, 2021e; Statistics Canada, 2021d; Statistics Canada, 2021f)

Census data for 2021 indicates that the average household size in Marten Falls First Nation was 3.5 people, more than the average household sizes in Kenora District and Ontario, both of which were 2.6. Larger household sizes, combined with limited housing availability, can increase stress, affect privacy, influence family and social dynamics, considerations in psychosocial well-being. It is important to note that the average household size in Marten Falls First Nation has declined from 3.9 people in 2016 to 3.5 in 2021 (see **Table 5-22** below).

Table 5-22: Average Household Size (2016 - 2021) in Marten Falls, Kenora, and Ontario

Average Household Size by Region			
Year	**Marten Falls**	**Kenora**	**Ontario**
2016	3.9	2.7	2.6
2021	3.5	2.6	2.6

(Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f)

Crowded conditions can contribute to stress, reduced privacy, strain on family relationships, which impacts psychosocial well-being of adults and children in the community. A member living in the community indicated that he lives in a three-bedroom house with 3 generations of family, 5 adults and 11 children (Indigenous Watchdog, 2023). Another community member shared that while she had her own apartment when living outside the community, she now has to live with her mother in Marten Falls First Nation due to the housing shortage (Indigenous Watchdog, 2023). During the 2025 Story Beads

Program, a community member shared that improved road access would allow for larger, better-built homes with suitable space and furniture for the number of residents, as the community is currently limited by transportation constraints. For example, currently a king-sized bed cannot be flown in (AECOM, 2025).

The data highlights the challenges faced by the community in securing suitable housing that meets basic standards for space. Understanding these challenges is important as housing suitability can influence residents' quality of life, mental health, and overall community resilience (Impact Assessment Agency of Canada, 2025).

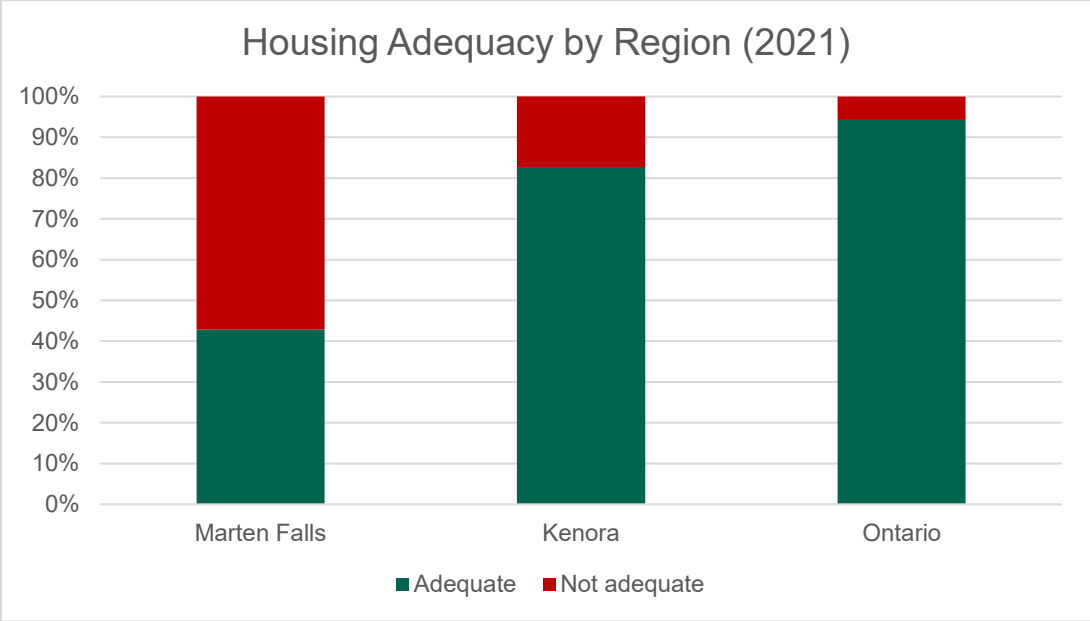
In Marten Falls First Nation, most homes are owned and managed by the Band Council, which allocates housing to community members based on availability and need. As of 2021, the median cost of shelter provided by the Band was $268 monthly (Statistics Canada, 2021e). The housing landscape is characterized by single-detached houses, which make up approximately 79% of the total occupied dwellings. The remaining 21% of the housing consists of multi-family units, providing a mix of housing options within the community.

The community faces a housing shortage, overcrowding and deteriorating infrastructure. The demand for housing often exceeds available resources, making it difficult for many to obtain suitable accommodations. The lack of housing creates challenges for service providers who travel to the region, such as teachers. In 2022, a state of emergency was declared when the elementary school in the community was forced to close due to a lack of housing for teachers (CBC News, 2022).

Housing Adequacy

Housing adequacy, as defined by Statistics Canada, refers to whether a dwelling is considered suitable in terms of physical condition, including whether it requires major repairs such as plumbing, electrical or structural fixes. Homes that do not require such major repairs are deemed adequate, while those that do are considered inadequate (Statistics Canada, 2021d; 2021e; 2021f). In 2021, the percentage of adequate homes in Marten Falls First Nation was lower compared to Kenora District and Ontario. Only 42.9% of homes in Marten Falls First Nation were considered adequate. In comparison 82.7% of homes in Kenora District and 94.3% in Ontario met adequacy standards, as seen in **Figure 5-5.**

Figure 5-5: Housing Adequacy by Region (Statistics Canada, 2021)



(Statistics Canada, 2021e; Statistics Canada, 2021d; Statistics Canada, 2021f)

Marten Falls First Nation faces a higher prevalence of inadequate housing, with 57.1% of homes requiring major repairs. A community member reported that individuals are residing in unsuitable housing, such as the old water treatment plant (Indigenous Watchdog, 2023). Over the past decade, an average of one house per year has been lost to fire (Indigenous Watchdog, 2023). These conditions contribute to stress, anxiety, and uncertainty for residents, as unstable or unsafe housing can affect daily life, family cohesion, and overall mental health. Living in substandard housing also increases vulnerability to physical health risks, and can exacerbate the impacts of overcrowding. The majority of the population in Marten Falls First Nation is living in substandard conditions, which not only jeopardizes health and well-being but also underscores the urgent need for improvements to housing infrastructure.

5.1.5.1.2 Accessibility of Home Building and Repair Materials

The gap in housing suitability and adequacy in Marten Falls First Nation is driven by a combination of logistical challenges and underlying infrastructure issues. The remote location of Marten Falls, accessible only by a winter road for approximately six weeks each year, severely limits the volume and timing of delivery of building materials, causing delays or preventing construction and repairs. Alternative methods, such as air transport, are prohibitively expensive, and barge shipments are unreliable due to fluctuating water levels.

The construction and maintenance of housing in Marten Falls First Nation are highly dependent on the winter road, which serves as the primary mode of transporting building materials into the community. During the winter road season, materials can be delivered in bulk and at relatively lower cost. However, once the winter road is no longer operational,

the only viable alternative is to transport materials by air, resulting in a substantial increase in construction expenses. The operational window of the winter road has been steadily declining in recent years; in 2023, it was open for only six weeks. Chief Achneepineskum has emphasized the seriousness of this issue, noting that supply shipment costs would double if materials were required to be flown into the community (CBC News, 2023). These persistently high shipping costs continue to limit housing development and infrastructure upgrades, thereby exacerbating existing housing challenges.

Marten Falls struggles with inadequate servicing and utilities infrastructure, such as insufficient wastewater and water treatment plants (Perreault, 2024) and low power generation within the community (McGee, 2023). This complicates the construction of new homes and further limits the number of suitable and adequate dwellings. These factors together contribute to the lower percentage of suitable and adequate homes in Marten Falls, highlighting the urgent need for targeted housing initiatives and improvements in both transportation and infrastructure.

During community engagement, housing was identified as a key factor driving residents to leave the region. The Chief successfully secured the construction of new residences by the federal government after declaring a state of emergency in education last year. As noted by a community member of Marten Falls First Nation, “on the edge of town is a clear-cut area where Chief Achneepineskum wants to build three six-plexes that would take some of the pressure off“ (Indigenous Watchdog, 2023).

It must be noted that housing affordability also contributes to a community’s overall housing condition. However, as housing on reserve is managed by the band, it was not assessed or considered as part of this analysis (Statistics Canada, 2023).

5.1.5.2 Aroland First Nation

Housing conditions in Aroland First Nation highlight unique challenges and potential areas for enhancement. This section explores various aspects of housing within the community, such as housing characteristics, household sizes, and adequacy and suitability of homes.

5.1.5.2.1 Housing Suitability

The housing landscape in Aroland First Nation is predominantly characterized by single-detached houses, which make up the majority of the total occupied dwellings. According to Statistics Canada, in 2016 91% of the 110 dwellings in Aroland were single-detached housing, while approximately 9% were multi-family row houses (Statistics Canada, 2016a).

Census data for 2021 indicates that the average household size in Aroland First Nation was 3.1 people, which is larger than the average household sizes in Thunder Bay District (2.2 people) and Ontario (2.6 people) (Statistics Canada, 2016a; 2021a); see **Table 5-23** below.

Table 5-23: Average Household Size (2016 – 2021) in Aroland, Thunder Bay District, and Ontario (Statistics Canada, 2016 – 2021)

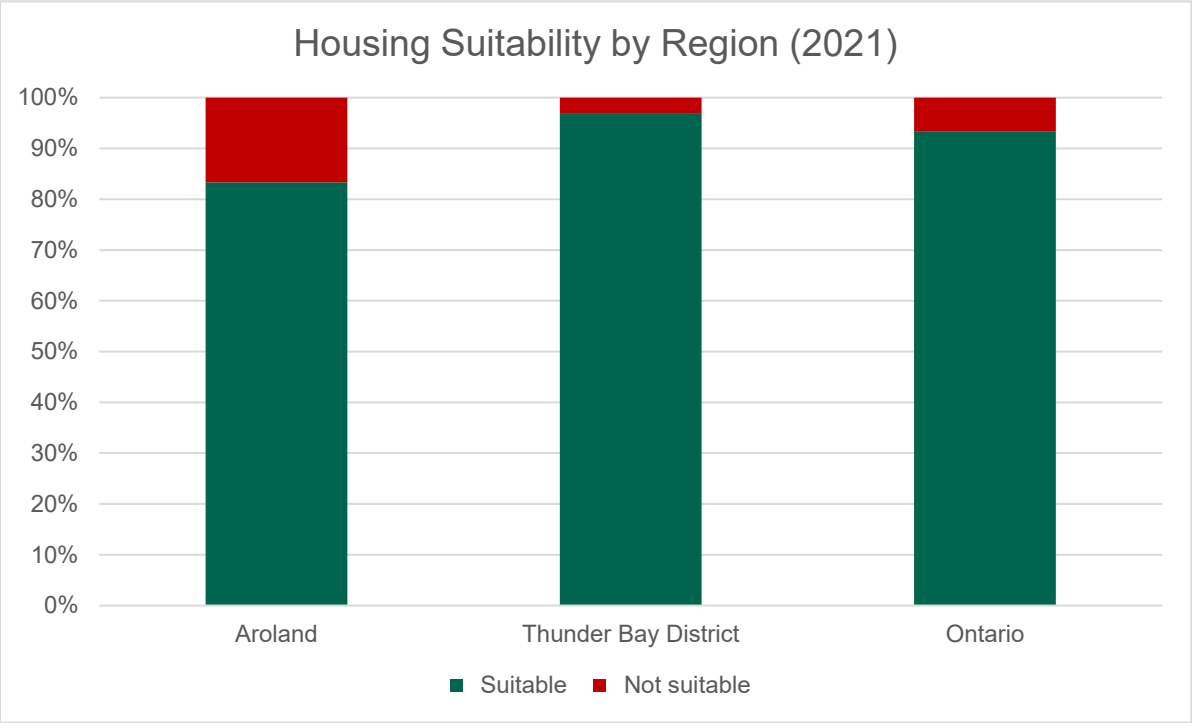
Average Household Size by Region			
Year	**Aroland**	**Thunder Bay District**	**Ontario**
2016	3.3	2.3	2.6
2021	3.1	2.2	2.6

(Statistics Canada, 2016a; 2016f; 2016g) (Statistics Canada, 2021a; 2021f; 2021g)

The average household size in Aroland First Nation has declined from 3.3 people in 2016 to 3.1 in 2021, possibly due to population changes and / or increased housing availability. Comparisons with historical data are challenging because the 2021 census had lower response rates due to data collection issues (Taylor, 2022; Statistics Canada, 2021a).

Data gathered from the 2021 Census regarding housing suitability indicates a difference in the percentage of homes in Aroland First Nation (83.3%) that met suitability standards, compared to Thunder Bay District (96.8%) and Ontario (93.3%) (**Figure 5-6**). This gap suggests that residents in Aroland First Nation are more likely to experience overcrowded living conditions, with multiple people sharing bedrooms due to the lack of suitable housing.

Figure 5-6: Housing Suitability by Region (Statistics Canada, 2021)

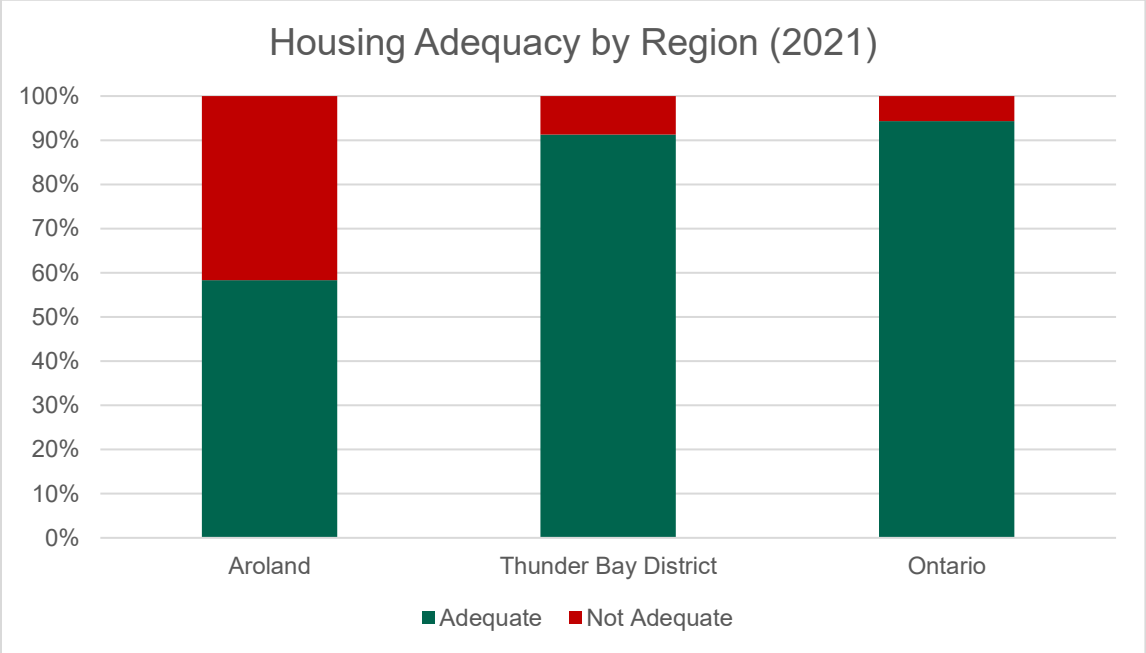


(Statistics Canada, 2021a; 2021f; 2021g)

5.1.5.2.2 Housing Adequacy

In 2021, the percentage of adequate homes in Aroland First Nation was lower when compared to Thunder Bay District and Ontario. According to Statistics Canada (2021) 25% sample data, 41.7% of homes in Aroland First Nation were considered inadequate, while 58.3% were deemed adequate as seen in **Figure 5-7**. Aroland First Nation has a higher prevalence of inadequate housing, with a substantial portion of homes requiring major repairs. Inadequate housing can negatively affect residents' psychosocial well-being, contributing to stress, anxiety, and reduced quality of life, and may also impact family relationships, social cohesion, and the ability to engage in cultural and community activities. This situation highlights the need for improvements to housing infrastructure to support the health and well-being of the community.

Figure 5-7: Housing Adequacy by Region (Statistics Canada, 2021)



(Statistics Canada, 2021a; 2021d; Statistics Canada, 2021g)

5.1.5.2.3 Accessibility of Home Building and Repair Materials

Aroland First Nation is connected by road and therefore has year-round access to home building and repair materials delivered, at lower cost than fly-in-only communities, like Marten Falls First Nation. However, Aroland First Nation still faces ongoing challenges with housing.

In Aroland First Nation, most homes are owned and managed by the Band Council, which allocates housing to community members based on availability and need. As of 2021, the median cost of shelter provided by the Band was $250 monthly (Statistics Canada, 2021a).

The community faces challenges, including a housing crisis, overcrowding, and deteriorating infrastructure. The demand for housing often exceeds available resources, making it difficult for many to obtain suitable accommodations. In 2024, the government announced $2.4 million from the Housing Accelerator Fund to help begin addressing the housing crisis. This initiative includes community consultations, creating new serviced lots for housing development and establishing relationships with non-profit housing partners in collaboration with a housing supply co-ordinator (Stimpson, 2024). These initiatives are contributing to addressing the housing shortage and improving living conditions for Aroland First Nation residents, though housing adequacy and suitability remain a challenge in the community.

5.1.6 Cultural Preservation and Change

Understanding the cultural value of traditional practices is important in understanding the social fabric of Indigenous communities like Marten Falls First Nation and Aroland First Nation. These communities have economies deeply rooted in customs and traditions, where activities such as engaging in the traditional economy (hunting, fishing, trapping, and gathering), practicing cultural activities, and speaking traditional languages reinforce social cohesion and cultural identity. Participation in these traditional practices supports food security, cultural preservation and community resilience. The qualitative assessment of these traditional economic practices reveals their positive impact on the cultural identity and social cohesion of the community and highlights the need to preserve and promote these activities for future generations.

The Ogoki Forest is a vital source of life for Aroland First Nation, Marten Falls First Nation and Eabametoong First Nation, providing employment, food, water, medicine, and the physical and spiritual foundation of traditional culture. For thousands of years, the local Anishinaabeg people have relied on the area for hunting, fishing, and trapping, navigating the forest's network of rivers, lakes, and wetlands. The forest is also home to diverse wildlife, including moose, caribou, marten, wolverine, and bear. Chief Bruce Achneepineskum of Marten Falls First Nation stated "Our traditional lands are fundamental to the spiritual, social, and economic well-being of our people, and as such, we must play a vital role in managing these lands and sharing in the benefits they provide" (Matawa First Nations, 2015).

The traditional economy is an economic system rooted in customs, traditions, and cultural practices, where economic activities such as production and distribution are guided by ancestral methods and social norms (Kumar, Furgal, Hutchinson, Roseborough, & Kootoo-Chiarello, 2019). It can be considered part of the social economy, which promotes mutual collective benefit and views consumption as a reciprocal exchange that supports health and resilient ecosystems (Stolz, Levkoe, & Nelson, 2017). In many Indigenous communities in northern Ontario, including Aroland First Nation and Marten Falls First Nation, traditional economies have historically centred around subsistence activities like

hunting, fishing, trapping, and gathering. These practices not only provided sustenance but also reinforced social cohesion, cultural identity, and cultural preservation. Participating in traditional harvesting activities is key to meeting nutritional needs, supporting food security for on-reserve populations, and has a social value that is not easy to quantify in dollar value (Kumar, Furgal, Hutchinson, Roseborough, & Kootoo-Chiarello, 2019; Wdowin, 2024).

Traditional economies often rely on subsistence practices, where the community and the environment support each other in a balanced relationship. This balanced relationship entails the community's sustainable use of natural resources to meet their needs while ensuring the environment remains healthy and productive for future generations, holding the view that the land, animals, and people should be treated with equal respect and consideration (Stolz, Levkoe, & Nelson, 2017).

As result of economic, social and political pressures, climate factors, and decreased transmission of Indigenous Knowledge and skills, participation in traditional activities among on-reserve First Nation adults in Canada declined by 43% for hunting and trapping and by 33% for fishing between 2002 and 2016 (Kumar, Furgal, Hutchinson, Roseborough, & Kootoo-Chiarello, 2019; Wdowin, 2024). Despite this, community members noted the presence of trap lines throughout the Community Access Road study areas during the Engagement Program.

"What I want to see is my grandchildren, great grandchildren and everybody else's, that they have access to the riches that are there in the land," Elizabeth Achneepineskum (Indigenous Watchdog, 2023).

5.1.6.1 Marten Falls First Nation

5.1.6.1.1 Traditional Economy

The community of Marten Falls First Nation was relocated from the original community site on the river to the current site, Ogoki Post, in the 1920s, where the Hudson's Bay Company had an established a trading post (Marten Falls First Nation, 2023a). Hunting, trapping, and fishing, has been part of the traditional economy for the community for hundreds of years (Marten Falls First Nation, 2023a), deeply rooted in the culture and traditions of Marten Falls First Nation (Indigenous Knowledge Program see **Table 3-1**). Until the 1970s, community members traded caribou, moose, beaver skins, whitefish and pickerel with the Hudson's Bay Company in exchange for tools, canvas, tents, guns, and bullets (Indigenous Watchdog, 2023).

In addition to being a food source, trapping beavers is a traditional method of managing local ecosystems. Without this management, beavers can overpopulate and cause environmental damage, such as flooding areas and disrupting plant life (Marten Falls First Nation, 2020). Beaver pelts were highly valued for making felt hats in Europe in the 17th

and 18th Centuries, primarily for making felt hats, which drove demand for the beaver trade. This led to extensive trapping efforts, nearly decimating the beaver population in northern Ontario and resulting in starvation for some Indigenous communities that relied on beaver as a major food source. Beavers were reintroduced in the 1900s to restore ecological balance (Marten Falls First Nation, 2020).

Trapping continues to provide economic opportunities through the sale of crafts such as mitts, moccasins, and more. The declining demand and price of fur have made trapping less feasible, limiting the ability to pass traditional skills on to younger generations (Indigenous Knowledge Program see **Table 3-1**).

Through the 2025 Story Beads Program, Marten Falls First Nation members discussed that hunting activities have decreased because of the high cost of gas, and the expense of vehicles, such as trucks, boats, motors, and skidoos, make hunting, fishing, and trapping cost prohibitive (AECOM, 2025). During the engagement programs, it was reported that while younger generations still hunt, fish, and trap, many are more interested in the opportunities that the road access would bring, such as greater access to resources and economic prospects, over traditional activities (Marten Falls First Nation, 2024 see **Table 3-2**) (Mining Life, 2022). This shift in interest is also attributed to the high effort, low monetary reward of traditional activities, as well as the declining availability of animals in the region (Marten Falls First Nation, 2024 see **Table 3-2**). Marten Falls First Nation members noted that with the road, community members would hunt and fish more, as there would be more access to hunting areas and little creeks to go fishing (AECOM, 2025).

The traditional harvesting practices in Marten Falls First Nation include: hunting moose, caribou, deer, geese, partridge and ptarmigan; trapping beaver, muskrat and rabbit; fishing for pickerel, trout, pike, whitefish and sturgeon; picking blueberries, strawberries and gooseberries; and harvesting trees including cedar, aspen, poplar, jack pine and tamarack (Marten Falls First Nation, 2023a; Teach for Canada, 2024). Since the 1960s, the Albany and Ogoki Rivers near Marten Falls First Nation have been dammed to generate power, resulting in the destruction of traditional hunting and fishing grounds (Indigenous Watchdog, 2023). Both man-made and natural obstructions to these rivers have negatively impacted the people of Marten Falls First Nation. Lower water levels have hindered navigation, creating challenges for transporting large game by water, which, in turn, affects traditional hunting practices in the region (Indigenous Knowledge Program see **Table 3-1**).

5.1.6.1.2 Participation in Cultural Activities

Marten Falls First Nation, located at the confluence of the Albany and Ogoki Rivers in northern Ontario, has a deep-rooted connection to the surrounding waterways. Traditionally, these rivers have been integral to the community's way of life, serving as vital routes for transportation, fishing, hunting, and cultural practices.

Historically, the waterways facilitated travel and trade, connecting Marten Falls First Nation to other communities and resources. The rivers served as natural highways, enabling the movement of people and goods across the region. This network of waterways was essential for maintaining relationships with neighbouring communities and accessing hunting and fishing territories. Fluctuating water levels from natural and human-made obstructions, such as hydroelectric developments and beaver dams, have made navigation increasingly difficult. While smaller vessels like canoes continue to navigate the waterways, long-distance travel along the rivers is increasingly challenging and is not commonly used for navigation (Indigenous Knowledge Program see **Table 3-1**).

Cultural practices are deeply intertwined with these waterways. Activities such as canoeing and white-water rafting on the Albany River are not only recreational but also serve to reinforce traditional skills and a connection to the land and water. The community's annual events, including powwows and cultural weeks, often incorporate elements that honor and celebrate their relationship with the rivers. The annual powwow and community feast is held at the end of August (Teach for Canada, 2024)

There are culture weeks held in October for hunting and winter preparations, and in April for duck and goose hunting (Teach for Canada, 2024). The school hosts a culture week every spring to teach skills including trapping, skinning a beaver, setting up rabbit snares, making dreamcatchers, and learning how to bead (Teach for Canada, 2024). The school offers instruction in traditional music (Indigenous Watchdog, 2023).

5.1.6.1.3 Use of Traditional Languages

The 2021 Census data reveal some important trends in language knowledge within Marten Falls First Nation and Aroland First Nations. For Marten Falls First Nation, the percentage of Ojibway speakers decreased from 22% in 2016 to 18% in 2021 (**Table 5-24**). While the census does not show any Oji-Cree and Cree language speakers in the community, there may be some members who speak these languages though they have not been captured in the census data. These speakers represent an important part of the linguistic diversity within the communities, even though they are underrepresented in official statistics. A community priority is to consider culture and language in the development and planning of the Community Access Road (Three Roads Forum, personal communication, Feb 27 2025). Community members have expressed that cultural practices, such as traditional harvesting of plants and foods, spiritual ceremonies, and oral histories, are deeply tied to language. It was noted that language fluency is important for the transmission of cultural knowledge and strengthening community bonds.

In Marten Falls First Nation, the decline in Ojibway language knowledge could be attributed to a variety of factors. Given the lower population in Marten Falls First Nation, migration may be one possible reason for this decrease, as community members could be moving off-reserve for employment or educational opportunities. The aging of fluent

speakers and a reduced number of opportunities for language transmission may also contribute to this decline. The decrease could reflect data variability inherent in census collection processes, particularly in smaller communities where sample sizes can skew results.

5.1.6.2 Aroland

5.1.6.2.1 Traditional Economy

Aroland First Nation was settled in the early 1900s by community members involved in the fur trade with the Hudson's Bay Company (Aroland First Nation, 2022). While the fur trade played a key role in Aroland First Nation's early economy, the community has long relied on natural resource harvesting, including hunting, fishing, and gathering. These traditional practices remain central to Aroland First Nation's way of life, supporting both cultural continuity and economic development.

Traditional harvesting in Aroland First Nation includes hunting black bear, moose, caribou, deer, geese, partridge and ptarmigan; trapping beaver, muskrat and rabbit; fishing; and gathering wild blueberries, strawberries and gooseberries; and harvesting timber such as cedar, aspen, poplar, jack pine and tamarack (Indigenous Knowledge Program see **Table 3-1**). Through the 2025 Story Beads program, Aroland First Nation members confirmed that they hunt for moose, goose, grouse, partridge; fish for walleye, whitefish, often giving fish to community members who are unable to go out themselves; trap for rabbit and beaver; and gather berries, such as gooseberries, raspberries, blueberries, and bush tea. While wild rice is eaten by some community members, it is most commonly eaten by Elders. A trapline holder reported harvesting beaver, otter, muskrat, mink, marten, lynx, wolf, and one fisher, within their registered trapline area, with harvested furbearers sold to the commercial fur market (AECOM, 2025). Aroland First Nation and Ginoogaming First Nation harvest approximately 90 moose per year combined (Indigenous Knowledge Program see **Table 3-1**). A key cultural practice associated with moose hunting is to give the first moose to Elders. Subsequent servings of moose are shared among those who assist with the harvest and processing, so each family receives meat, reinforcing traditions of sharing and community support (AECOM, 2025).

These activities not only provide food and materials but also have cultural significance, helping to build social networks, trust, and mutual relationships (Stolz, Levkoe, & Nelson, 2017). Through the 2025 Story Beads Program, Aroland First Nation members mentioned that living off the land is culture, a place to share stories of past experiences, family histories on the land, and continue passing along culture through camping, hunting, fishing, and trapping. Picking blueberries is an important cultural activity that brings together family members (uncles, aunties, cousins, grandparents), is a time to share stories and learn about traditional culture, and an opportunity for Elders to share their experiences (e.g., residential school experiences) (AECOM, 2025).

Recently, traditional species within Aroland First Nation, such as blueberries, raspberries, willows, and timber, are facing pressure from industrial activities; this may put further strain on the traditional economy in the region (Indigenous Knowledge Program **Table 3-1**). Despite these challenges, the community continues to blend the traditional economy with a market-based economy. The Aroland Youth Blueberry Initiative, started in 2008, is an example of this mixed approach. Community members harvest and sell surplus blueberries to support youth programs, with the berries sold through a non-profit depot. Pickers are compensated at below market prices, benefiting both the initiative and the community. The blueberries are inspected at a community warehouse, transported in air-conditioned vans, and sold in Thunder Bay and other communities, generating approximately $50,000 during the growing seasons (Indigenous Knowledge Program see **Table 3-1**) (LeBlanc, 2014; Stolz, Levkoe, & Nelson, 2017).

The Aroland Youth Blueberry Initiative helps fund youth activities by purchasing sports equipment and promoting recreational participation, while also supporting food sovereignty and reducing dependence on the global food system. It is one of Northern Ontario's largest fresh blueberry depots. In 2012, the Aroland Youth Blueberry Initiative received the Community Food Champion Award from Nishnawbe-Aski Nation for being the largest supplier of handpicked blueberries in Northern Ontario. That year, the initiative generated an estimated revenue of $30,000 to $50,000 for the community (Stolz, Levkoe, & Nelson, 2017).

While the initiative has brought cultural and economic benefits, it faces challenges, especially related to transportation. The vehicle that transports the berries between Aroland First Nation and Thunder Bay makes at least two trips a week, with each round trip taking over eight hours. To support this and other community activities, food-related workshops are frequently held, though limited space for cooking and teaching remains a barrier. To address this, a portion of the community warehouse is being converted into a community food hub, with plans for further infrastructure development to include a kitchen (Understanding Our Food Systems, 2024). In addition to supporting economic growth, traditional harvesting activities are linked to improved health, including a better diet, exercise, and a greater sense of purpose, contributing to overall collective well-being (Indigenous Knowledge Program see **Table 3-1**).

Aroland First Nation considers the Ogoki Falls and Amy Falls on the Albany River as areas of cultural and ecological importance, where community members have engaged in traditional activities, including fishing, for generations. Concerned about the Lake Sturgeon population, the community applied for funding through the Aboriginal Fund for Species at Risk to develop the Aroland Lake Sturgeon Management Plan. The community initiated a documentary project to preserve Indigenous Knowledge, enhance community capacity, and improve understanding of the project's potential impacts and the threats to the conservation and management of Lake Sturgeon (Shared Value Solutions Ltd., 2024).

5.1.6.2.2 Participation in Cultural Activities

Aroland First Nation hosts the annual Ongonigaming First Nation Pow Wow, featuring traditional drumming, a community feast, and a variety of dance styles, including crow hop, spot dances, and exhibition dancers (CFNO, 2024). As noted, the Aroland First Nation Elders Lodge will offer communal spaces for cultural and social activities, and a fitness room. It will enable Elders to live independently while staying connected to their community, participate in traditions, preserve the Ojibway language, and supports intergenerational knowledge sharing (Government of Canada, 2024a).

The Family Well-Being Program provides activities and programs that can help revitalize Ojibway language, including community events such as feasts, family circles, traditional land-based healing events (NorthWesthealthline, 2024b). The National Native Alcohol and Drug Abuse Program also co-ordinates cultural and spiritual events and gatherings (NorthWesthealthline, 2024g). The Family Well-Being Program provides activities and programs that can help revitalize Ojibway language, including community events such as feasts, family circles, traditional land-based healing events (NorthWesthealthline, 2024b). The National Native Alcohol and Drug Abuse Program also co-ordinates cultural and spiritual events and gatherings (NorthWesthealthline, 2024g). Family holds a central place in community life. Women in the community maintain strong bonds through a dedicated women's group, where they engage in traditional crafts such as cradle-making (tikananbik). One participant noted making a cradle for her granddaughter, reflecting the community's commitment to preserving and practicing traditional customs (AECOM, 2025).

5.1.6.2.3 Use of Traditional Languages

In contrast to Marten Falls First Nation, Aroland First Nation saw a slight increase in Ojibway speakers, from 35.6% in 2016 to 36.1% in 2021 (**Table 5-24**). The relatively stable or slightly increasing trend in Ojibway language use in Aroland First Nation could be due to active cultural initiatives or community-driven language revitalization programs. Participants in the 2025 Story Beads Program emphasized the importance of preserving the Ojibway language, noting concerns about language loss and reporting that some have started taking Ojibway classes (AECOM, 2025).

Table 5-24: Knowledge of Languages in Marten Falls First Nation, Kenora District, and Ontario (2016-2021)

Knowledge of Languages (%)	Year	Marten Falls First Nation			Aroland First Nation			Ontario		
		Total	Men	Women	Total	Men	Women	Total	Men	Women
English	**2016**	100	96.4	95.7	100	100	100	97.3	97.7	96.8
	2021	98	96.0	100	100	100	100	97.3	97.8	96.8
French	**2016**	0	0	0	0	0	0	11.5	10.5	12.5
	2021	0	0	0	0	0	0	11.1	10	12.0
Cree languages	**2016**	0	0	0	0	0	0	0	0	0.1
	2021	0	0	0	0	0	0	0	0	0
Oji-Cree	**2016**	6	0	0	2.7	0	5.9	0.1	0.1	0.1
	2021	0	0	0	0	0	0	0	0	0

Knowledge of Languages (%)	Year	Marten Falls First Nation			Aroland First Nation			Ontario		
		Total	Men	Women	Total	Men	Women	Total	Men	Women
Ojibway languages	2016	22	28.6	17.4	35.6	43.6	29.4	0.1	0.1	0.1
	2021	18	19.0	17.0	36.1	37.5	35.0	0.1	0.1	0.1
Non-Indigenous languages (other than English and French)	2016	0	0	0	0	0	0	33.2	32.4	33.9
	2021	0	0	0	0	0	0	35.8	35.1	36.6

(Statistics Canada, 2016d; 2016e; 2016f) (Statistics Canada, 2021d; 2021e; 2021f)
Notes: Census tabulations are rounded to the nearest 5, which can skew results for small sample sizes.

5.1.6.3 Regional Indigenous Communities

5.1.6.3.1 Traditional Economy

Constance Lake First Nation

Constance Lake First Nation has a long-standing relationship with the land and waterways that shaped its traditional economy. For generations, families traveled and harvested along extensive river systems such as the Kenogami, Kabinakagami, Nagagami, Pagwachuan, and Albany, as well as numerous lakes including Constance, Fushimi, and Bannerman. These waterways served as vital transportation routes and trade corridors, forming the backbone of early economy activities (Constance Lake First Nation, 2019). Community members became highly skilled in fishing sturgeon and walleye, crafting tools for hunting and trapping, and observing protocols that respected territorial boundaries and customary laws (Constance Lake First Nation, 2019).

Education initiatives, such as the trapping courses offered through Mamawamatawa Holistic Education Centre, have supported knowledge transmission (Lowen & MacPherson, 2015) while conservation efforts for Woodland Caribou reflect the community's commitment to ecological stewardship (Rabski-McColl, A, 2022; Four Rivers, 2022). These practices illustrate how Constance Lake First Nation traditional economy is deeply interconnected with cultural values, sustainable resource use, and respect for the land.

Today, these traditional practices remain central to cultural identity and food security, forming a core part of the community's economy alongside emerging opportunities. Hunting, fishing, trapping, and gathering plants and medicines continue to be practiced in the community. Activities such as wild rice harvesting and bait fishing are permitted within designated areas in Constance Lake First Nation (Constance Lake First Nation, 2025).

Neskantaga First Nation

The traditional economy of Neskantaga First Nation was historically based on a seasonal cycle of hunting, trapping, and fishing, complemented by plant and berry harvesting (Indigenous Knowledge Program see **Table 3-1**). Hunting and trapping began in the fall and extended through winter into spring, with meat preserved by smoking or making pemmican and stored in birch bark containers for times of scarcity (Indigenous Knowledge Program see **Table 3-1**). Beaver became one of the most important species for trapping,

providing both valuable pelts and food, while women contributed significantly to trapping and preparing pelts for clothing and trade. Small game hunting and snaring were also practiced from an early age, reinforcing survival skills and cultural knowledge (Indigenous Knowledge Program see **Table 3-1**).Fishing was both a subsistence and commercial activity, with families establishing seasonal camps near lakes to harvest species such as sturgeon, whitefish, northern pike, trout, walleye, burbot, and sucker (Indigenous Knowledge Program see **Table 3-1**). Sturgeon held cultural and economic importance and was widely shared within the community, especially with Elders (Indigenous Knowledge Program see **Table 3-1**). At times, sturgeon was harvested commercially, with shipments flown out by air carriers to meet market demand. Today, Neskantaga First Nation continues to prioritize sturgeon conservation through stewardship programs, while expressing concerns about development impacts on wildlife, including moose and caribou, which remain vital to traditional food systems and cultural identity (Turner, 2022).

Animbiigoo Zaagi'igan Anishinaabek First Nation

The traditional economy of Animbiigoo Zaagi'igan Anishinaabek First Nation was historically based on seasonal harvesting of wildlife, fish, and plants, which provided both sustenance and trade opportunities. Hunting and trapping were key activities, with fall harvests focused on deer, moose, bear, partridge, duck, lynx, and caribou, and winter trapping targeting marten, rabbits, fisher, geese, and beaver (Indigenous Knowledge Program see **Table 3-1**). These species were not only essential for food security but also for fur trading, which contributed to household income and inter-community exchange. Fishing was equally significant, with trout, sucker, salmon, and sturgeon harvested in the fall, and pike, sucker, whitefish, and walleye in winter from waterbodies such as Kenogamisis Lake, Kenogamisis River, and Goldfield Lake (Indigenous Knowledge Program see **Table 3-1**). Sturgeon, in particular, held cultural and economic importance, and commercial fishing has grown in recent years, providing income for several families (Nextbridge Infrastructure, 2018).

Plant and berry harvesting also played an important role in the traditional economy. Blueberries were especially significant, with some families relying on commercial blueberry harvesting in the Lake Nipigon area for additional income. Other plants and medicines, including birch and chaga, were gathered for food, cultural practices, and medicinal purposes (Indigenous Knowledge Program see **Table 3-1**). Today, trapping remains an important source of income for some Elders, while commercial fishing and berry harvesting continue to provide economic opportunities for community members. These activities reflect a traditional economy that integrates cultural values, ecological knowledge, and adaptive strategies to sustain livelihoods (Nextbridge Infrastructure, 2018).

Ginoogaming First Nation

Ginoogaming First Nation's traditional economy has historically been rooted in hunting, trapping, fishing, and plant harvesting across a broad territory that includes Lake Nipigon,

Long Lake, areas north of Lake Superior, and parts of the Pic River watershed (Indigenous Knowledge Program see **Table 3-1**). These activities typically occurred in the fall and winter, with hunting focused on large game such as moose and Woodland Caribou, and trapping providing furs for trade and household use. Multiple traplines identified within the study area remain actively used today, reflecting the continued importance of trapping as both a cultural and economic practice (Indigenous Knowledge Program see **Table 3-1**). Fishing has also been central to the traditional economy, with species such as pike, sucker, and walleye harvested seasonally. Plant gathering, including cedar, sweetgrass, blueberries, and medicinal roots, complemented these practices and supported food security and cultural traditions (Beringia community planning, 2015).

In recent years, community members have expressed concerns about environmental changes and development pressures that threaten these traditional economic activities (Beringia community planning, 2015). Declining wildlife health such as moose with small organs and sour-tasting meat, bears scavenging garbage, and reduced marten populations, has impacted hunting and trapping. Similarly, fish quality has deteriorated, with reports of pickerel with red spots and pike with worms, while forestry spraying and dust have affected berries and medicinal plants. Increased external access, tourism, and private lodges have raised fears of overharvesting and restrictions on hunting and fishing rights (Beringia community planning, 2015). These pressures, combined with broader social and health challenges, risk eroding traditional practices, food security, and cultural continuity for Ginoogaming First Nation.

Long Lake #58 First Nation

The traditional economy of Long Lake #58 First Nation was historically rooted in subsistence activities that supported both cultural practices and trade. Hunting and trapping were central components, with moose regarded as the most significant game species and Woodland Caribou also contributing to community diets. These activities were complemented by fishing, which remains a staple food source, and the seasonal harvesting of plants, berries, and fungi for nutritional and medicinal purposes (Indigenous Knowledge Program see **Table 3-1**). Meat preservation techniques such as drying and smoking, combined with storage in birch bark baskets, supported food security during harsh winters.

Beyond sustenance, hunting and trapping served as primary economic drivers, with fur trading remaining the dominant economic activity well into the 1950s (Indigenous Knowledge Program see **Table 3-1**). Trap lines were strategically relocated to maintain ecological balance and meet seasonal needs, reflecting adaptive resource management. Cultural materials such as porcupine quills were also highly valued, used to decorate baskets, clothing, and jewelry (Indigenous Knowledge Program see **Table 3-1**). This demonstrates the integration of economic and cultural systems. These practices

collectively formed a resilient traditional economy that sustained livelihoods while reinforcing cultural identity.

5.1.7 Community and Public Health

This section describes the existing conditions for the community and public health for Marten Falls First Nation and Aroland First Nation, given available data, related to access to health services and programs, recreation, mental health and well-being, and substance use.

5.1.7.1 Marten Falls First Nation

5.1.7.1.1 Access to Health Services and Programs

Marten Falls First Nation offers a variety of programs through its health centre, Family Well-Being Program, Healthy Babies Healthy Children initiative, and Home and Community Care services. These programs are essential in promoting health, cultural revitalization, and family support within the community (**Table 5-25**). The Medical Transportation Program provides assistance in logistics co-ordination for appointments in Sioux Lookout and Thunder Bay. Although Marten Falls First Nation has some health services available, access is limited due to the short amount of time a doctor is present in the community, resulting in the inability to accommodate most individuals seeking care. These healthcare services have been described as “inadequate” to meet the community’s needs (Hessey, 2023). Chief Achneepineskum has stated, “We struggle to see a doctor. We’re struggling to transport our sick people” (Hessey, 2023). Accessing healthcare is challenging, particularly since community members must rely on regularly scheduled flights to attend medical appointments or rely on medevac services for emergency situations (AECOM, 2025). The road would improve access to healthcare and improve access to medical services and treatment programs (AECOM, 2025).

Table 5-25: Health Services and Programs available in Marten Falls First Nation

Services and Programs	Services
Marten Falls First Nation Health Centre	■ Health awareness education, education and prevention workshops ■ Co-ordination of clinics for diabetes, immunization, sexual health, and communicable disease ■ Prenatal and postpartum healthcare ■ Wellness groups for men and women ■ Smoking cessation counselling ■ First aid / CPR courses ■ Intake services to determine health care needs of individual ■ Education and information on Fetal Alcohol Syndrome and Fetal Alcohol Effects ■ Home visits to the sick, senior, new mothers, and persons with health care needs ■ Co-ordinating travel for medical appointments

Services and Programs	Services
Marten Falls First Nation Family Well-Being Program	■ Activities to revitalize Indigenous language ■ Alcohol and drug abuse prevention and intervention ■ Community events (e.g., feasts) ■ Family circles, counselling, and child / youth support groups ■ Referrals to other programs and services ■ School programs ■ Traditional land-based healing events
Marten Falls First Nation Healthy Babies Healthy Children	■ Information and education session on healthy pregnancy, birth, taking care of baby ■ Organizes prenatal classes ■ Home visits to prepare family for baby, post birth to offer support to new mothers, and during child's early years to offer child development guidance ■ Operates a children's library to encourage child literacy
Marten Falls First Nation Home and Community Care	■ Assessment and development of a personalized care plan ■ Case management ■ Home care nursing duties ■ Personal care help for activities such as getting dressed or bathed ■ Basic or advanced practice food care ■ Teaching individual how to care for themselves ■ Home support with light housekeeping, laundry, meal preparation ■ Respite for family members and care givers ■ Help with light outdoor work and yard work
Marten Falls First Nation Medical Transportation Program	■ Transportation to medical appointments within the community ■ Transportation to members in Marten Falls First Nation to Sioux Lookout and Thunder Bay for medical appointments (e.g., doctor, dentist, optometrist, specialists) ■ Assistance in booking appointments, hotels, and completing applications for mileage compensation for out of community medical appointments

(Ontario, 2011; 2024a; 2024b; 2024c; 2024d; 2024e)

Marten Falls First Nation operates the Muskeg Thunder clinic, offering a variety of medical services, including health education, specialized clinics (e.g., for diabetes, immunization, and sexual health), prenatal and postpartum care, and wellness programs (211 Ontario North, 2024c). The clinic also provides smoking cessation counseling, first aid / CPR courses, home visits, and supports programs like the Aboriginal Diabetes Initiative and Family Well-Being Program. Additionally, it offers the Healthy Babies Healthy Children program, home and community care, and an immunization clinic. The Medical Transportation Program facilitates access to off-site healthcare, and the clinic supports the National Native Alcohol and Drug Abuse Program, including a Suboxone Treatment Program (Ontario, n.d.b).

5.1.7.1.2 Recreation

Marten Falls First Nation offers a variety of recreational activities and facilities for its residents. The community features an indoor arena that serves multiple purposes throughout the year. In the winter, it hosts hockey games, while in the summer, it is used for powwows, volleyball, floor hockey, bingo, and card nights. Residents enjoy outdoor activities such as snowmobiling, hunting, fishing, camping, canoeing, and white-water rafting. The community also has a boat launch, providing access to water-based

recreation. An annual powwow is an important cultural event, bringing the community together to celebrate their heritage and traditions (Teach for Canada, 2024).

5.1.7.1.3 Mental Health and Wellbeing

Isolation has made life hard for many community members in Marten Falls First Nation, and the community faces social challenges, including youth suicide, alcoholism and opioid addiction (Indigenous Watchdog, 2023). As recently as January 2025, a Community Safety Bulletin reported two suspected non-fatal overdoses in the community that required intervention and noted the presence of fentanyl and other potent substances is increasing, including the growing risk of fentanyl being found in non-opioid substances such as methamphetamines (Davidson, 2025).

Mental health concerns are persistent in the Nishnawbe Aski Central Region communities, which includes Marten Falls First Nation and Aroland First Nation. As noted in **Table 5-26**, the 2023 to 2024 year, there were 484 service calls related to mental health or suicide attempts (Nishnawbe Aski Police Service, 2024). While these calls were not all specific to Marten Falls First Nation or Aroland First Nation, they reflect the broader mental health challenges that may also be experienced in these communities.

Table 5-26: Nishnawbe Aski Police Service, Number of Mental Health Related Calls by Type for the Central Region (2023 – 2024)

Mental Health Related Calls	Central Region, Nishnawbe Aski Police Service (2023 - 2024)
Mental Health Act	195
Attempt Suicide	104
Threat of Suicide	185
Total	484

Although the *Suicide Crisis Prevention to Marten Falls First Nation & Nishnawbe Aski Nation* report from 2011 is dated, the report remains relevant in understanding the long-term psychosocial impacts of isolation and limited service access. The report highlighted an incident involving the loss of a young child and raised concerns about distressing behaviours observed among children in the community, including self-harm and expressions of suicidal thoughts (Timpson & O'Gorman, 2011). At the time, over 75% of parents and working age individuals were using drugs (Timpson & O'Gorman, 2011). Grandparents were stepping in to provide students with food, while addicted parents struggled to provide care. The effects of this were felt throughout the community. Children stopped riding their bikes. People ceased using the river for traditional activities. And houses lacked many possessions, such as TVs and computers. Several barriers were identified at the time, including response to substance abuse and support community health. The report concluded that the community lacked access to effective withdrawal medications, such as suboxone, and had limited engagement with regional services,

including drug education programs and aftercare programs for individuals seeking to quit (Timpson & O'Gorman, 2011).

As of 2011, the community was in the early stages of addressing substance use issues, and the high addiction rate among the work force which resulted in vacant job positions (Timpson & O'Gorman, 2011). In response to the question of what might help prevent substance use, community members emphasized the importance of cultural activities. Many suggested that reconnecting with traditions and engaging in outdoor, recreational, and creative pursuits could be beneficial. These activities include learning about their history and culture, using traditional names for kids and adults, fishing, setting nets with Elders, canoeing, camping, beading, moccasin making, mitt making, snowshoe making, and creating dreamcatchers. Additionally, they highlighted the value of coming together for feasts (Timpson & O'Gorman, 2011). These are important protective factors that can help support mental wellness and reduce substance use.

While the current conditions of substance use remain similar, with approximately 80% of the work force in the community struggling with addictions, Marten Falls First Nation is working to build a treatment centre to provide in-community addictions treatment (B. Baxter, personal communication, February 19, 2025). Increased access to in-community treatment was viewed as essential for reducing the need to leave community for supports, reconnecting with culture and traditions, and improving culturally-relevant treatment access for Marten Falls First Nation and Aroland First Nation community members (AECOM, 2025).

Isolation in Marten Falls First Nation affects the physical, social, mental and economic well-being of its community members. Limited access to healthcare services, due to the long distances required to travel for medical care, leads to delays in diagnoses and treatment (National Collaborating Centre for Indigenous Health, 2019). These challenges intersect with substance-related risks; the availability of substances like fentanyl and other toxic substances heightens the risk of overdoses and other drug-related health problems. Ongoing struggles with alcoholism and opioid addiction contribute to physical health decline, chronic conditions, and increased mortality rates.

Social isolation can increase feelings of disconnection and marginalization. Youth suicide is often linked to feelings of hopelessness and lack of support, while substance abuse issues like alcoholism and drug addiction strain family relationships, disrupt community cohesion, and may increase domestic violence and neglect (Timpson & O'Gorman, 2011). These dynamics have long-term impacts on families, caregivers, and community cohesion.

Mental health is impacted by isolation, leading to higher rates of depression, anxiety, and substance abuse. A decline in mental health can be observed by the number of emergency service calls related to mental health concerns. In 2023 - 2024, there were 484 service calls within the Central Region of the Nishnawbe Police Service for mental health related concerns; Marten Falls First Nation falls within this catchment. Geographic barriers

worsen these challenges, as individuals struggling with mental health often face difficulties accessing necessary services, such as counselling, crisis supports, and clinical services. Stigma surrounding mental health and substance use can further prevent individuals from seeking help.

Economic opportunities are limited due to isolation. High unemployment rates and lower workforce participation reflect limited access to education, training, and employment pathways. Requirements such as a driver's license, which is difficult to obtain in a remote fly-in community, further restrict employment options. These barriers contribute to financial stress, reduced household stability, and broader socio-economic challenges for community well-being.

Psychosocial well-being refers to the interconnection between psychological health, including thoughts, emotions, mental state, and social factors, including relationships, community engagement, and cultural identify. Psychosocial well-being plays an important role in community and public health, particularly for Indigenous communities where cultural identity is closely tied to land-based relationships. Connection to the land is recognized as a key determinant of overall mental health and well-being (Salerno, Tam, & Page, 2021).

Changes to the physical landscape can disrupt this connection and potentially result in psychosocial stress. Studies note that these effects extend beyond biophysical changes, and can influence First Nations' cultural continuity, identity, and spiritual practices that are tied to traditional lands and local environments (Casey, 1996; Windsor & McVey, 2005). For youth, who are in critical stages of cultural learning and identity development, disruptions to land-based relationships may weaken opportunities for intergenerational knowledge transfer and diminish cultural resilience, increasing vulnerability to mental health challenges.

A sense of place reflects the physical, symbolic, social, and intergenerational aspects of the environment. Places can carry language, memory, and cultural practices for First Nations' peoples, serving as living records of individuals and communities' identity (Casey, 1996; Windsor & McVey, 2005). When landscapes are altered, individuals and communities may experience ecological grief or solastalgia, both of which describes chronic psychological distress associated with environmental degradation and loss of place-based identity (Albrecht, 2005; Mcmanus, Albrecht, & Graham, 2014). Solastalgia refers to the distress or sense of loss experienced when one's home environment undergoes alterations, such as environmental alterations.

Assessing connectivity to land is complex because these impacts occur on a spectrum and vary across communities. They are shaped by factors such as historical land dispossession, cultural resilience, and community cohesion, which influence how changes to landscapes are experienced. These dynamics help explain why disruptions to land-based relationships can lead to negative psychosocial consequences, including loss of

identity and psychological distress among youth and adults alike (Salerno, Tam, & Page, 2021).

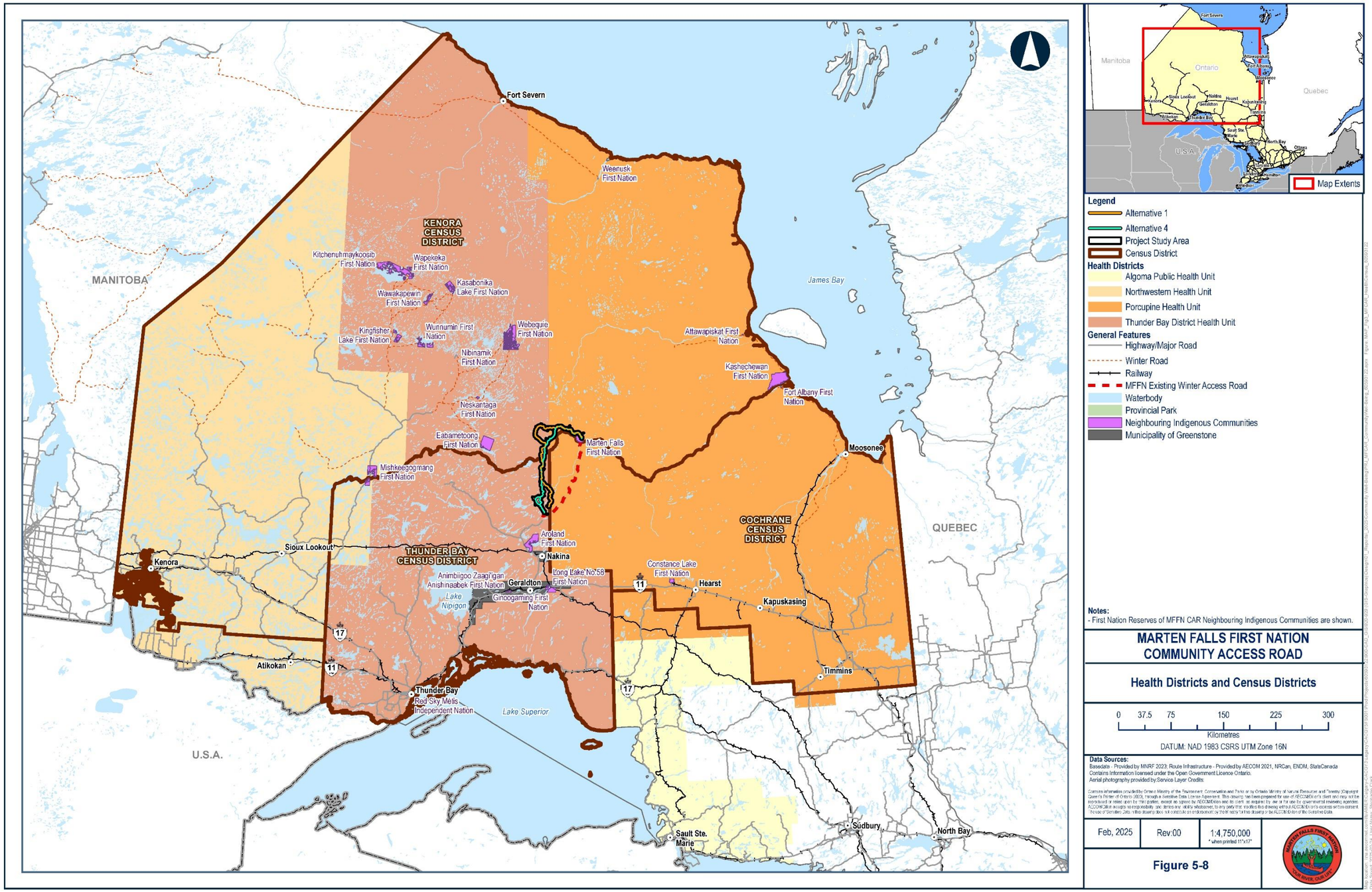
Available secondary information indicates that mental health challenges are already significant within Nishnawbe Aski Central Region communities, with elevated rates of suicide (**Table 5-26**) and addictions reported. These existing vulnerabilities may amplify psychosocial effects associated with changes to land access and landscape integrity. Historical land dispossession and cumulative industrial development further contribute to the stressors faced by Indigenous peoples. Understanding these contextual factors is important for interpreting potential project-related impacts on overall mental health as it relates to peoples' perceptions of connectivity to the land in Indigenous communities such as Marten Falls First Nation.

5.1.7.1.4 Substance Use

Health statistics are made available for the entire health unit (i.e., region) and not specific to Marten Falls First Nation. Despite this, they still provide valuable insights into the general health trends and challenges faced by the community, specifically substance use. The Porcupine Health Unit, boundaries are shown in **Figure 5-8**.

Alcohol consumption is a key indicator of community health and psychosocial well-being. Higher levels of alcohol use can contribute to household stress, influence perceptions of safety, and compound pre-existing vulnerabilities in remote communities where treatment and supports are limited. Including alcohol consumption in the existing conditions provides context for understanding current health pressures and understand how project-related changes may interact with community well-being (Impact Assessment Agency of Canada, 2025).

Figure 5-8: Health Unit Boundaries



The self-reported rate of alcohol consumption in the Porcupine Health Unit increased from 79.9% in 2015 - 2016 to 86.9% in 2019 - 2020, representing a 7% increase. In contrast, Ontario saw a slight decline from 78.9% to 75.8% over the same period. These mixed trends suggest that while some areas have seen success in reducing alcohol consumption, others have not. For Marten Falls First Nation, this indicates the need for targeted interventions to address alcohol misuse, the varying effectiveness of strategies across the district. For more detailed statistics, please refer to **Table 5-27**. Higher rates of alcohol consumption can also influence psychosocial well-being by contributing to stress within households, affecting perceptions of community safety, and amplifying existing vulnerabilities in remote communities.

Table 5-27: Self-reported Rate of Current Alcohol Consumption, by Percent (2015 – 2020)

District	2015 – 2016	2017 – 2018	2019 - 2020	% change
Porcupine Health Unit	79.9	84.1	86.9	7
Ontario	78.9	77.4	75.8	-3.1

(Public Health Ontario, 2023a)

In addition to concerns about alcohol use, the community has identified issues related to the presence and increasing availability of illegal drugs within Marten Falls First Nation (Indigenous Knowledge Program; Consultation and Engagement Program). Limited access to withdrawal medications, such as suboxone, has been noted as a gap in local health services, contributing to challenges in addressing substance use. More broadly, there is a perception that expanded mental-health supports and addictions-related programming would be beneficial. Information from the Indigenous Knowledge Program noted that substance-use challenges may be affecting overall wellbeing and reducing the connection with the community's traditional territory. In response to these identified needs, Marten Falls First Nation is currently establishing a community-based treatment centre to improve access to supports and care.

5.1.7.2 Aroland First Nation

5.1.7.2.1 Access to Health Services and Programs

Aroland First Nation offers a range of health services through its health centre, including health awareness programs, education and prevention workshops, and specialized clinics focusing on areas such as immunization, sexual health, and communicable diseases (**Table 5-28**) (NorthWesthealthline, 2024c). Hospital and clinic services are not available in Aroland First Nation, members must travel to Geraldton for the hospital and Nakina for the clinic. As noted, there are Child and Family services provided in the community through the Tikinagan Child and Family Services organization (NorthWesthealthline, 2024a; 2024h).

Hospital services are available in Geraldton, and clinic services are available in Nakina (Anishinabek Education System, 2024). The Tikinagan Child and Family Services provide in-community child and family support (NorthWesthealthline, 2024h).

In 2024, the Government of Canada announced a $20.5 million investment from the Green and Inclusive Community Buildings program for the new Aroland First Nation Elders Lodge. The lodge will provide Elders in the community with a place to call home and live independently as they receive care. When complete, the building will be a net-zero carbon building and will offer 20 private suites (Government of Canada, 2024a).

Table 5-28: Health Services and Programs available in Aroland First Nation

Services & Programs	Services
Aroland Health Centre	■ Co-ordination of health care services, such as home care and community health nurses, nurse practitioners, foot care nurse, and diabetes educator ■ Co-ordination of immunization, sexual health and communicable disease clinics ■ Co-ordination of one-on-one prenatal care with community nurse ■ Home visits to sick, senior, new mothers, and persons with health care needs ■ Assistance with logistics for medical appointment travel arrangements
Family Well-Being Program	■ Revitalize Ojibway language ■ Alcohol and substance use prevention and intervention ■ Community events such as feasts ■ Family circles, counselling, and child / youth support groups ■ School programs ■ Traditional land-based healing events
Aroland First Nation Healthy Babies Healthy Children	■ Information and education session on healthy pregnancy, birth, taking care of baby ■ Organizes prenatal classes ■ Home visits to prepare family for baby, post birth to offer support to new mothers, and during child's early years to offer child development guidance ■ Operates a children's library to encourage child literacy
National Native Alcohol and Drug Abuse Program	■ Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) meetings when required ■ Transportation to meetings and workshops ■ Educational sessions in schools ■ Cultural and spiritual events ■ Recreational activities and social events ■ Individual and group discussion ■ Counselling, sharing circles, support groups
Aroland First Nation Home and Community Care	■ Assessment and development of a personalized care plan ■ Case management ■ Home care nursing duties ■ Personal care help for activities such as getting dressed or bathed ■ Basic or advanced practice food care ■ Teaching individual how to care for themselves ■ Home support with light housekeeping, laundry, meal preparation ■ Respite for family members and care givers ■ Help with light outdoor work and yard work
Aroland First Nation Medical Transportation Program	■ Transportation to medical appointments (doctor, dentist, optometrist) in Nakina and Geraldton; exceptions for travel to Thunder Bay on a case-by-case basis ■ Provides assistance in completing approval forms for long distance travel ■ Processing non-insured health benefit service claims

(NorthWesthealthline, 2024a; 2024b; 2024c; 2024d) (2024e; 2024f; 2024g)

See section above on mental health concerns in the Nishnawbe Aski Central Region for more information.

5.1.7.2.2 Recreation

Aroland First Nation offers a variety of recreational facilities, including an outdoor hockey rink, a school playground, and a community hall. An annual powwow is held on the school grounds each year (CFNO, 2024). Johnny Therriault Memorial School features a computer laboratory, gymnasium, community kitchen and public library, supporting both educational and community events. These facilities promote physical health, cultural preservation and community engagement in Aroland First Nation.

5.1.7.2.3 Mental Health and Wellbeing

As noted in **Section 5.1.7.1.3**, many of the social and health challenges associated with geographic isolation in the region also affect Aroland First Nation. Although Aroland has road access, it is part of the broader Nishnawbe Aski Central Region where communities experience ongoing pressures related to mental health, substance use, and service availability. The broader challenges identified for Marten Falls First Nation, including youth suicide, alcoholism, and opioid addiction (Indigenous Watchdog, 2023), are relevant at the regional level and may also be experienced by Aroland First Nation.

Mental health concerns are prevalent across the Nishnawbe Aski Central Region, which includes both Aroland First Nation and Marten Falls First Nation. As shown in **Section 5.1.7.1.3**, during 2023 to 2024, the Nishnawbe Aski Police Service responded to 484 calls related to mental health concerns or suicide attempts (Nishnawbe Aski Police Service, 2024). These data are not community specific, and provide context for understanding the broader regional pressures that may influence community well-being in Aroland First Nation.

As described in **Section 5.1.7.1.3**, isolation affects physical health, mental wellness, and socio-economic conditions across the region. Limited access to primary and specialized healthcare contributes to delayed diagnoses and reduced continuity of care (National Collaborating Centre for Indigenous Health, 2019). Substance use trends, including increased circulation of toxic drug supplies, influence health risks that may affect individuals across Central Region communities.

Social impacts related to isolation, including experiences of disconnection, family stress, and intergenerational trauma, are also relevant to Aroland First Nation. Youth suicide and mental health concerns are linked to limited access to supports, experiences of hopelessness, and disruptions to community cohesion (Timpson and O'Gorman, 2011). These conditions can influence well-being for families and caregivers.

Psychosocial well-being in Indigenous communities is closely connected to cultural identity, land-based relationships, and social cohesion. As described in **Section 5.1.7.1.3**, changes to the land may influence cultural continuity, identity formation, and spiritual practices (Salerno, Tam, and Page, 2021; Casey, 1996; Windsor and McVey, 2005). These considerations are also relevant to Aroland First Nation, where cultural practices and land relationships contribute to community identity and resilience. Changes to the landscape may lead to experiences of ecological grief or solastalgia, which describe forms of psychological distress associated with environmental alteration and shifts in place-based identity (Albrecht, 2005; McManus, Albrecht, and Graham, 2014).

As noted in **Section 5.1.7.1.3**, mental health and addictions pressures already exist within the Central Region. These broader conditions may shape how communities experience changes related to land access or environmental conditions. Historical land dispossession, cumulative development pressures, and structural factors form part of the context for communities across the region. Considering these elements provides background that may help describe the broader circumstances relevant to Aroland First Nation when discussing potential project-related effects on mental health and psychosocial well-being.

5.1.7.2.4 Substance Use

Health statistics are made available for the entire health unit (i.e., region) and not specific to Aroland First Nation. Examining data from the Thunder Bay District Health Unit provides insights into the public health trends as well as challenges faced by the community, including substance use.

Alcohol consumption is a key indicator of community health and psychosocial well-being. Higher levels of alcohol use can contribute to household stress, influence perceptions of safety, and compound pre-existing vulnerabilities in remote communities where treatment and supports are limited. Including alcohol consumption in the existing conditions provides context for understanding current health pressures and understand how project-related changes may interact with community well-being (Impact Assessment Agency of Canada, 2025).

The self-reported rate of current alcohol consumption in the Thunder Bay District Health Unit increased slightly from 82.6% in 2015 - 2016 to 84.3% in 2019 - 2020, representing a 1.7% increase; alcohol consumption has remained relatively stable, with a slight upward trend over the five-year period. For Aroland First Nation, this indicates the need for targeted interventions to address alcohol use, considering the persistent levels of consumption. For more detailed statistics, please refer to **Table 5-29**. Higher rates of alcohol consumption can also influence psychosocial well-being by contributing to stress within households, affecting perceptions of community safety, and amplifying existing vulnerabilities in remote communities.

Table 5-29: Self-reported Rate of Current Drinking Percent (2015 – 2020)

District	2015 – 2016	2017 – 2018	2019 - 2020	% change
Thunder Bay District Health Unit	82.6	84	84.3	1.7
Ontario	78.9	77.4	75.8	-3.1

(Public Health Ontario, 2023a)

Throughout the course of the Consultation and Engagement and Indigenous Knowledge Programs, Aroland First Nation community members shared that substance use is a concern for the community. Community members noted that drug use is already present, and some expressed worry that these issues may increase over time (Indigenous Knowledge Program).

Community members also raised concerns about the potential for more drugs and alcohol entering the community due to non band members passing through or accessing the area. These observations provide insight into how some community members understand current and emerging substance use issues within Aroland First Nation (Indigenous Knowledge Program; Consultation and Engagement Program).

5.1.8 Access to Clean Water

Access to clean water remains a significant challenge for many First Nation communities. Despite ongoing efforts, such as government-funded initiatives, many Indigenous communities continue to face barriers to accessing safe and reliable water sources, including Marten Falls First Nation.

5.1.8.1 Marten Falls First Nation

Access to Clean Water

Clean water is essential for the health and well-being of every community, a point that was emphasized by community members during the engagement process for this project. Marten Falls First Nation does not have access to clean water; the community has been under a long-term boil water advisory for approximately 19 years (Law, 2024).

A new 3,600 square foot water treatment plant was constructed in 2019 to improve water quality (Penn-Co, 2025). However, issues related to the raw water intake have continued, with efforts underway by Indigenous Services Canada to address these concerns, with completion anticipated in spring 2025 (Government of Canada, 2025a). Challenges associated with the new water treatment plant have included difficulties with the water intake in the Albany River, including contamination at the source (Perreault, 2024), infrastructure limitations, and a shortage of qualified personnel to operate the plant (Rinne, 2021). These issues have contributed to the ongoing reliance on bottled water, which is flown in from Thunder Bay at cost to the community. Between 2005 and 2014, the federal government reimbursed Marten Falls First Nation approximately $2.13 million for bottled

water (Smith J. , 2015), with costs exceeding $300,000 annually for shipping, although some sources have indicated up to $40,000 per month on water is spent on water (Labine, 2012).

Inconsistent funding and support have been challenges, with the community sometimes having to wait until the following fiscal year to receive reimbursement for shipping costs (Cision, 2021). In June 2021, Marten Falls First Nation joined a class-action lawsuit aimed at securing compensation and ensuring the provision of clean water to First Nations communities. In 2022, Indigenous Services Canada discontinued funding for the bottled water program in Marten Falls (Achneepineskum, 2024). Indigenous Services Canada resumed funding for bottled water following a 2024 state of emergency declaration triggered by a sewage spill from the wastewater treatment plant (Law, 2024).

Quality of Drinking Water

While steps have been taken to improve water quality in some communities, more work remains to support equitable access to clean water for all.

The existing conditions relevant to the Surface Water and Sediment Quality may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Surface Water Technical Support Document [Appendix F].

The existing conditions relevant to the Groundwater Quality and Soil Leachate Quality may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Groundwater Technical Support Document [Appendix H].

In conversation, community members noted that some drinking water is sourced directly from the Albany River adjacent to the Marten Falls First Nation Community (Three Roads Forum, personal communication, Feb 27, 2025). Samples taken in the Albany River at Nottick Island as part of the surface water technical study revealed exceedances of the drinking water standards for total iron and mercury. Therefore, during the May 2025 Project in Community meetings, four surface water samples were collected from two locations in the Albany River adjacent to the community. The results and further information this sampling can be found in Attachment A – Problem Formulation for Human Health Risk Assessment.

Information on Surface Water and Sediment Quality in the Local Study area can be found in the Attachment A – Problem Formulation for Human Health Risk Assessment.

5.1.8.2 Aroland First Nation

Access to Clean Water

Aroland First Nation currently has some access to clean water. Although the community was previously under a long-term boil water advisory between 2008 and 2021, a period

during which residents were required to boil their water before consumption. This raised concerns over health, sanitation, and the financial challenges of obtaining safe clean water (First Nations Drinking Water Settlement, 2024).

Information on the specific funding or upgrades to the water treatment plant that allowed Aroland First Nation to lift its long-term boil water advisory is limited. It may be that government funding was provided to support necessary improvements. For example, the Government of Canada allocated funding for Indigenous water infrastructure projects, including $1.5 billion in 2020 to improve access to clean water in First Nations communities.

While the boil water advisory has been lifted for most of the community, some private businesses and semi-public water systems have not been fully integrated into the upgraded infrastructure. The main community water system provides clean water to most residents, but a Boil Water Advisory remains in place for the O'Sullivan Lake Gas Bar Semi-Public Water System. This advisory was first issued in September 2008 and was still active as of October 2024 (Government of Canada, 2024c). The advisory applies only to the gas bar and does not affect residential homes or most public buildings in Aroland First Nation.

Quality of Drinking Water

While steps have been taken to improve water quality in some communities, more work remains to support equitable access to clean water for all.

Information on Surface Water and Sediment Quality in the Local Study area as it relates to human health can be found in the Attachment A – Problem Formulation for Human Health Risk Assessment.

5.1.8.3 Regional Indigenous Communities

Access to Clean Water

Constance Lake First Nation

Access to safe drinking water has been a longstanding challenge for Constance Lake First Nation. The community experienced extended boil water advisories from July 25, 2010, to July 3, 2012, and again from April 2014 to September 16, 2016, highlighting infrastructure gaps and health risks. In response, the community celebrated the grand opening of a new water treatment plant in 2016, a milestone that supports clean and safe drinking water for residents (Indigenous and Northern Affairs Canada, 2016). This development reflects a broader commitment to improving health and quality of life while reducing reliance on emergency measures.

Historically, water sources were deeply tied to seasonal mobility and traditional practices. In summer months, families traveled along major waterways such as the Albany River, which served as a source of drinking water and a vital transportation corridor (Daigle, 2005).

Fort Albany First Nation

Fort Albany First Nation has faced prolonged challenges accessing safe drinking water. The community was under a boil water advisory from August 12, 2003 to June 23, 2006, a period of almost three years. From October 9, 2024 to December 11, 2024, part of Fort Albany First Nation was under boil water advisory and a state of emergency due to water treatment plant infrastructure failure (Rutherford, 2024). The water treatment plant was built in 1997 and then expanded in 2004. The community is not currently under any boil water advisories, but the recent state of emergency raises possible concerns about the continued stability of the water treatment infrastructure.

The Albany River and its tributaries are a direct source of drinking water, with community members preferring to drink straight from the river without boiling. The river and tributaries are also travel routes for the community—used as highways to hunting and fishing areas, and travel to other communities. These traditional practices rely on clean water for cultural continuity (Minkin, 2008). Subsistence fishing is vital to Fort Albany First Nation and is practiced on several different water bodies surrounding the community.

Attawapiskat First Nation

Access to safe drinking water has been a significant challenge for Attawapiskat First Nation. The community was under a boil water advisory from January 1, 2009, to June 20, 2021, a period spanning over a decade. This prolonged advisory highlight infrastructure limitations in the community. Today, there is no active boil water advisory, marking an important improvement in water safety and reliability for residents.

The traditional lands of Attawapiskat First Nation include a vast area of Ontario's Far North, including major waterways such as the Attawapiskat River, Ekwan River, and Albany River. These rivers have historically served as essential sources of drinking water and transportation routes, reflecting deep cultural and subsistence ties to the land and water. The territory extends from the Kapiskau River in the south to Hudson Bay (Cape Henrietta Maria) in the north, and westward along Hudson Bay toward the Winisk River, as well as from Akimiski Island in the east to Lake Missisa in the west (Attawapiskat First Nation & Neegan Naynowan Stantec LP, 2015).

Kashechewan First Nation

Kashechewan First Nation has had serious and ongoing issues accessing safe drinking water, with the community currently under a boil water advisory as of November 2025. The first recorded advisory lasted from August 12, 2003, to June 23, 2006, which included an E

coli contamination in 2005 that led to an evacuation of about 1,000 residents (Baragar, 2025). On December 4, 2024, approximately 200 community members evacuated to Thunder Bay due to a contamination at the water treatment plant, with the advisory lifted and evacuees returning in February 2025. Another boil water advisory put in place from August 12, 2025, to November 14, 2025, which was then reinstated on November 17, 2025, and was in place at the time of writing (Indigenous Services Canada, 2025).

The community was built along a floodplain, an area chosen by the federal government despite warnings from elders, and the water treatment plan is downstream from a sewage lagoon. The Government of Canada has pledged to relocate the Kashechewan First Nation community 30 km north of its current location by 2029, as its current location makes access to clean water virtually impossible. The government has noted that this may not occur by 2029, and the community currently evacuates annually due to water contamination (Baragar, 2025).Hunting of waterfowl and beaver and muskrat trapping is also a key part of community subsistence. Kashechewan First Nation members utilize boat travel and winter roads to hunting camps and cabins, however, water levels have decreased over the last few decades due to upriver dams, affecting boat travel and harvesting (Indigenous Knowledge Program see **Table 3-1**). This community is greatly affected by water contamination and constant evacuation, with no reliable clean drinking water possible until relocation.

Neskantaga First Nation

Access to safe drinking water has been an ongoing crisis for Neskantaga First Nation. The community has been under a boil water advisory since February 1, 1995 (Indigenous Services Canada, 2024), making it the longest-running advisory in Canada (Matawa First Nations, 2025). Residents rely on surface water sources, which increases vulnerability to contamination and health risks. Despite decades of advocacy, this situation underscores systemic infrastructure challenges and the urgent need for sustainable solutions.

Historically, local waterways have been central to Neskantaga's seasonal mobility and cultural practices. Summers were a time to travel along interconnected waterways for both transportation and sustenance, often drinking directly from surface water sources. Major rivers such as the Attawapiskat, Albany, and Winisk serving as vital routes to James Bay. In the 1980s, traditional travel paths included the Attawapiskat River eastward toward James Bay, the Otoskwin River via Ozhiski Lake to the southwest, and routes through Eyes Lake and Peeagwan Creek toward the Winisk watershed and neighboring First Nations (Indigenous Knowledge Program see **Table 3-1**). These waterways remain deeply tied to identity and land-based knowledge.

Animbiigoo Zaagi'igan Anishinaabek First Nation

No boil water advisories were found for Animbiigoo Zaagi'igan Anishinaabek First Nation. The Local Study Area includes Kenogamisis Lake, Kenogamisis River, Goldfield Lake and

nearby and connecting waterbodies. The Regional Study Area extends downstream from the Kenogamisis Lake Dam to the discharge point of the Kenogamisis River to Long Lake at Crib Road and northeast to the Kenogamisis Diversion Dam.

Elders drink water directly from Kenogamisis Lake, which suggests that the rest of the community may do so as well. The community relies on fishing, particularly for commercial purposes, and is particularly interested in impacts to fishing, particularly in the Goldfield Creek habitat and spawning area (Indigenous Knowledge Program see **Table 3-1**).

Ginoogaming First Nation

Ginoogaming First Nation receives water from the Longlac Water Treatment Plant. While there are no records of boil water advisories, the groundwater in the area was shown in a 2015 study to exceed Ontario Drinking Water Standards for heavy metals (Beringia community planning, 2025)

The local assessment area includes Kenogamisis Lake, Kenogamisis River, Goldfield Lake and nearby and connecting waterbodies. The regional assessment area extends downstream from the Kenogamisis Lake Dam to the discharge point of the Kenogamisis River to Long Lake at Crib Road and northeast to the Kenogamisis Diversion Dam.

The community has reported ongoing and worsening water quality issues in Long Lake, as well as key contaminants in fish from Kenogamisis Lake and River. Ginoogaming First Nation members have reported deformities and reduced and worsening quality in fish from surrounding waterways (Indigenous Knowledge Program see **Table 3-1**).

There is a historic canoe route that runs along Long Lake to Making Ground River with a portage to McKay Lake and the Pic River maintaining family connections to the south. Ginoogaming First Nation community members travel north on several rivers, including the Kenogamisis, Pagwachuan, and Nagagamisis Rivers and west to Lake Nipigon via the Namaybin (Sturgeon) River. The community healing camp is also located along the traditional canoe route between Long Lake and the Pic River. The community considers water to be essential to their health, culture, and well-being (Ketcheson & Rawn, 2022).

Quality of Drinking Water

Regional Indigenous Communities located downgradient of the Local Study Area may interact with local water systems in a variety of ways, and changes to surface water, groundwater or sediment quality could influence these uses. If Project related effects occur, they may lead to reduced water quality in downgradient areas. As a result, these communities may be vulnerable to any decline in overall water quality.

5.1.9 Traditional Foods

For thousands of years, foraged food has been a staple of the human diet. In northern Ontario, wild blueberries are gathered annually during late summer and early fall. This native plant thrives in the boreal forest of northwestern Ontario and has been a vital resource for food security, reflecting the connection between the land, traditional food practices and community well-being. Archaeological excavations near Thunder Bay have uncovered tools and campsites, providing evidence that Indigenous peoples have inhabited the area for at least 9,000 years (Stolz, Levkoe, & Nelson, 2017).

A traditional foods sampling program has been completed for the Local Study Area and the results shared with Marten Falls First Nation and Aroland First Nation.

5.1.9.1 Marten Falls First Nation

Access to Traditional Foods

As discussed in the traditional economy section, the Marten Falls First Nation community currently has access to traditional foods including hunting moose, caribou, deer, geese, partridge, ptarmigan; trapping beaver, muskrat, and rabbit; fishing for pickerel, trout, pike, whitefish, and sturgeon; and plant harvesting for wild blueberries, strawberries, gooseberries; and harvesting trees including cedar, aspen, poplar, jack pine, and tamarack (Marten Falls First Nation, 2023a; Teach for Canada, 2024).

The Harvesters Support Grant program was introduced in 2022 by the Government of Canada to Nutrition North Canada to improve conditions for food sovereignty within northern communities. The Harvesters Support Grant was established to reduce reliance on store-bought food, encourage the restoration of harvesting culture and practices, and support local food production and community food sharing, enhancing social cohesion and mental well-being (Government of Canada, 2023). The federal government granted $4.5 million over two years to the Kiikenomaga Kikenjigewen Employment and Training Services, which includes the community of Marten Falls First Nation, to support their Harvesters Support Program (Government of Canada, 2023) which aims to help remote First Nations communities combat food insecurity (Campbell, 2024). Engagement in these programs can provide psychosocial benefits by reducing stress related to food insecurity and increase a sense of pride through participation in cultural grounded food practices.

Marten Falls First Nation Chief Achneepineskum was hopeful that the Harvesters Food Program would help close nutritional gaps and improve community health. He emphasized that returning to traditional teachings and meals is essential in addressing health challenges faced by the community, including diabetes, cancer, and heart disease (Law, 2023). Chief Wayne Moonias of Neskantaga First Nation discussed the importance of educating young people about how to harvest the land to maintain Indigenous Knowledge in nutrition. Chief Moonias emphasized that much of this knowledge has been lost and highlighted its

connection to broader issues facing northern communities, including boil-water advisories, the housing crisis, and mental health (Law, 2023).

Availability of Traditional Foods

Moose is an important source of food in the community and is culturally significant. Community members have expressed concerns about the road increasing the accessibility to traditional hunting grounds and increasing pressures if moose are overhunted and disappear from the region (Three Roads Forum, personal communication, Feb 27 2025). The general public enters draws for game tags, including white-tailed deer, moose, elk, black bear, wild turkey, wolf / coyote, small game, and falconry. They can also purchase permits to hunt migratory birds, including waterfowl, common snipe, woodcock, and mourning dove (Ontario, 2024a). Maintaining access to traditional foods is important for nutrition but also for psychosocial well-being, as it supports community cohesion, cultural continuity, and a sense of security and identity.

Reliance on Store-Bought Foods

On October 20, 2023, Marten Falls First Nation opened a new community store, Adawegamik, which offers items such as dairy and produce products flown in from Nakina by NorthStar Air. A resident of the community mentioned that the store will improve food security by allowing residents to purchase what they need locally, rather than relying on external resources (Campbell, 2024).

Keeping the Marten Falls First Nation community store is well-stocked can be challenging without year-round roads to facilitate the delivery of new goods. The lack of consistent transportation makes it difficult to offer a variety of products, as bulky items cannot be easily flown into the community (Indigenous Watchdog, 2023). Inconsistent access can lead to shortages and make it difficult to maintain a steady supply of essential items. Currently, groceries are flown into the community, resulting in high costs and occasional theft (AECOM, 2025).

The Project is expected to reduce the delays often experienced with flying in food. Currently, stocking the store remains challenging. As of January 2024, supplies were being sourced from Pickle Lake, with plans to switch to Nakina. The primary difficulties are transportation and pricing. Balancing food shipment cost with reasonable prices for customers is crucial to making the store a practical shopping option, rather than relying on alternatives like Amazon or Daneff's in Geraldton. Weather delays and technical difficulties also pose challenges, often causing products to become dated while they sit waiting for transport. This leaves little time to sell the items once they finally arrive, further complicating the store's ability to maintain a fresh and varied inventory (Campbell, 2024). Limited access to affordable, healthy foods can contribute to psychosocial stress, anxiety about daily sustenance, and feelings of frustration among community members, and exacerbate social inequalities, particularly for families and youth who may experience food

insecurity or rely on store-bought foods. Despite challenges, the Adawegamik community store enhances food security and provides easier access to essential items, making a positive impact on the community's daily life.

Through the engagement program, we heard that 10 out of 56 students attended school hungry (Marten Falls First Nation, 2024 see **Table 3-2**). The Marten Falls First Nation school operates a "healthy food program" that provides students with nutritious meals throughout the school day, with both breakfast and lunch provided on-site. This initiative supports the psychosocial well-being and academic success of students by offering balanced meals that promote health and learning and reducing stress related to hunger, providing a sense of care and support for students (Indigenous Watchdog, 2023).

Marten Falls First Nation Chief Achneepineskum noted that, "Indigenous people's diets continue to be disrupted due to their reliance on processed foods" (Law, 2023). He discussed health challenges such as diabetes, cancer, and heart disease affecting people in remote communities, highlighting the connection of health challenges to limited access to healthy, traditional foods (Law, 2023).

Current data for in-store prices in Marten Falls First Nation are being confirmed, but in comparison, in 2023, Neskantaga First Nation was paying between $40 to $70 for a 10 kg bag of flour and $30 for sugar (Law, 2023), compared to the February 2025 prices at Superstore in Thunder Bay, ranging between $10.99 to $18.97 for a 10 kg bag of flour or $15.97 for a 10 kg bag of sugar (Real Canadian Superstore, 2025). These prices for staples like flour and sugar makes traditional foods, such as Bannock, an expensive luxury that not everyone can afford (Law, 2023). The high cost and limited availability of healthy foods can negatively affect psychosocial well-being by creating stress around meal planning, limit cultural food practices, and reinforce feelings of isolation or inequality. A road would allow for more reliable and affordable deliver of goods (AECOM, 2025). Many community members expressed excitement about the money they will save on flights and the ability to more affordable food, without the concern of gear or coolers being lost or stolen (AECOM, 2025).

Quality of Traditional Foods

Information regarding the Quality of Traditional Foods in the Local Study Area can be found in Attachment A – Problem Formulation for Human Health Risk Assessment.

Effects from soil contamination leaching, emissions of criteria air contaminants and deposition to surface water, soils and sediment, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have the potential to affect the quality of fish, vegetation, birds, and ungulates as country foods and potentially affect human health.

A Country Foods and Water Use study was completed, sampling the quality of Canada goose, moose, beaver, blueberries, and walleye in the Local Study Area. Results have been shared with Marten Falls First Nation and are summarized in Attachment A – Problem Formulation for Human Health Risk Assessment.

5.1.9.2 Aroland First Nation

Access to Traditional Foods

Prior to European contact, the ancestors of Aroland First Nation sustained themselves by hunting, fishing, and harvesting plants through both cultivation and gathering (Aroland First Nation, 2022). Aroland First Nation community members continue to have access to traditional foods, relying on the Albany River, including areas like Ogoki Falls and Amy Falls, for traditional fishing practices, which are integral to the community's cultural heritage and the consumption of traditional foods. Fishing in these waters has sustained the community for generations, and it remains a vital part of Aroland First Nation's connection to the land and its ancestral ways of life (Shared Value Solutions Ltd., 2024). Engagement in traditional fishing practices supports psychosocial well-being by reinforcing cultural identity, fostering intergenerational knowledge transfer, and strengthening connections to the land.

Main dietary staples include foods like moose, walleye, lake whitefish, caribou, ruffled grouse, snowshoe hare, and beaver (LeBlanc, 2014). They also eat deer, rabbit, bear, partridge, goose, cattail roots, berries (such as cranberries, blueberries, chokecherries, and strawberries), seeds, rose hips, edible flowers, and teas. There are concerns amongst Aroland First Nation members about contamination in traditional foods due to the forestry and mining industries, and the use of glyphosate. There has been a shift from local to processed foods and from harvested to purchased foods within the community due to perceived contamination, as well as due to loss of traditional practices and pressures to change social, economic, and food systems due to colonization. These shifts can negatively impact psychosocial health by increasing dependence on external food systems, reducing opportunities for cultural engagement, and eroding community cohesion. The community's health is closely tied to their spirit, culture, community, land, family, and individual self. Despite these connections, they face challenges like increased food insecurity, and an erosion of sovereignty, health, and well-being.

Availability of Traditional Foods

Aroland First Nation members confirmed that they hunt for moose, goose, grouse, partridge; fish for walleye, whitefish, often giving fish to community members who are unable to go out themselves; trap for rabbit and beaver; and gather berries, such as blueberries, raspberries, gooseberries, and cranberries; and bush tea, labrador tea, cedar tea. While wild rice is eaten by some community members, it is most commonly eaten by Elders. Community feasts are held in the spring and fall, celebrating these traditional foods

and bringing together Elders and youth to share meals, such as moose, grouse, pickerel, Bannock, and 3 Sisters Soup (beans, corn, and squash) (AECOM, 2025).

Aroland First Nation's traditional territory is a rich source of blueberries, providing a reliable and accessible supply under the community's stewardship. Berry picking has been a way of life in Aroland First Nation for many generations, forming a broader nomadic subsistence lifestyle with seasonal migrations. Berries offered vital nutrition through the winter and were collected during fishing or hunting trips. Elders recall that berries were historically sold to rail workers, train passengers, neighbouring Ojibwe and Cree communities, and even to Minnesota as a dye for blue jeans (Stolz, Levkoe, & Nelson, 2017).

The Aroland Youth Blueberry Initiative supports local food security and youth programs by enabling community members to gather and sell blueberries. This initiative promotes food sovereignty by maintaining control over food resources, reducing dependence on external food systems, and preserving traditional harvesting practices. Blueberries are shared within a reciprocal network, ensuring care for family members and Elders (Stolz, Levkoe, & Nelson, 2017). These practices strengthen social networks and community cohesion, contributing to psychosocial resilience.

The community school also hosts a greenhouse, which the Health Centre occasionally utilizes for programming. This greenhouse plays a role in supporting local food and educational initiatives (Understanding Our Food Systems, 2024). Engagement with school and community-based food programs enhances psychosocial well-being by providing opportunities for skill-building, social interaction, and connection to cultural practices.

Aroland First Nation is focused on strengthening food sovereignty by blending traditional and modern food systems. Community members continue to engage in hunting, fishing, foraging, and gardening, alongside food sharing programs, to address food security, fostering a sense of self-reliance, cultural pride, and intergenerational learning (Levkoe, McLaughlin, Strutt, & Ng, 2019).

Reliance on Store-Bought Foods

Aroland First Nation operates a family-run store that provides essential goods to the community. For additional food shopping, residents can visit the Northern Store in Nakina, located about 15 minutes away, or travel to Geraldton for grocery purchases (NorthWesthealthline, 2024a).

The "Understanding Our Food Systems" project focuses on strengthening food sovereignty within Northwestern Ontario's First Nations, including Aroland First Nation. Through a multi-phase approach, the project facilitated the development of community-driven food sovereignty visions and local food plans (Levkoe, McLaughlin, Strutt, & Ng, 2019). Aroland First Nation and other participating communities are reclaiming their food systems by

promoting traditional practices such as hunting, fishing, and foraging, alongside modern initiatives like community gardens and food sharing programs. These culturally rooted practices support psychosocial well-being by fostering community cohesion, intergenerational learning, and a sense of identity, pride, and resilience. A participant in the 2025 Story Beads Program expressed the desire to live off the land rather than have to rely on store-bought groceries, sharing that the proposed road would provide more opportunities for them to live off the land (AECOM, 2025).

This signals steps to address food insecurity, emphasizing the importance of culturally appropriate, locally sourced food to enhance community health and resilience, while reducing dependency on external food systems. As noted, in addition to these traditional food systems, Aroland First Nation members can access store-bought food from local retailers, such as the Northern Store in Nakina, and occasionally larger stores in Geraldton; this reflects a mixed approach to meeting the community's nutritional needs while working addressing food sovereignty (Levkoe, McLaughlin, Strutt, & Ng, 2019). Some participants noted in the 2025 Story Beads Program, that many community members eat from the stores, because access to the land can be a challenge. With a boat, or access to more areas, they would be able to hunt, fish, and trap more for subsistence. Balancing access to both traditional and store-bought foods is important for psychosocial well-being, as it allows community members to maintain cultural practices while ensuring reliable access to essential nutrition, reducing stress, and supporting overall quality of life (AECOM, 2025).

Quality of Traditional Foods

Effects from soil contamination leaching, emissions of criteria air contaminants and deposition to surface water, soils and sediment, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have the potential to affect the quality of fish, vegetation, birds, and ungulates as country foods and potentially affect human health.

A Country Foods and Water Use study was completed, sampling the quality of Canada Goose, moose, beaver, blueberries, and walleye in the Local Study Area. Results have been shared with Aroland First Nation, and are summarized in Attachment A – Problem Formulation for Human Health Risk Assessment.

5.1.9.3 Regional Indigenous Communities

Availability of Traditional Foods

Constance Lake First Nation

For Constance Lake First Nation, traditional food harvesting is central to cultural identity and community health. The ability to hunt, fish, and gather across the traditional territory

reflects a deep reliance on the land's ecological integrity. Generations of hunters, fishers, and medicine gatherers have developed skills that support sustainable use of resources while preserving cultural heritage and knowledge systems (Constance Lake First Nation, n.d.). This ongoing relationship with the land supports physical nourishment and spiritual and social well-being.

Moose and Caribou remain culturally significant species, with moose hunting continuing as a primary source of food, while caribou conservation efforts are prioritized to support future generations. Fishing for species such as sturgeon, pike, and walleye is common in the community (Indigenous Knowledge Program see **Table 3-1**). Hunting, trapping, fishing, and gathering are acknowledged as current uses of the land, though it is unclear what species are trapped and how frequently it is consumed (Constance Lake First Nation & Ontario Ministry of Natural Resources , 2025).

Fort Albany First Nation

Traditional foods are deeply woven into the cultural fabric of Fort Albany First Nation, shaping identity and sustaining well-being. Hunting, fishing, and gathering provide nourishment and reinforce connections to the land and water. Waterfowl, especially Canada Geese, remain central to seasonal harvests, while trapping species such as beaver, muskrat, and marten continues to hold not only cultural, but also economic importance (Kitching, K.; Firelight Research Inc. with Fort Albany First Nation, 2024) (Indigenous Knowledge Program see **Table 3-1**). Moose and caribou are also valued food sources, and traditional practices emphasize respect and resourcefulness, with all parts of the animal historically used. These activities reflect knowledge passed down through generations and remain integral to community life, even as patterns of harvesting adapt to changes in climate, migration routes, and economic conditions.

Harvesting traditions also include fishing and plant gathering. Community members fish for whitefish, walleye, northern pike, lake sturgeon, and brook trout, which are eaten fresh or preserved for later use (Kitching, K.; Firelight Research Inc. with Fort Albany First Nation, 2024) (Indigenous Knowledge Program see **Table 3-1**). Berries, including cranberries, raspberries, and gooseberries, offer nutrition in the summer, while plants like Labrador tea, tamarack, and juniper are also harvested for medicine. Other traditional foods include roots, sap, and edible greens such as fireweed and wild onions, which are incorporated into soups and broths. Traditional food practices are living heritage, shaping daily life and guiding future generations. By continuing to hunt, fish, and gather, Fort Albany First Nation preserves knowledge, supports healthy food for community members, and honors their relationship with the land.

Attawapiskat First Nation

Historically, traditional food consumption among Attawapiskat First Nation followed a seasonal cycle closely tied to the land and waterways. In spring, families moved from

inland areas to the coast for the goose and duck hunts, with geese being the most consumed species. Muskrat hunting also occurred during this period. Fishing was a major source of food in spring and summer often carried out by women, with whitefish being the most frequently eaten species. These foods formed the staple diet during the warmer months (Cummins, 1992).

Summer provided opportunities to hunt caribou, while moose was also harvested when available. Following the fall goose hunt, families returned inland for winter trapping and hunting. Winter was the peak season for trapping, with beaver, muskrat, and rabbit commonly taken. Furbearer snaring and small bird hunting was common (Long, Preston, Srigley, & Sutherland, 2017). These animals were consumed for their meat, while their pelts were often sold or traded, reflecting both subsistence and economic roles in traditional food systems (Cummins, 1992).

While these patterns describe historical practices, it is difficult to distinguish them from current uses of the land. Hunting, fishing, and trapping are assumed to continue where species remain available and where gathering is cost-effective. These activities not only provide food but also maintain cultural connections to the land, even as modern factors influence accessibility and reliance on traditional foods.

Eabametoong First Nation

Traditional foods hold deep cultural, spiritual, and practical significance for the people of Eabametoong First Nation. Historically, the community lived semi-nomadic lifestyles, moving seasonally to follow the availability of resources. Spring was particularly important for hunting moose and geese, while fishing and plant gathering shaped travel patterns throughout the year (Jacasum, Matawa First Nations Community and Life Experiences Volume 2 (North), 2007). Community members continue to use waterbodies throughout their territory to harvest fish such as sturgeon, walleye, and whitefish (Eabametoong First Nation, 2016). These resources that have sustained families for generations and, in earlier times, supported commercial fishing (Jacasum, Matawa First Nations Community and Life Experiences Volume 2 (North), 2007). Today, many Eabametoong First Nation members continue to harvest goose, fish, moose, and other traditional foods, reflecting traditional ways of being and maintaining a strong connection to the land (Eabametoong First Nation, 2018).

Gathering plants and using natural materials remain essential practices that support food security, health, and cultural continuity. Berries like wild raspberries, blueberries, and cranberries provide nutrition, while wild rice and other plants contribute to a balanced diet (Eabametoong First Nation, 2016). Hunting and fishing supply protein-rich staples, and these activities strengthen community ties through shared harvesting and preparation. Medicines are also harvested throughout the territory. More than just food, these traditions represent deep relationships with the land. They are a way of preserving knowledge, identity, and the cultural fabric of Eabametoong First Nation.

Kasabonika Lake First Nation

Traditional food practices in Kasabonika Lake First Nation have long reflected a balance between seasonal availability and community-based land use. Hunting and trapping were organized through communal traplines rather than family-exclusive territories, with groups assigned areas each year under the guidance of Elders. This system allowed trappers to work across large portions of the traditional territory over time (Indigenous Knowledge Program see **Table 3-1**).

Men typically traveled the farthest to hunt and trap, focusing on large game such as moose and caribou, with peak hunting seasons in the fall for big game and early spring for waterfowl. Women generally hunted and trapped smaller game closer to permanent settlements and played a central role in processing and preparing country foods. Cooking was considered an important form of community-making among women, reinforcing social ties through shared food preparation (Indigenous Knowledge Program see **Table 3-1**).

While these patterns describe historical practices, it is difficult to distinguish them from current uses of the land. Hunting, trapping, and food preparation are assumed to continue where species remain available and where harvesting is cost-effective, supported by initiatives such as the “Back to Our Roots” project, which provides youth with mentorship in traditional methods of hunting, gathering, and food preparation (hme Enterprises, 2019).

Kitchenuhmaykoosib Inninuwug First Nation

Caribou are an important subsistence resource for Kitchenuhmaykoosib Inninuwug First Nation, providing food and supporting cultural practices that are central to community identity. Hunting caribou is an important tradition, and maintaining access to healthy populations is essential for sustaining these practices (Nature United, 2022; Ariss & Cutfeet, 2011). Kitchenuhmaykoosib Inninuwug First Nation has expressed that any disruption to caribou migration would affect their ability to exercise gathering rights and continue traditional harvesting (Indigenous Knowledge Program see **Table 3-1**).

Through the Consultation Program, Kitchenuhmaykoosib Inninuwug raised significant concerns about the proposed road project and its potential impacts on caribou migration pathways. Community members noted that satellite imagery shows a migration route extending from Kitchenuhmaykoosib Inninuwug territory toward Marten Falls territory, and they questioned how this route would remain undisturbed. Elders shared past experiences where road construction altered caribou habitat, reinforcing fears that similar changes could occur again. Kitchenuhmaykoosib Inninuwug emphasized that protecting these migration routes is critical to ensuring caribou remain available for hunting and for preserving cultural continuity for future generations (Indigenous Knowledge Program see **Table 3-1**).

Kingfisher Lake First Nation

Kingfisher Lake First Nation has long relied on traditional hunting and trapping practices as a cornerstone of cultural identity and sustenance. Woodland Caribou, which occur in low to moderate densities throughout Pipestone River Provincial Park, remain an important species for the community, as the First Nation is directly adjacent to this protected area (Ontario Parks, 2022). Hunting and trapping territories historically overlapped, with hunting areas extending farther due to inter-community social connections and the mobility required to track game. These extended hunts often crossed into neighboring territories, creating the need for social agreements among First Nations in the region, including Kingfisher Lake, to govern appropriate practices. For example, it was generally acceptable to hunt while traveling through another community's land, but not to enter specifically for the purpose of hunting (Indigenous Knowledge Program see **Table 3-1**). Such protocols reflect the importance of cooperation and respect in sustaining traditional food systems. Hunting and trapping were common activities, supporting both nutritional needs and the transmission of cultural knowledge (Indigenous Knowledge Program see **Table 3-1**).

Mishkeegogamang First Nation

Traditional foods have long been central to the culture, health, and resilience of Mishkeegogamang First Nation. Historically, the community relied on a subsistence lifestyle, harvesting what the land and waters provided through hunting, fishing, and gathering while travelling with the seasons (Mishkeegogamang First Nation, 2010a). Meat was smoked, dried, or cooked, and every part of the animal was used, including bones for soup, fat for grease, and hides for clothing and tools. Mishkeegogamang First Nation members fished for species such as sturgeon, walleye, and whitefish, which were eaten fresh, dried, or made into pemmican, while fish broth was often prepared for children as a source of nourishment. Community members gathered a variety of berries, including blueberries, goose berries, and Saskatoon berries, which were often dried for winter use. Wild rice has been harvested throughout history, though its availability has declined after changes to local waterways (Mishkeegogamang First Nation, 2010b). These seasonal activities embody knowledge passed down through generations and a profound connection to the land.

The fur trade introduced new dynamics, shifting some focus toward commercial hunting and trapping, yet traditional food harvesting has remained integral to the Mishkeegogamang way of life (Mishkeegogamang First Nation, 2010c). Families continue to harvest moose, beaver, and other game, as well as such as sturgeon, northern pike, and whitefish. Berries, such as blueberries, are still gathered for food and cultural practices (Mishkeegogamang First Nation, 2010b). Trapping persists as both a cultural and economic activity, with fur-bearing species such as marten and fox harvested alongside food resources. These practices strengthen individual and community identity and wellness and uphold the reciprocal relationship between people and the environment.

Neskantaga First Nation

Neskantaga First Nation maintains a deep connection to the land, with many members continuing traditional harvesting of wildlife, fish, plants, berries, and fresh spring water (Neskantaga First Nation, 2022). Hunting and trapping typically begin in the fall and extend through winter into spring, with meat historically preserved by smoking or making pemmican and stored in birch bark containers for times of scarcity. Sturgeon holds particular cultural significance and is prepared in various ways including smoked, boiled, baked, or dried, and shared widely within the community, especially with Elders. Neskantaga First Nation has also initiated a sturgeon stewardship program to conserve this important species. Other fish species of significance include whitefish, northern pike, trout, walleye, burbot, and sucker (Indigenous Knowledge Program see **Table 3-1**).

In recent years, Neskantaga First Nation has raised concerns about potential development impacts on wildlife. In 2024, the community reported that low-flying helicopters associated with regional projects were scaring away moose, creating challenges for hunters during the critical fall harvest. Neskantaga First Nation requested that all project activities cease during this period to protect traditional practices (Hale, 2024). The community also emphasized the importance of safeguarding calving and nesting grounds for moose, caribou, and waterfowl (Ontario Ring of Fire, 2025) and expressed broader concerns about environmental damage and declining wildlife populations, particularly caribou, linked to development in the Ring of Fire region (Maynes, 2022).

Nibinamik First Nation

Nibinamik First Nation's traditional food system reflects a deep cultural connection to the land and seasonal cycles. Historically, community life was organized around family units, with hunting, trapping, and fishing forming the foundation of sustenance. Moose and caribou were primary sources of protein and materials, while rabbits and waterfowl such as ducks and grouse supplemented diets (Indigenous Knowledge Program see **Table 3-1**). Fishing was both a nutritional and social activity, strengthening family ties across generations. Preservation techniques such as smoking and drying supported food security during long winters, and hides were transformed into essential clothing and household items, demonstrating resource efficiency and cultural craftsmanship (Indigenous Knowledge Program see **Table 3-1**).

These practices were embedded in spiritual values that emphasized respect for the land and animals, such as returning bones to the earth and ceremonial offerings after hunts. Mobility was central to this way of life, with families maintaining seasonal settlements and traveling along ancient canoe and portage routes to access hunting and fishing grounds. This system supported health, resilience, and cultural continuity, illustrating how traditional foods were not only sustenance but integral to identity and community well-being (Indigenous Knowledge Program see **Table 3-1**).

Kashechewan First Nation

Based on findings from the Traditional Knowledge study completed by Kashechewan First Nation, seasonal cycles influence the harvesting of traditional foods. Hunting occurs throughout the year, but spring and fall are especially important. Spring is preferred for harvesting ducks and other waterfowl, while fall is the prime season for large game such as moose and caribou. These animals are typically tracked deep in the bush, requiring skill and patience, and are noted to be healthy and abundant within the territory.

Fishing is most active during the summer months, when species such as Northern Pike, Walleye, Sturgeon, Whitefish, and various trout are commonly caught. While fishing does occur in other seasons, summer provides the greatest opportunities for harvesting these staple foods (Indigenous Knowledge Program see **Table 3-1**).

Trapping is concentrated in the colder months, particularly fall and winter. Community members trap animals such as beaver, marten, rabbit, otter, muskrat, mink, fox, and wolf, often sharing the harvest within the community. Birds are also plentiful throughout the territory, with some harvesters collecting significant numbers each season to support both their households and communal sharing practices (Indigenous Knowledge Program see **Table 3-1**).

Wapekeka First Nation

Traditional foods remain an important part of life for Wapekeka First Nation, sustaining cultural identity and community well-being. Hunting, fishing, and gathering provide nourishment and strengthen ties to the land. While the number of year-round hunters has declined over the past several decades, hunting continues to hold significant cultural value (Thompson, Mason, & Robidoux, 2018), with successful harvests of moose and other meat often shared among families (Thompson H. , 2018). Seasonal patterns guide these activities: moose and beaver are harvested in winter, geese in spring and fall, and caribou during migration periods (Randazzo, 2018). Although caribou hunting has decreased in recent years due to changing preferences, other traditional foods remain central to the diet (Robidoux, Winnepetonga, Santosa, & Haman, 2021). These practices reflect knowledge passed down through generations and a commitment to using resources respectfully.

Fishing and berry gathering complement hunting traditions and continue to provide important sources of food. Community members harvest fish such as walleye, northern pike, whitefish, trout, and sturgeon, which are eaten fresh or preserved for later use (Robidoux, Winnepetonga, Santosa, & Haman, 2021; Thompson H. , 2018). Burbot is prized by Elders for its taste and nutritional value. In summer, berries such as blueberries, cloudberries, gooseberries, and raspberries, are gathered for eating, sharing, and trading within the community. These activities reinforce cultural continuity, foster community ties, and uphold the reciprocal relationship between people and the land.

Wawakapewin First Nation

Wawakapewin First Nation has historically played an important role in supporting regional food security through traditional harvesting practices. Unlike some neighboring communities, hunters and trappers from Wawakapewin First Nation were not associated with exclusive territories, resulting in significant overlap between their hunting and trapping areas and those of Long Dog Lake, Kasabonika Lake, Wapekaka, and Kitchenuhmaykoosib Inninuwug First Nations (Indigenous Knowledge Program see **Table 3-1**). This flexible approach allowed the community to serve up to 300 people in the region with fish and game, including large species such as Woodland Caribou and moose, which were important for sustenance and cultural continuity. In recent years, Wawakapewin First Nation has actively supported the revitalization of traditional harvesting methods, ensuring intergenerational knowledge transfer and food sovereignty. Complementing these efforts, the community partnered with the University of Ottawa to introduce local food production initiatives, including growing strawberries and potatoes, as part of a broader strategy to enhance community resilience and nutrition (Smith J. , 2011).

Webequie First Nation

Webequie First Nation maintains a strong connection to the land through traditional harvesting practices that provide essential food for community members. Hunting and trapping are integral activities, with species such as caribou, moose, bear, beaver, otter, marten, geese, ducks, and other birds and animals harvested for fresh meat (Webequie Firsts Nation, n.d.). These practices are deeply rooted in cultural traditions and continue to sustain families today. The Simon Jacob Memorial Education Centre operates on a culturally sensitive schedule, ensuring that students can participate in the spring and fall hunts with their families, reinforcing the importance of these seasonal harvesting periods (hme Enterprises, 2019).

Traditionally, Webequie First Nation hunters and trappers operated along the northern edge of the boreal forest. Both spring and fall hunts remain important, with the spring goose hunt holding particular cultural significance. Moose and Canada geese are among the most frequently eaten traditional foods. Nothing from the harvest is wasted. Meat is often smoked and preserved for times of scarcity, bones are used for tools and jewelry, and pelts and skins are crafted into clothing and teepees. Fish that were not consumed were left ashore in summer to attract fur-bearing animals or used as bait in winter traps, reflecting a resourceful approach to harvesting (Indigenous Knowledge Program see **Table 3-1**)

Weenusk First Nation

Based on findings from the Traditional Knowledge study completed by Weenusk First Nation, the ability to care for and manage the environment is central to Weenuski Inninowuk identity and well-being. Weenusk First Nation has participated in Caribou

conservation efforts (Semeniuk, 2022; Nerberg, 2025). Stewardship of lands and waters supports that culturally significant resources, such as caribou, moose, fish, and geese, continue to sustain the community and future generations (Indigenous Knowledge Program see **Table 3-1**).

Caribou are the most culturally significant species and are harvested year-round, forming a critical part of subsistence and identity. Community members emphasized that any disruption to hunting would require extra effort to secure game, as caribou provide sustenance throughout the year. Moose are also important for subsistence, with hunting concentrated in the fall months, particularly September and October (Indigenous Knowledge Program see **Table 3-1**).

Fishing is most common during the summer, with ice fishing taking place in winter. These seasonal practices reflect a deep connection to the land and waters, ensuring that traditional foods remain available for sharing within the community (Indigenous Knowledge Program see **Table 3-1**).

Wunnumin Lake First Nation

Wunnumin Lake First Nation maintains a strong connection to traditional land-based practices, where hunting and resource gathering are integral to cultural identity and food security. Woodland Caribou, which occur in low to moderate densities throughout Pipestone River Provincial Park, represent an important species for the community, as the First Nation is directly adjacent to this protected area (Ontario Parks, 2022). Moose hunting is also a key subsistence activity, providing essential nutrition and reinforcing traditional knowledge systems. In the 1980s, land use was organized into seven family territories, with individuals typically utilizing two or three territories over their lifetimes for hunting and resource harvesting (Indigenous Knowledge Program see **Table 3-1**). These practices were not recreational but vital for survival, and children actively participated in cultural activities such as felling small birds with slingshots and assisting with fish net gathering, ensuring intergenerational transmission of knowledge (Indigenous Knowledge Program see **Table 3-1**).

Animbiigoo Zaagi’igan Anishinaabek First Nation

Historically, food consumption among Animbiigoo Zaagi’igan Anishinaabek First Nation was strongly seasonal and based on locally available resources. Moose, deer, snowshoe hare, grouse (both spruce and ruffed), Canada goose, and mallard duck were among the most commonly consumed game animals. Caribou, lynx, and fisher were also harvested, though less frequently. The report indicates that in the fall, members hunted deer, moose, bear, partridge, duck, lynx, and caribou. In the winter, members trapped marten, rabbits, fisher, geese, and beaver (Indigenous Knowledge Program see **Table 3-1**).

Fishing was and continues to be a major source of food. Historically, fall harvests included trout, sucker, salmon, and sturgeon, while winter fishing focused on pike, sucker, whitefish, and walleye. These species were caught in waterbodies such as Kenogamisis Lake, Kenogamisis River, Goldfield Lake, and their connected waterways. Many community members still obtain most of their meat through fishing, and commercial fishing has grown in recent years, providing income for several families (Indigenous Knowledge Program see **Table 3-1**).

Berry harvesting, particularly blueberries, was also significant for food and cultural practices, with some families relying on commercial blueberry harvesting for additional income. Other plants and medicines, including birch and chaga, were gathered in the same areas (Indigenous Knowledge Program see **Table 3-1**).

Ginoogaming First Nation

Ginoogaming First Nation has a long-standing tradition of hunting, trapping, and fishing across a broad territory that includes areas surrounding Lake Nipigon, Long Lake, north of Lake Superior, and, to a lesser extent, the Pic River watershed (Indigenous Knowledge Program see **Table 3-1**). These activities typically occur during the fall and winter seasons, when conditions favor the pursuit of large game such as moose and Woodland Caribou, as well as other furbearing game. Fishing is also central to seasonal harvesting, with species such as pike, sucker, and walleye being most abundant in winter. These practices have historically provided sustenance and reinforced cultural identity through intergenerational knowledge transfer (Indigenous Knowledge Program see **Table 3-1**).

In recent years, community members have observed changes in the quality of harvested game, including poor taste and smaller organ sizes, alongside shifts in wildlife behavior, such as bears increasingly scavenging garbage and a decline in marten populations (Indigenous Knowledge Program see **Table 3-1**). Despite these challenges, Ginoogaming First Nation continues to maintain strong connections to traditional plant harvesting, which is largely practiced by women. This emphasis on plant gathering complements hunting and fishing traditions, ensuring a diverse and culturally significant food system for the community (Indigenous Knowledge Program see **Table 3-1**).

Long Lake #58 First Nation

Long Lake #58 First Nation maintains the traditional of harvesting plants, berries, and fungi for food. Historically, meat preservation relied on drying and smoking, with storage in birch bark baskets. Moose was considered the most significant game species valued above all others, while Caribou also likely played an important role in sustaining community diets. Fishing has long been central to food systems, with documented sites around Geraldton and Longlac, including Nakina, Eldee Lake, Kenogamisis Lake, and the Kenogamisis River. Fish remains a staple in community diets, completing hunting and plant gathering traditions (Indigenous Knowledge Program see **Table 3-1**).

Community members have identified numerous hunting and trapping areas, noting that trap lines are not repeatedly set in the same location but moved as needed to meet seasonal requirements (Indigenous Knowledge Program see **Table 3-1**). This adaptive approach reflects a deep understanding of ecological balance and resource sustainability.

Quality of Traditional Foods

Effects from soil contamination leaching, emissions of criteria air contaminants and deposition to surface water, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have the potential to affect the quality of fish, vegetation, birds, and ungulates in the Local Study Area. These fish, vegetation (via seeds, pollen, etc.), birds, and ungulates may travel outside the Local Study Area and be harvested in the Regional Study Area, potentially affecting human health. These potential changes to quality of traditional foods may affect Indigenous communities in the Regional Study Area who rely on these resources for subsistence, cultural practices, and well-being.

Information regarding the Quality of Traditional Foods in the Local Study Area can be found in Attachment A – Problem Formulation for Human Health Risk Assessment.

5.1.10 Public Safety

This section describes existing conditions related to key components of public safety, including driver licensing challenges, concerns related to road safety, access to emergency services, and violence and harassment, including availability of drugs and alcohol and human trafficking, which can particularly affect Indigenous women and girls.

5.1.10.1 Driver's Licenses

5.1.10.1.1 Marten Falls First Nation

The *Addressing Disparity in Employment Rates for Indigenous People in Remote Communities* report highlights challenges faced by residents of Marten Falls First Nation in obtaining a driver's license. A core assumption in this report was that most employers have an expectation that their work force holds a valid driver's license, which can limit employment opportunities for those without one. Due to the community's remote location, accessing licensing centres requires travel to urban areas like Thunder Bay or Geraldton, which can be cost prohibitive or logistically difficult. This current barrier to gaining a Driver's Licence may contribute to lower employment rates, as many jobs require a valid driver's license.

To mitigate this issue, Kiikenomaga Kikenjigewen Employment and Training Services introduced a Driver's License Pilot Project aimed at increasing awareness about the importance of driver's licenses and delivering access to testing services within remote First

Nations, including Marten Falls First Nation for members to get their G1 Driver's license. There were 70 applicants to the program, nine of which were from Marten Falls First Nation. Of the 29 applicants that successfully completed the program and obtained their driver's licence, two were from Marten Falls First Nation (Kiikenomaga Kikenjigewen Employment and Training, 2017). The report identified several barriers to this program that should be considered in future driver training programs in Marten Falls First Nation, including:

- Community access: Marten Falls First Nation became inaccessible for same-day trips after the Nakina Air Service discontinued its direct flight to the community in May 2017.
- Communications: Staffing and personnel changes created challenges in providing details and updates about the pilot project.
- Community infrastructure: A lack of proper signage on roadways posed issues.
- Language barrier and literacy issues: Many individuals were reluctant to acknowledge language or literacy barriers. Those who did self-identify were provided with headphones to access the test questions audibly, instead of reading them.
- Program Applicant Barriers:
  - Many applicants lacked valid identification, including birth certificates with no identification clinics were planned. A significant barrier was for married female applicants who did not have the appropriate documentation, such as a marriage certificate.
  - Prescription glasses were required for some participants, but many were unable to replace their prescriptions in time for testing due to difficulties accessing vision services and the associated high cost in remote communities.

5.1.10.1.2 Aroland First Nation

As noted above, obtaining a driver's licenses and vehicle registration to comply with the *Highway Traffic Act* is difficult for residents in the Far North, including residents of Aroland First Nation, as these services are only available in larger centres. Barriers to obtaining appropriate driver training and licensing services contributes to dangerous behaviour and accidents (NorthWinds Environmental Services, 2023).

5.1.10.2 Road Safety

5.1.10.2.1 Marten Falls First Nation

Marten Falls First Nation is not connected to the provincial highway network by an all-season road, and therefore there are no existing conditions to describe for all-season road

safety. However, there are current concerns related to road safety for the seasonal winter road.

The Ontario *Highway Traffic Act* applies to drivers on Ontario winter roads, requiring a driver's license and a registered vehicle. Safety concerns on winter roads include delays in reaching the target ice thickness, which increases the risk of users accessing over-ice segments too early, potentially leading to breakthroughs. Poor signage often causes confusion regarding speed limits, increasing safety concerns, especially on difficult sections of the roads. The Ontario Provincial Police can enforce the law on winter roads and may work with the Nishnawbe Aski Police Service to patrol certain areas. However, patrols are rare because of limited resources, and it is unclear which police force is responsible or willing to handle issues like speeding, drunk driving, dangerous driving, and emergency response (NorthWinds Environmental Services, 2023). The lack of training for commercial truck drivers is another identified safety concern. While the *Highway Traffic Act* sets driving rules, trucking companies are generally responsible for training their staff on winter road safety (NorthWinds Environmental Services, 2023).

Ontario does not have mandatory technical and safety standards for winter roads, creating safety liabilities for winter road construction and road users. Compliance with winter road guidelines is voluntary (NorthWinds Environmental Services, 2023). Voluntary standards raise concerns about the safety of the existing and future winter road network in northern Ontario. Without a required standard, there is no provincial program to inspect the safety of Ontario's winter roads, with the exception of water crossing inspections of permanent structures which has been in place since 2015 (NorthWinds Environmental Services, 2023). Safety on winter roads follows voluntary standards outlined in *Best Practices for Building and Working Safely on Ice Covers in Ontario.* Enforcement is a collaborative effort between the Ontario Provincial Police and Nishnawbe Aski Police Service, who patrol the roads and enforce the *Highway Traffic Act* (NorthWinds Environmental Services, 2023).

5.1.10.2.2 Aroland First Nation

Community members from Aroland First Nation experiences similar challenges with safety on winter roads as described above, in addition to existing road safety concerns associated with all-season road travel. The annual average daily traffic data, based on the 2021 traffic volumes, reveals the following counts: Highway 643 from Aroland First Nation to Cavell had 320 vehicles, with the count taken 1.5 km north of Burroughs. At the Howard Crescent culvert, located at the end of the highway near Nakina, the traffic count was 420 vehicles. Highway 584 at Cavell Road, at the end of the highway, had a traffic count of 200 vehicles (Ontario, 2024e).

News reports report that there have been several accidents in the news near Aroland First Nation since 2022, including a fatal single-vehicle collision north of Nakina (SNnewsWatch, 2022).

5.1.10.3 Access to Emergency Services

5.1.10.3.1 Marten Falls First Nation

Access to emergency services is a key determinant of both physical safety and psychosocial well-being, increase stress during medical or safety incidents, and place additional pressure on families and caregivers. Reliable fire, medical, and policing services can reduce feelings of vulnerability, strengthen community confidence, and support timely response during emergencies. For Marten Falls First Nation, the current limited access to emergency services contributes to heightened safety concerns, reinforces feelings of isolation, and may intensify anxiety during crisis situations. Including emergency service availability in the existing conditions provides important context for understanding existing safety concerns and how project-related changes may interact with community well-being.

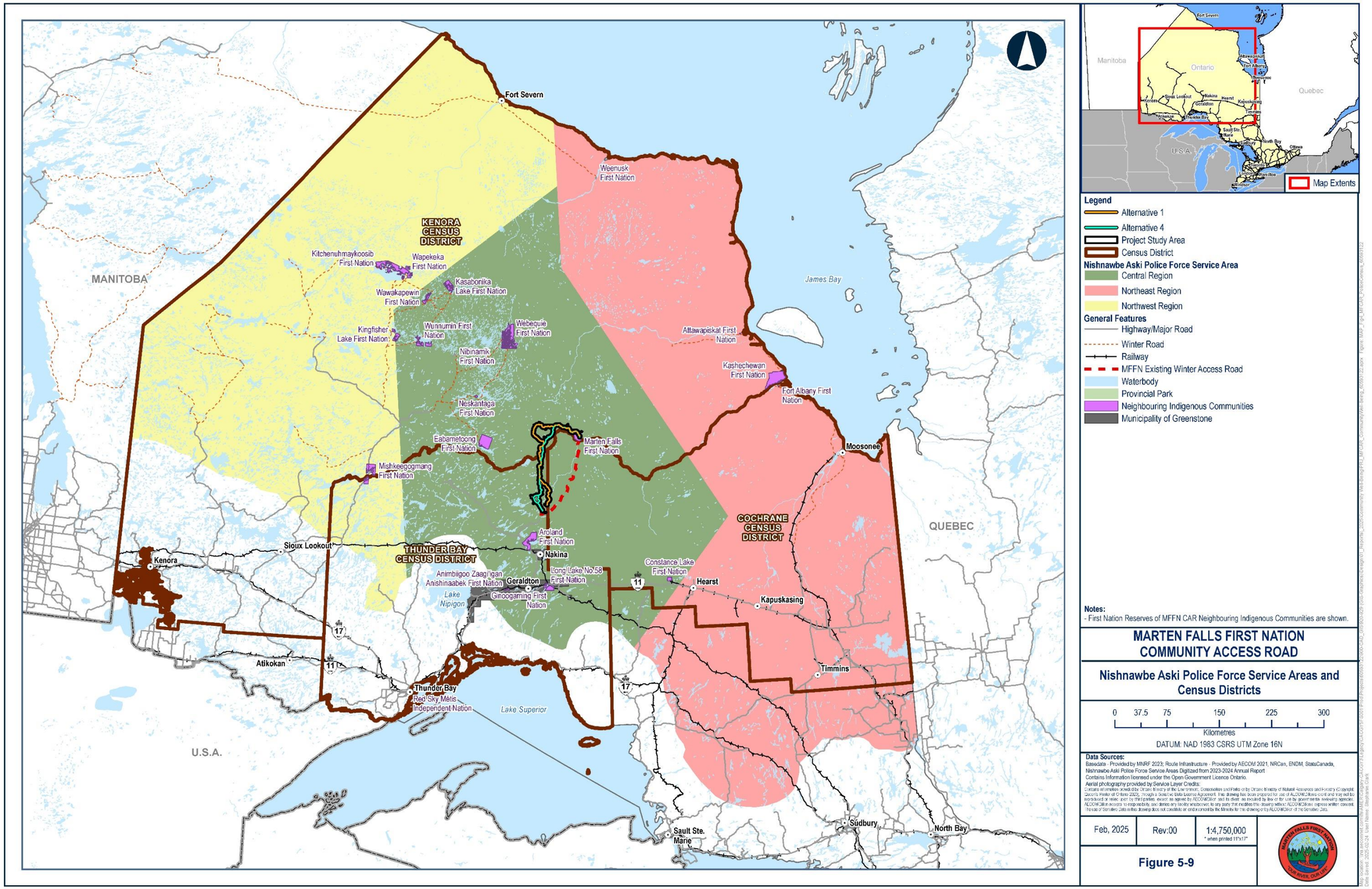
Marten Falls First Nation currently does not have a fire station or a fire truck (Indigenous Watchdog, 2023) and the community has noted ongoing challenges in emergency medical response, including the absence of an ambulance. As a community member stated, “We are struggling to transport our sick people” (Hessey, 2023). While medical transportation services are available for appointments within the community (211 Ontario, 2024), urgent and emergency care remains difficult to access due to distance and limited in-community resources.

The Nishnawbe Aski Police Service Detachment was created in 1994 to provide police services to 23 out of 24 Nishnawbe Aski Nation communities, including Marten Falls First Nation and Aroland First Nation (Nishnawbe Aski Police Service, n.d.b). Marten Falls First Nation and Aroland First Nation are both within the Central Region of the Nishnawbe Aski Police Service (Nishnawbe Aski Police Service, n.d.a), as seen in **Figure 5-9**. As of the 2017 Uniform Organizational chart, there were two constables in Marten Falls First Nation (Nishnawbe Aski Police Service, 2018), and increased to four constables in 2024 (Nishnawbe Aski Police Service, 2024). Although this increase has improved policing capacity, overall current emergency response services remain constrained by geography, transportation limitations, and resource availability.

5.1.10.3.2 Aroland First Nation

Including emergency service availability in the existing conditions provides important context for understanding existing safety concerns and how project-related changes may interact with community well-being. For Aroland First Nation, the availability of nearby, road-connected service offers some measure of support, however, reliance on external providers and limited local capacity still contributes to stress during urgent situations.

Figure 5-9: Nishnawbe Aski Police Service Areas



Aroland First Nation has a volunteer fire department in community and has ambulance services provided by the community of Nakina, located 15 minutes from the community (NorthWesthealthline, 2024a). While proximity to Nakina improves access compared to more remote communities, the absence of an on-site ambulance may still result in longer response times during emergencies, which can heighten anxiety for families and caregivers during medical events. Volunteer fire services also rely on local capacity, training availability, and equipment condition, which can vary and influence community readiness during crisis situations.

Aroland First Nation also relies on the Nishnawbe Aski Police force, as described in the Marten Falls First Nation section above. There were two constables located in Aroland First Nation in 2018 (Nishnawbe Aski Police Service, 2018) and this increased to two sergeants and four constables in 2024 (Nishnawbe Aski Police Service, 2024). This increase has improved policing capacity and supports improved safety, although perceptions of safety, which directly influence psychosocial well-being, may still be heightened during serious or emergency incidents.

5.1.10.4 Violence and Harassment

Gender-Based Violence refers to harmful acts directed at individuals based on their gender. It encompasses a range of physical, sexual, psychological, and economic abuse and is rooted in gender inequality, power imbalances, and systemic discrimination. Gender based violence disproportionately affects women, girls, and gender-diverse people, and can occur in both public and private spheres (Government of Canada, 2025b). In remote communities, such as Marten Falls First Nation, the risk may be elevated due to factors like geographic isolation, limited access to support services, and social or economic vulnerabilities.

The sense of safety is largely psychosocial. When individuals feel unsafe or believe their security has been compromised, they are more likely to suffer negative health effects such as stress, anxiety, and depression. Indigenous peoples experience heightened concerns about safety and security, particularly for women and girls. Indigenous women and girls experience violence and sexual violence at much higher rates than non-Indigenous women. For example, 56% of Indigenous women have endured physical assault and 46% have faced sexual assault. In comparison, roughly one-third of non-Indigenous women have experienced either physical or sexual assault during their lifetime (Assembly of First Nations, 2024). Factors that contribute to increased rates of violence against women include poverty, inadequate housing (overcrowded or substandard), food insecurity, lack of health services, racism, substance use, lack of education, lack of opportunity, denial of language, culture, and traditions, and intergenerational challenges in family and community cohesion linked to residential school experiences (Assembly of First Nations, 2021).

Between 2001 and 2014, Indigenous women were murdered at rates up to 12 times higher than non-Indigenous women in Canada (Department of Justice Canada, 2017). Among

solved homicide cases involving Indigenous women from 1980 to 2014, 53% were committed by family members, 26% by acquaintances, and 8% by strangers (Department of Justice Canada, 2017). Furthermore, 17% of these homicides occurred on streets, roads, or highways, compared to the 1% for non-Indigenous women (Department of Justice Canada, 2017).

Indigenous women are disproportionately affected by human trafficking, a vulnerability rooted in generations of racialized violence and socio-economic challenges. Although Indigenous women made up only 4% of Canada's population in 2014, they accounted for approximately 50% of human trafficking victims (National Inquiry into Missing and Murdered Indigenous Women and Girls, 2019). Of those charged with trafficking, 83% were men (Karam, 2016).

The presence of temporary and permanent work camps near remote communities can introduce additional pressures on community well-being and gender-based violence. Workcamps are typically male-dominated and may contribute to increased rates of violence, sexual assault, substance misuse, and sexually transmitted infections, through mechanisms such as sex trafficking and exploitation (Gibson & Klinck, 2005; Gibson, G; K. Yung, Chisholm, L; Quinn, H, Lake Babine Nation, & Nak'azdli Whut'en, 2017). While Indigenous women often face barriers to accessing economic or social benefits generated by development, interactions between camp workers and community members can increase the risk of harassment, violence and women's perceptions of safety in male-dominated industrial contexts. The presence of temporary and permanent work camps near remote communities can introduce additional pressures on community well-being and gender-based violence. Workcamps are typically male-dominated and may contribute to increased rates of violence, sexual assault, substance misuse, and sexually transmitted infections, through mechanisms such as sex trafficking and exploitation (Gibson & Klinck, 2005; Gibson, G; K. Yung, Chisholm, L; Quinn, H, Lake Babine Nation, & Nak'azdli Whut'en, 2017). While Indigenous women often face barriers to accessing economic or social benefits generated by development, interactions between camp workers and community members can increase the risk of harassment, violence and women's perceptions of safety in male-dominated industrial contexts. The absence of road connectivity has given the community of Marten Falls First Nation greater control over who enters the community and when, which has a positive influence on residents' perceptions of safety and stability.

5.1.10.4.1 Marten Falls First Nation

Violence, harassment, and exposure to crime are important determinants of psychosocial well-being. Experiences or perceptions of community violence can heighten stress, reduce trust, increase social isolation, and contribute to feelings of insecurity. Including this information in the existing conditions provides necessary context for understanding

existing safety dynamics and how potential project-related changes, such as increased mobility or population flows, may interact with community well-being.

The Central Region of the Nishnawbe Aski Police Service encompasses a large geographic area that includes Marten Falls First Nation; however, due to the aggregated nature of available crime data, community-specific statistics are not reported at a more granular level. Between January 1 and December 1, 2023, the Nishnawbe Aski Police Service recorded 10,191 crime occurrences across the broader Central Region (**Table 5-30**). A large number of reported incidents involved assaults, mental health concerns, personal well-being checks, family disputes, and domestic disputes (Nishnawbe Aski Police Service, 2024). Many of the calls received are serious and / or violent crimes (e.g., assaults, sexual assault, aggravated assault, homicide) at a higher frequency than seen in many southern Ontario jurisdictions. Ongoing challenges with drugs and alcohol remain a challenge, and affect community health, safety, and overall well-being of communities in the region (Nishnawbe Aski Police Service, 2024).

While these data reflect the broader Central Region rather than Marten Falls First Nation and Aroland First Nation directly, they provide insight into the types of incidents officers regularly respond to and the regional policing environment where the community is situated. Research indicates that exposure to community violence is associated with higher levels of social isolation and loneliness, especially among individuals who have experienced more severe forms of violence (Tung, Cagney, Hawkley, & Peek, 2019). In remote communities with limited police services and slower response times, concerns about violence can heighten anxiety and feelings of vulnerability.

During engagement activities with the community, concerns were raised about lateral violence. Lateral violence, such as exclusion, bullying, gossip, and intimidation, can negatively affect individual confidence and undermine community cohesion and well-being. Impacts can include reduced cultural participation, ongoing interpersonal conflict, contribute to lower self-esteem, and increased psychosocial stress (Mueller, 2023). While no direct reports of lateral violence were provided by the community, it remains important to acknowledge its potential presence and the potential that major projects may influence interpersonal dynamics, either positively through increased opportunity or negatively through increased stress.

There is no specific human trafficking data for Marten Falls First Nation, however, broader national and provincial research highlights that Indigenous women, girls, and gender-diverse individuals in Canada are disproportionately affected by human trafficking due to ongoing racialized violence and gender discrimination. Although Indigenous women make up only 4% of the total population, they represent approximately 50% of trafficking victims. In 2016, the RCMP reported 330 human trafficking cases in Canada, with 94% being domestic, and women under 18 made up about a quarter of the victims (Roudometkina & Wakeford, 2018). Risk factors include high levels of poverty, homelessness, and violence, with Indigenous transgender youth particularly vulnerable to sexual harassment and assault.

Indigenous communities experience compounded discrimination, which can increase their risk of exploitation and trafficking. Indigenous Peoples, especially in remote Northern areas, often live in multiple communities to access essential services, which can lead to disconnection from their cultural support systems (Native Women's Association of Canada, n.d.). Historical and systemic factors, such as unstable housing, lack of social supports, family violence, and exposure to the sex trade from a young age, have positioned Indigenous women as more vulnerable to exploitation, contributing to their higher risk of trafficking (Roudometkina & Wakeford, 2018). A common method used by human traffickers is the "boyfriend method," where the trafficker is someone close to the victim and grooms them by providing basic needs such as food, shelter, and providing money, gifts, and drugs (Native Women's Association of Canada, n.d.).

Marten Falls First Nation and Aroland First Nation are both located within the Central Region of the Nishnawbe Aski Police Service. **Table 5-30** highlights the total number of offenses in the Central Region. It is important to note that not all of these offenses occurred in Marten Falls First Nation or Aroland First Nation, but rather within the broader Central Region.

Table 5-30: Offenses in the Nishnawbe Aski Police Service Central Region

Offense Type	Central Region
Violent Offenses	
Murder / Attempt Murder	0
Sexual Offenses	45
Assaults	239
Utter Threats	56
Robberies	3
Arson	12
Theft	
Break and Enter	39
Theft – Motor Vehicles	8
Theft and Possession	45
Frauds	5
Alcohol and Drug Related Offenses	
Drugs	23
Liquor Acts	135
Impaired Operation	36
Reduce Impaired Driving Everywhere program	313
Mental Health Related Incidents	
Mental Health Act	195
Attempt Suicide	104
Threat of Suicide	185
Traffic Related Incidents	
Traffic Related	195
Motor Vehicle Collision	39
Dangerous Operation	6
Missing Persons	
Missing Person	32
All Other	
All other crime and violations	7,641

(Nishnawbe Aski Police Service, 2024)

As shown in **Table 5-30**, the total number of violent offenses in the region is 355, with assaults being the most prevalent at 239 incidents. Other violent offenses include 45 sexual offenses, 56 utter threats, and 12 cases of arson. Of significance are the recorded incidents of both alcohol and drug related offenses, which total 507, alongside a total of 484 recorded mental health related incidents. Together, these data indicate challenges with mental health, alcohol and drug abuse, and violence within the community. These societally disruptive behaviours and acts can lead community members to feel unsafe within their community. Such feelings can result in people choosing to move out of the community or, if they choose not to or are unable to relocate, contribute to increasing feelings of insecurity, fear, isolation and loneliness and a general lack of individual and community well-being.

5.1.10.4.2 Aroland First Nation

Refer to the Marten Falls First Nation section above (**Section 5.1.10.2.1**) for details on reported incidents, including lateral violence, human trafficking, and other forms of violence, as the information remains largely applicable to Aroland First Nation.

5.1.11 Biophysical Factors Influencing Human Health

In addition to Quality of Drinking Water Quality (Surface Water and Groundwater) and Quality of Traditional Foods (Country Foods) discussed above, existing conditions for the biophysical indicators relevant to human health (Air Quality, Soil Quality, Sediment Quality, Land Use, Peatlands, Accidents and Malfunctions) are fully described in their respective discipline reports; therefore, this section references those reports directly to avoid duplication and to rely on the most accurate and discipline-specific existing conditions information.

Each technical discipline assessed the potential effects of the Project within their area of expertise. Indigenous Knowledge, particularly concerning traditional foods and land use, was integrated into the analysis where available. Exceedances of discipline-specific standards were identified in each media except noise. In the Problem Formulation to support Human Health Risk Assessment, additional screening of the available data for Surface water, Sediment, Soils, Soil Leachate, and Groundwater was screened against specific human health-based standards / criteria to identify potential for risks to human health.

Contaminants of potential concern to human health can also affect the quality of traditional foods, which may be impacted by both anthropogenic and non-anthropogenic sources. These contaminants can enter traditional foods via surface water, soil, sediment, groundwater, and air. In some instances, the quality of traditional foods may also be impacted by the ingestion of other contaminated foods (e.g., a bear eating fish). Therefore, a country foods and water sampling program was completed for the Local Study Area and the results shared with Marten Falls First Nation and Aroland First Nation.

Due to the all-encompassing nature of the Biophysical Factors: existing conditions were considered across several studies, including:

- Fish and Fish Habitat Technical Support Document [Appendix G];
- Peatlands Existing Conditions & Effects Assessment [Appendix I]
- Ungulates Technical Support Document [Appendix M];
- Vegetation Technical Support Document [Appendix J];
- Wildlife Technical Support Document [Appendix K];
- Birds Technical Support Document [Appendix L];
- Cultural Heritage Technical Support Document [Appendix Q];

Biophysical effects of the Project are quite spatially limited and therefore only considered under the Local Study Areas.

5.1.11.1 Air Quality

The existing conditions relevant to the Biophysical Factor: Air Quality may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Air Quality and Greenhouse Gas Technical Support Document [Appendix S].

5.1.11.2 Noise and Vibration

The existing conditions relevant to the Biophysical Factor: Noise and Vibration may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Acoustic and Vibration Environment Technical Support Document [Appendix P].

5.1.11.3 Soil Quality

The existing conditions relevant to the Biophysical Factor: Soil Quality may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Physiography, Terrain, and Soils Technical Support Document [Appendix N].

5.1.11.4 Sediment Quality

The existing conditions relevant to the Biophysical Factor: Surface Water and Sediment Quality may be found in the Problem Formulation for Human Health Risk Assessment [Attachment A] and Surface Water Technical Support Document [Appendix F];

5.1.11.5 Land Use

The existing conditions relevant to the Biophysical Factor: Land Use may be found in the *Problem Formulation for Human Health Risk Assessment [Attachment A]* and *Land and Resource Use Technical Support [Appendix U].*

5.1.11.6 Accidents and Malfunctions

The existing conditions relevant to the Biophysical Factor: Accidents and Malfunctions may be found in the Wildlife Technical Support Document [Appendix K], Fish and Fish Habitat Technical Support Document [Appendix G], and Ungulates Technical Support Document [Appendix M].

5.1.11.7 Peatlands

The existing conditions relevant to the Biophysical Factor: Peatlands may be found in *Peatlands Existing Conditions & Effects Assessment [Appendix I].*

5.2 Regional Study Area

The Regional Study Area for the Marten Falls First Nation Community Access Road Community Well-being Report focuses on the impacts to Indigenous communities and municipalities.

Municipalities were identified based on the potential for interaction between the Project and select valued components, specifically sustainable population growth and public safety. The Project is expected to increase regional accessibility and facilitate more frequent movement of people through adjacent regions, creating a potential pathway for effect related to population dynamics and community safety for the regional municipal communities of Greenstone and Thunder Bay. The Existing Conditions for those regional municipal communities are described below.

This section also provides a high-level overview of the Regional Study Area, focusing on various widely applicable economic indicators including the valued components labour market dynamics, business environment, and regional economy. Due to the widespread nature of economic impacts, the Existing Conditions for the Kenora District, Thunder Bay District, and the Cochrane District, are described below.

As defined in **Section 4**, where a potential pathway for impact to regional Indigenous communities was identified within the Local Study Area, the Existing Conditions for Regional Indigenous Communities were described in **Section 5.1**, alongside the Existing Conditions of the Local Study Area Communities, Marten Falls First Nation and Aroland First Nation. For more information on each Indigenous community, please refer to the *Environmental Assessment / Impact Statement* and / or the *Aboriginal and / or Treaty Rights and Interests Draft Existing Conditions Report*.

5.2.1 Sustainable Population Growth

5.2.1.1 Greenstone Municipality

Age Distribution

According to Statistics Canada, between 2011 and 2021, the population of Greenstone declined from 4,725 to 4,309 residents. In 2016, the population was 4,636 (Stats Canada, 2011 – 2021). Over this period, population change occurred alongside shifts in age composition. Refer to **Table 5-30** for more information.

In 2021, children and youth aged 0 to 14 years accounted for approximately 16.8% of the total population, a similar proportion to 2016 (16.7%) and lower than in 2011 (18.2%). The working-age population (15 to 64 years) represented approximately 61.8% of residents in 2021, compared to 65.4% in 2016 and 68.1% in 2011. Residents aged 65 years and older comprised approximately 21.2% of the population in 2021, increasing from 17.7% in 2016 and 13.9% in 2011 (Statistics Canada, 2011c; Statistics Canada, 2016c; Statistics Canada, 2021c)

When disaggregated by gender in 2021, males aged 0 to 14 years accounted for approximately 17.0% of the male population, while females in the same age group accounted for approximately 16.6%. Among working-aged residents, males aged 15 to 64 represented approximately 62.6% of the male population, compared to 61.0% among females. In the 65 years and over age group, females represented a higher proportion (22.1%) than males (20.2%) (Statistics Canada, 2011c; Statistics Canada, 2016c; Statistics Canada, 2021c). Refer to **Table 5-30** for more information.

Gender Distribution

In 2021, Greenstone's population included approximately 2,200 men and 2,100 women. Men represented approximately 51% of the total population, while women accounted for approximately 49%. In 2016, men represented approximately 51% of the population, and a similar distribution was reported in 2011 (Statistics Canada, 2011c; Statistics Canada, 2016c; Statistics Canada, 2021c). Refer to **Table 5-30** for more information.

Across age cohorts, the distribution of men and women is generally similar. Differences are more evident in older age groups, where women comprise a larger share of the population aged 65 years and over (Statistics Canada, 2011c; Statistics Canada, 2016c; Statistics Canada, 2021c). In younger and working-age groups, the proportions of men and women are relatively comparable. Refer to **Table 5-30** for more information.

Table 5-31: Age and Gender Distribution, 2011, 2016, 2021 for Greenstone Municipality

Population	2011			2016			2021		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Greenstone Total Population	4,725	2,425	2,300	4,636	2,375	2,260	4,309	2,200	2,100
Ages 0 to 14 Percent of Total Population	18.2	19.8	16.1	16.7	17.9	15.7	16.8	17	16.6
Ages 15 to 64 Percent of Total Population	68.1	65.8	77.6	65.4	64.8	66.2	61.8	62.6	61.0
Ages 65 and over Percent of Total Population	13.9	13.6	14.1	17.7	17.5	17.9	21.2	20.2	22.1
Ontario Total Population	12,851,820	6,263,140	6,588,685	13,448,494	6,559,390	6,889,105	14,223,945	6,970,855	7,253,085
Ages 0 to 14 Percent of Total Population	17.0	31.2	16.1	16.4	17.3	15.6	15.8	16.6	15.1
Ages 15 to 64 Percent of Total Population	75.1	75.9	74.4	66.8	67.3	66.4	65.6	66.2	65.0
Ages 65 and over Percent of Total Population	14.6	13.3	15.9	16.7	15.5	17.9	18.5	17.2	19.8

5.2.1.2 Thunder Bay

Age Distribution

According to Statistics Canada, Thunder Bay's Metropolitan Area population increased slightly from 121,600 in 2011 to 121,621 in 2016 and to 123,258 in 2021. Changes in population size over this period occurred alongside changes in age composition.

In 2021, residents aged 0 to 14 years comprised approximately 14.3% of the population, compared to 14.6% in 2016 and 14.8% in 2011. The working-age population (15 to 64 years) accounted for approximately 63.7% of residents in 2021, decreasing from 65.7% in 2016 and 74.4% in 2011. Residents aged 65 years and older represented approximately 21.9% of the population in 2021, compared to 19.8% in 2016 and 17.2% in 2011 (Statistics Canada, 2011g; Statistics Canada, 2016g; Statistics Canada, 2021g).

By gender in 2021, males aged 0 to 14 years represented approximately 14.9% of the male population, while females in the same age group represented approximately 13.7%. Among working-aged residents, males aged 15 to 64 accounted for approximately 64.4% of the male population, compared to 63.1% among females. In the 65 years and over age group, females represented approximately 23.2% of the female population, compared to 20.7% of males (Statistics Canada, 2011g; Statistics Canada, 2016g; Statistics Canada, 2021g).

Gender Distribution

In 2021, Thunder Bay Metropolitan Area had approximately 60,910 men and 62,350 women. Women represented approximately 51% of the population, while men accounted for approximately 49%. This distribution is similar to that reported in 2016 and 2011 (Statistics Canada, 2011g; Statistics Canada, 2016g; Statistics Canada, 2021g).

Across most age cohorts, the number of men and women is relatively similar. Differences between men and women are more apparent in the older age groups, particularly among residents aged 65 years and over (Statistics Canada, 2011g; Statistics Canada, 2016g; Statistics Canada, 2021g).

Table 5-32: Age and Gender Distribution, 2011, 2016, 2021 for Thunder Bay

Population	2011			2016			2021		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Thunder Bay Total Population	121,600	59,250	62,350	121,621	59,690	61,930	123,258	60,910	62,350
Ages 0 to 14 Percent of Total Population	14.8	15.4	14.3	14.6	15.3	13.9	14.3	14.9	13.7
Ages 15 to 64 Percent of Total Population	74.4	75.7	73.4	65.7	66.5	64.8	63.7	64.4	63.1
Ages 65 and over Percent of Total Population	17.2	15.5	18.7	19.8	18.2	21.3	21.9	20.7	23.2
Ontario Total Population	12,851,820	6,263,140	6,588,685	13,448,494	6,559,390	6,889,105	14,223,945	6,970,855	7,253,085
Ages 0 to 14 Percent of Total Population	17.0	31.2	16.1	16.4	17.3	15.6	15.8	16.6	15.1
Ages 15 to 64 Percent of Total Population	75.1	75.9	74.4	66.8	67.3	66.4	65.6	66.2	65.0
Ages 65 and over Percent of Total Population	14.6	13.3	15.9	16.7	15.5	17.9	18.5	17.2	19.8

5.2.2 Labour Market Dynamics

5.2.2.1 Kenora District

Labour Force

To better understand the regional economy of Marten Falls First Nation, **Table 5-33** below shows the labour market indicators of the Kenora District. The Kenora District working-age population (15 years and older) in 2024 was estimated to be around 55,300, with an even split between men and women. The population has increased between 2011 and 2024 by approximately 26%, or an average of 1.8% per year. Approximately 57% of the working-age population participated in the labour force in 2024, with a seasonal work force of 12% and 9% that were self-employed. Approximately 52% of the working-age population was employed in 2024, with 35% working full time. The 2024 unemployment rate was 9%, which has decreased over the years largely due to the decline in men's unemployment rate.

Table 5-33: Labour Market Indicators for Kenora District (2011, 2016, 2021, 2024)

Kenora District Labour Market Indicators	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+ (thousands)	43.8	21.9	21.9	50.2	25.1	25.1	51.0	25.6	25.4	55.3	28.0	27.3
Labour Force (thousands)	27.9	14.4	13.5	30.5	15.8	14.7	29.2	15.3	14.0	31.8	16.7	15.1
Participation Rate (%)	64	66	62	61	63	59	57	60	55	57	60	55
Employment Rate (%)	57	58	56	54	54	53	52	54	51	52	54	51
Employment Rate - Full Time (%)	33	35	30	32	34	30	35	37	32	35	37	32
Unemployment Rate (%)	10	12	8	12	14	9	9	10	8	9	9	8

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2016d; 2021d), AECOM Analysis
Note: e: estimate based on most recent labour force data

Table 5-34 below shows that the Kenora District's increasing labour force is relatively diversified across the available industries (classified by the North American Industry Classification System categories). Based on 2024 estimates, the main industries overall include health care and social assistance, public administration, retail trade and educational services. The largest industries for men were construction, public administration, retail trade, and health care and social assistance. The most dominant industry for women was health care and social assistance, followed by educational services, public administration, and retail trade.

Table 5-34: Labour Force by Industry for Kenora District (2011, 2016, 2021, 2024)

Kenora District Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	540	435	110	765	570	190	725	540	185	785	590	200
21 Mining, quarrying, and oil and gas extraction	1,230	1,045	180	1,270	1,045	230	975	815	160	1,060	890	175
22 Utilities	320	270	50	360	320	40	405	380	25	440	415	25
23 Construction	2,225	1,980	245	2,420	2,200	225	2,350	2,100	250	2,555	2,290	270
31-33 Manufacturing	1,030	840	185	1,205	990	220	990	805	180	1,075	875	195
41 Wholesale trade	415	260	155	265	175	95	275	230	50	300	250	55
44-45 Retail trade	3,100	1,490	1,610	3,445	1,670	1,780	3,190	1,670	1,520	3,465	1,820	1,645
48-49 Transportation and warehousing	1,490	1,185	310	1,680	1,345	335	1,485	1,170	320	1,615	1,275	345
51 Information and cultural industries	405	245	165	275	175	100	210	135	75	230	145	80
52 Finance and insurance	530	75	455	485	105	380	425	110	325	460	120	350
53 Real estate and rental and leasing	190	130	60	320	180	145	345	220	125	375	240	135
54 Professional, scientific and technical services	580	250	325	670	295	375	765	365	405	830	400	440
55 Management of companies and enterprises	0	0	0	10	10	0	10	0	0	10	0	0
56 Administrative and support, waste and remediation services	520	295	220	720	395	325	795	470	325	865	510	350
61 Educational services	2,245	550	1,690	2,890	880	2,005	3,045	915	2,125	3,305	995	2,300
62 Health care and social assistance	4,685	1,015	3,665	5,210	1,145	4,070	6,100	1,505	4,590	6,625	1,640	4,965
71 Arts, entertainment and recreation	355	235	115	335	195	140	290	190	105	315	205	115
72 Accommodation and food services	2,090	810	1,280	2,375	980	1,395	1,500	685	820	1,630	745	885

Kenora District Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
81 Other services (except public administration)	1,145	510	635	1,125	505	615	975	520	455	1,060	565	490
91 Public administration	4,075	2,375	1,695	3,430	1,935	1,495	3,690	2,045	1,640	4,010	2,230	1,775
Unclassified / Adjustment	750	425	350	1,225	675	535	700	430	270	755	480	295

(Statistics Canada, c; e) (Statistics Canada, 2011k; 2016d; 2021d), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings

The earnings **Table 5-35** below for the Kenora District shows that the average after-tax income in 2024 was about $47,200, which was $17,300 above the average disposable income in Marten Falls First Nation. The average after-tax income for the Kenora District in 2024 was 46% higher than in 2011, which represents an annual growth of 2.9%. This is similar to Ontario's average after-tax income growth of 45% during this period, or 2.9% per year. Unlike with Marten Falls First Nation, the Kenora District's average after-tax income was higher for men ($51,100) than for women ($43,400). The average after-tax income for men grew 39% since 2011, or 2.5% per year, while for women it grew 56%, or 3.5% annually.

The median after-tax income for the Kenora District in 2024 was $42,000 overall, which was also higher for men ($45,100) than for women ($39,400). The median after-tax income for the Kenora District in 2024 represents a 52% increase since 2011, or 3.3% per year. This is higher than Ontario's median after-tax income growth of 46%, or 3.0% annually. The Kenora District's median after-tax income for men grew 38%, or 2.5% per year, while for or women it grew 63%, or 3.8% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.1, indicating lower inequality than in Marten Falls First Nation (1.5). The income inequality is similar between men and women, which has decreased slightly over the past decade.

Table 5-35: Earnings for Kenora District (2011, 2016, 2021, 2024)

Kenora District Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	32.4	36.8	27.9	34.7	38.2	31.2	42.7	46.2	39.2	47.2	51.1	43.4
Median after-tax income (thousands $)	27.6	32.6	24.1	29.3	33.2	26.4	38.0	40.8	35.6	42.0	45.1	39.4
Average-to-median after-tax income ratio	1.2	1.1	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1

(Statistics Canada, d) (Statistics Canada, 2011k; 2016d; 2021d), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

Educational Attainment

Over the past decade, the Kenora District has seen an increase in the level of education being attained by its residents. **Table 5-36** shows that in 2021, 30.9% of the population

aged 15 years and over had no certificate, diploma, or degree. This marks an improvement from 35.2% in 2016, indicating a positive trend towards higher educational attainment. This figure remains higher than the provincial average in Ontario, where only 15.3% of individuals lacked formal educational qualifications in 2021.

The percentage of Kenora residents with a high school diploma or equivalency certificate has increased from 24.3% in 2016 to 29.0% in 2021. This increase suggests a growing emphasis on completing secondary education. In comparison, Ontario's figures are similar, with 27.2% of the population holding a high school diploma in 2021.

Apprenticeship or trades certificates and diplomas have declined in Kenora, dropping from 11.1% in 2011 to 7.5% in 2021. Women have even lower attainment in the trades, with only 3.3% holding such qualifications in 2021 compared to 11.7% of men. Ontario also experienced a lower percentage in this category, with 5.0% in 2021.

College-level qualifications have remained relatively stable in Kenora, with 18.6% of the population holding a college, CEGEP, or other non-university certificate or diploma in 2021. This is comparable to Ontario's 20.3% in the same year.

Table 5-36: Kenora District Educational Attainment

Highest Attained Certificate, Diploma or Degree for the Population aged 15 Years and Over (%)	Year	Total	Men	Women
No certificate, diploma or degree	2011	31.2	33.3	29.2
	2016	35.2	36.8	33.7
	2021	30.9	32.5	29.3
High (secondary) school diploma or equivalency certificate	2011	24.9	23.7	26.1
	2016	24.3	24.0	24.6
	2021	29.0	29.6	28.4
Apprenticeship or trades certificate or diploma	2011	11.1	16.8	5.4
	2016	8.8	13.9	3.7
	2021	7.5	11.7	3.3
College, CEGEP or other non-university certificate or diploma	2011	18.7	14.7	22.7
	2016	18.7	15.2	22.4
	2021	18.6	15.3	21.9
University certificate or diploma below bachelor level	2011	2.9	2.4	3.4
	2016	2.0	1.5	2.5
	2021	1.6	1.2	1.9
Bachelor's degree or higher	2011	11.2	9.2	13.2
	2016	10.9	8.6	13.2
	2021	12.4	9.7	15.2

(Statistics Canada, 2011d; 2016d; 2021d)

The percentage of individuals with a university certificate or diploma below the bachelor level has decreased slightly in Kenora, from 2.9% in 2011 to 1.6% in 2021. Ontario's figures are higher, at 2.3% in 2021.

One key trend in Kenora is the increase in the percentage of individuals with a bachelor's degree or higher. This figure rose from 10.9% in 2016 to 12.4% in 2021, with more women holding bachelor's degrees or higher than men (15.2% compared to 9.7%). Despite this

progress, Kenora still lags behind Ontario, where 29.9% of the population held a bachelor's degree or higher in 2021.

Overall, the educational attainment levels in Kenora District have shown positive trends over the past decade; there are fewer people without formal qualifications and more who hold high school diplomas and bachelor's degrees. The district's higher education levels remain lower than the provincial averages in Ontario. The census data also show a gender gap in educational attainment, with women generally achieving higher levels of education than men.

5.2.2.2 Thunder Bay District

Labour Force

As **Table 5-37** shows, The Thunder Bay Census District working-age population (15 years and older) in 2024 was estimated to be around 133,200, with equal representation between men and women. The 2024 population has increased about 10% since 2011, or 0.7% each year on average. Approximately 58% of the working-age population participated in the labour force in 2024, with about 11% of the labour force being seasonal and around 9% self-employed. Around 52% of the working-age population was employed in 2024, with about 30% working full time. The unemployment rate was estimated to be about 11% overall in 2024; this has increased since 2011, especially among women.

Table 5-37: Labour Market Indicators for Thunder Bay District (2011, 2016, 2021, 2024)

Thunder Bay District Labour Market Indicators	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+ (thousands)	121.3	59.4	61.9	121.3	59.8	61.5	122.8	60.7	62.0	133.2	66.4	66.9
Labour Force (thousands)	74.6	38.1	36.5	73.1	37.6	35.6	70.9	36.7	34.3	77.0	40.0	37.1
Participation Rate (%)	62	64	59	60	63	58	58	60	55	58	60	55
Employment Rate (%)	56	58	55	55	57	54	52	54	49	52	54	49
Employment Rate - Full Time (%)	44	50	38	31	34	27	30	34	27	30	33	27
Unemployment Rate (%)	9	10	8	8	10	6	11	11	11	11	11	11

(Statistics Canada, c; e) (Statistics Canada, 2011n; 2016g; 2021g), AECOM Analysis
Note: e: estimate based on most recent labour force data

Based on Thunder Bay District's labour force in 2024, as displayed in **Table 5-38**, the main industries overall include health care and social assistance, retail trade, educational services, and construction. The largest industries for men were construction, retail trade, transportation and warehousing, and public administration. Women's labour force was largely concentrated in health care and social assistance, followed by retail trade, educational services, and public administration.

Table 5-38: Labour Force by Industry for Thunder Bay District (2011, 2016, 2021, 2024)

Thunder Bay District Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	1,505	1,140	360	1,680	1,285	400	1,675	1,175	495	1,820	1,280	535
21 Mining, quarrying, and oil and gas extraction	2,035	1,655	380	1,770	1,600	170	1,900	1,660	240	2,065	1,810	260
22 Utilities	820	710	115	755	640	115	970	780	190	1,055	850	205
23 Construction	4,830	4,275	555	5,600	4,975	625	5,185	4,605	580	5,630	5,020	625
31-33 Manufacturing	3,745	3,015	725	3,980	3,360	620	2,745	2,180	565	2,980	2,375	610
41 Wholesale trade	1,870	1,455	415	1,700	1,325	375	1,400	1,105	300	1,520	1,205	325
44-45 Retail trade	8,620	3,905	4,725	8,490	3,990	4,500	8,585	4,160	4,425	9,325	4,535	4,785
48-49 Transportation and warehousing	4,000	3,230	775	3,765	2,950	815	4,225	3,360	865	4,590	3,665	935
51 Information and cultural industries	1,365	805	565	1,315	780	535	1,025	620	405	1,115	675	440
52 Finance and insurance	1,865	550	1,320	1,520	480	1,030	1,355	495	855	1,470	540	925
53 Real estate and rental and leasing	1,065	630	435	895	525	370	735	460	270	800	500	290
54 Professional, scientific and technical services	3,475	1,840	1,635	3,470	1,890	1,580	3,720	2,080	1,635	4,040	2,265	1,770
55 Management of companies and enterprises	10	0	0	15	10	10	40	30	10	45	35	10
56 Administrative and support, waste and remediation services	2,200	1,195	1,005	2,205	1,270	935	2,360	1,560	800	2,565	1,700	865
61 Educational services	6,540	2,185	4,350	6,485	1,960	4,525	6,250	2,040	4,205	6,790	2,225	4,550
62 Health care and social assistance	11,110	1,880	9,235	12,270	2,300	9,970	13,425	2,645	10,780	14,580	2,885	11,660
71 Arts, entertainment and recreation	1,580	945	630	1,330	635	695	1,040	545	500	1,130	595	540
72 Accommodation and food services	5,545	1,990	3,555	5,575	2,055	3,520	4,500	1,985	2,515	4,890	2,165	2,720
81 Other services (except public administration)	3,265	1,825	1,440	3,110	1,500	1,605	2,975	1,605	1,365	3,230	1,750	1,475
91 Public administration	7,450	3,780	3,665	5,920	3,240	2,680	5,355	2,710	2,640	5,815	2,955	2,855
Unclassified / Adjustment	1,715	1,090	625	1,290	780	515	1,465	860	630	1,590	930	695

(Statistics Canada, c; e) (Statistics Canada, 2011n; 2016g; 2021g), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings

The earnings **Table 5-39** below for the Thunder Bay District implies that the average after-tax income in 2024 was about $48,800, which was notably $22,200 above the average after-tax income in Aroland First Nation. The average after-tax income for the Thunder Bay District in 2024 was 47% higher than in 2011, which represents an annual growth of 3.0%. This is similar to Ontario's average after-tax income growth of 45% during this period, or 2.9% per year. Unlike with Aroland First Nation, the Thunder Bay District's average after-tax income was higher for men ($53,900) than for women ($43,700). The average after-tax income for men grew 41% since 2011, or 2.7% per year, while for women it grew 54%, or 3.4% annually.

The median after-tax income for the Thunder Bay District in 2024 was $42,900 overall, which was also higher for men ($47,800) than for women ($38,900). The median after-tax income for the Thunder Bay District in 2024 represents a 50% increase since 2011, or 3.1% per year. This is higher than Ontario's median after-tax income growth of 46%, or

3.0% annually. The Thunder Bay District's median after-tax income for men grew 38%, or 2.5% per year, while for or women it grew 64%, or 3.9% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.1, indicating lower inequality than in Aroland First Nation (1.4). While the Thunder Bay District's incomes have been generally higher for men than for women, the income inequality among men has been similar to the income inequality among women over the past decade.

Table 5-39: Earnings for Thunder Bay District Earnings (2011, 2016, 2021, 2024)

Thunder Bay District Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	33.2	38.2	28.4	37.8	43.5	32.2	44.1	48.8	39.6	48.8	53.9	43.7
Median after-tax income (thousands $)	28.7	34.5	23.7	32.5	38.4	27.7	38.8	43.2	35.2	42.9	47.8	38.9
Average-to-median after-tax income ratio	1.2	1.1	1.2	1.2	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1

(Statistics Canada, d) (Statistics Canada, 2011n; 2016g; 2021g), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

Educational Attainment

Over the past decade, the Thunder Bay District has experienced changes in educational attainment among its residents as seen in **Table 5-40**. In 2021, 18% of the population aged 15 years and over had no certificate, diploma, or degree. This marks an improvement from 21.2% in 2016, indicating a positive trend towards higher educational attainment. This figure remains higher than the provincial average in Ontario, where only 15.3% of individuals lacked formal educational qualifications in 2021.

Table 5-40: Thunder Bay District Educational Attainment

Highest Attained Certificate, Diploma or Degree for the Population Aged 15 Years and Over (%)	Year	Thunder Bay District		
		Total	Men	Women
No certificate, diploma or degree	2016	21.2	21.8	20.7
	2021	18.0	18.7	17.2
High (secondary) school diploma or equivalency certificate	2016	25.9	25.2	26.5
	2021	27.8	28.1	27.6
Apprenticeship or trades certificate or diploma	2016	8.9	14.5	3.4
	2021	7.6	12.5	2.9
College, CEGEP or other non-university certificate or diploma	2016	24.1	21.0	27.1
	2021	24.1	21.1	27.1
University certificate or diploma below bachelor level	2016	1.9	1.8	2.1
	2021	1.9	1.7	2.0
Bachelor's degree or higher	2016	18.0	15.7	20.3
	2021	20.6	17.8	23.2

(Statistics Canada, 2016g; 2021g)

The percentage of Thunder Bay residents with a high school diploma or equivalency certificate has increased from 25.9% in 2016 to 27.8% in 2021. This increase suggests a growing emphasis on completing secondary education or equivalent. In comparison, Ontario's figures are similar, with 27.2% of the population holding a high school diploma or equivalent in 2021.

Apprenticeship or trades certificates and diplomas in Thunder Bay have declined from 8.9% in 2016 to 7.6% in 2021. As of 2021, 12.5% of men held such qualifications compared to only 2.9% of women. This discrepancy indicates that men are attaining apprenticeships at a higher rate than women. Ontario also experienced a lower percentage in this category, with 4.3% of women attaining apprenticeships in 2021.

College-level qualifications have remained relatively stable in Thunder Bay, with 24% of the population holding a college, CEGEP, or other non-university certificate or diploma in 2021. This is higher than Ontario's 20.3% in the same year. In contrast, 20.6% of people in Thunder Bay have a bachelor's degree or higher, compared to 29.9% in Ontario. This indicates that more people are attending bachelor's or higher programs in broader Ontario, while in Thunder Bay, more people attend college or equivalent programs.

In Thunder Bay, 21.1% of men hold a college or equivalent qualification, and 17.8% hold a bachelor's degree or higher. Among women in Thunder Bay, 27.1% hold a college or equivalent qualification, while 23.2% hold a bachelor's degree or higher. This suggests that a higher proportion of women are pursuing post-secondary education, both at the college and university levels.

Overall, the educational attainment levels in Thunder Bay District have shown positive trends over the past decade, with fewer people without formal qualifications and more with high school diplomas and bachelor's degrees. The district's higher education levels remain lower than the Ontario provincial averages. The census data also show a gender gap in educational attainment, with women generally achieving higher levels of education than men.

5.2.2.3 Cochrane District

Labour Force

The Cochrane District working-age population (15 years and older) in 2024 was estimated to be around 69,100, with equal representation between men and women. The 2024 population has increased only about 6% since 2011, or 0.4% each year on average. Approximately 59% of the working-age population participated in the labour force in 2024, with about 10% of the labour force being seasonal and around 9% self-employed. Around 54% of the working-age population was employed in 2024, with about 32% working full time. The unemployment rate was estimated to be about 9% overall in 2024, which has increased slightly over the years, especially among women.

Table 5-41: Labour Market Indicators for Cochrane District (2011, 2016, 2021, 2024)

Cochrane District Labour Market Indicators	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+ (thousands)	65.2	32.4	32.8	65.0	32.2	32.8	63.7	31.8	31.9	69.1	34.8	34.3
Labour Force (thousands)	40.0	21.0	19.0	39.9	21.0	18.9	37.5	19.7	17.7	40.7	21.5	19.2
Participation Rate (%)	61	65	58	61	65	58	59	62	56	59	62	56
Employment Rate (%)	56	58	54	56	58	54	54	57	50	54	56	50
Employment Rate - Full Time (%)	47	55	40	32	36	27	32	36	28	32	36	29
Unemployment Rate (%)	8	10	7	9	11	7	9	9	10	9	9	10

(Statistics Canada, c; e) (Statistics Canada, 2011i; 2016b; 2021b), AECOM Analysis

Note: estimate based on most recent labour force data

Based on Cochrane District's labour force in 2024, the main industries overall include health care and social assistance, retail trade, mining, quarrying, and oil and gas extraction, and educational services. The largest industries for men were mining, quarrying, and oil and gas extraction, construction, retail trade, and manufacturing. Women's labour force was largely concentrated in health care and social assistance, followed by educational services, retail trade, and public administration.

Table 5-42: Labour Force by Industry for Cochrane District (2011, 2016, 2021, 2024)

Cochrane District Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	1,060	810	250	1,015	810	205	890	665	225	965	725	245
21 Mining, quarrying, and oil and gas extraction	4,020	3,660	365	4,170	3,760	420	4,315	3,860	465	4,685	4,210	505
22 Utilities	575	525	50	585	500	85	485	445	40	525	485	45
23 Construction	3,090	2,680	410	2,955	2,600	355	2,515	2,230	280	2,730	2,430	305
31-33 Manufacturing	2,295	1,885	410	2,305	1,910	400	1,930	1,525	405	2,095	1,660	440
41 Wholesale trade	810	665	150	815	665	150	750	560	190	815	610	205
44-45 Retail trade	4,990	2,140	2,850	4,950	2,205	2,745	4,330	2,015	2,320	4,705	2,195	2,510
48-49 Transportation and warehousing	2,135	1,475	660	2,035	1,440	600	1,840	1,340	500	2,000	1,460	540
51 Information and cultural industries	530	285	245	440	200	240	360	200	160	390	220	175
52 Finance and insurance	765	135	635	920	240	680	705	165	540	765	180	585
53 Real estate and rental and leasing	395	235	160	380	215	155	325	190	135	355	205	145
54 Professional, scientific and technical services	1,235	685	550	1,335	620	715	1,330	670	665	1,445	730	720
55 Management of companies and enterprises	0	0	0	15	10	0	30	10	15	35	10	15
56 Administrative and support, waste and remediation services	1,475	805	675	1,200	575	625	1,140	620	525	1,240	675	570
61 Educational services	3,320	800	2,520	2,965	765	2,200	3,295	810	2,480	3,580	885	2,685
62 Health care and social assistance	5,355	880	4,480	5,740	890	4,845	6,140	1,005	5,135	6,670	1,095	5,555
71 Arts, entertainment and recreation	410	210	200	465	215	250	295	155	145	320	170	155
72 Accommodation and food services	2,505	660	1,845	2,635	935	1,695	1,820	705	1,120	1,975	770	1,210
81 Other services (except public administration)	1,685	755	935	1,825	880	945	1,630	910	720	1,770	990	780
91 Public administration	2,810	1,460	1,350	2,525	1,260	1,265	2,510	1,200	1,305	2,725	1,310	1,410
Unclassified / Adjustment	520	245	245	580	315	275	840	465	355	915	510	375

(Statistics Canada, c; e) (Statistics Canada, 2011i; 2016b; 2021b), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings

The earnings table below for the Cochrane District shows that the average after-tax income in 2024 was about $49,200. The average after-tax income for the Cochrane District in 2024 was 46% higher than in 2011, which represents an annual growth of 3.0%. This is similar to Ontario's average after-tax income growth of 45% during this period, or 2.9% per year. The average after-tax income was higher for men ($55,600) than for women ($42,800). The average after-tax income for men grew 40% since 2011, or 2.6% per year, while for women it grew 56%, or 3.5% annually.

The median after-tax income for the Cochrane District in 2024 was $42,500 overall, which was also higher for men ($49,500) than for women ($36,700). The median after-tax income for the Cochrane District in 2024 represents a 50% increase since 2011, or 3.1% per year. This is higher than Ontario's median after-tax income growth of 46%, or 3.0% annually. The Cochrane District's median after-tax income for men grew 38%, or 2.5% per year, while for or women it grew 62%, or 3.8% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.2, indicating similar inequality as in Ontario overall. In addition to the Cochrane District's incomes being generally higher for men than for women, the income inequality among men has been lower than the income inequality among women.

Table 5-43: Earnings for Cochrane District (2011, 2016, 2021, 2024)

Thunder Bay District Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	33.6	39.7	27.5	38.2	45.5	30.9	44.5	50.3	38.7	49.2	55.6	42.8
Median after-tax income (thousands $)	28.4	36.0	22.6	31.9	40.6	25.2	38.4	44.8	33.2	42.5	49.5	36.7
Average-to-median after-tax income ratio	1.2	1.1	1.2	1.2	1.1	1.2	1.2	1.1	1.2	1.2	1.1	1.2

(Statistics Canada, d) (Statistics Canada, 2011i; 2016b; 2021b), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

Educational Attainment

Over the past decade, the Cochrane District has seen changes in the level of education attained by its residents. In 2021, 24.1% of the population aged 15 and over had no certificate, diploma, or degree. This marks an improvement from 27.6% in 2016. This remains higher than the provincial average in Ontario, where only 15.3% of individuals did not obtain a certificate, diploma, or degree.

The percentage of Cochrane residents with the highest level of education being a high school diploma or equivalency has increased from 25.7% in 2016 to 28.6% in 2021. This increase suggests a growing emphasis on completing secondary education. Ontario's

figures are similar, with 27.2% of the population having a high school or equivalent as the highest level of education.

Apprenticeship or trades certificates and diplomas have declined in Cochrane, dropping from 10% in 2016 to 8.3% in 2021. As of 2021, 13.2% of men held such qualifications while only 3.4% of women. This discrepancy indicates that men are attaining apprenticeships at a higher rate than women. As noted, this is a trend of women attaining fewer apprenticeships, with 5.0% in 2021.

College-level qualifications have remained relatively stable in Cochrane, with 26.5% of the population holding a college, CEGEP, or other non-university certificate or diploma in 2021. This is higher than Ontario's 20.3% in the same year. In contrast, 11.3% of people in Cochrane have a bachelor's degree or higher, compared to 29.9% in Ontario. This indicates that more people are attending bachelor's or higher programs in broader Ontario, while in Cochrane, more people attend college or equivalent programs.

In Cochrane, 23% of men hold a college or equivalent qualification, and 8.4% hold a bachelor's degree or higher. Among women in Cochrane, 30% hold a college or equivalent qualification, while 14.1% hold a bachelor's degree or higher. This suggests that a higher proportion of women are pursuing post-secondary education, both at the college and university levels.

5.2.2.4 Greenstone Municipality

Labour Force

The Greenstone Municipality working-age population (15 years and older) in 2024 was estimated to be around 3,800, with an equal representation between men and women. The 2024 population has increased only about 1% since 2011, or 0.1% each year on average. Approximately 55% of the working-age population participated in the labour force in 2024, with about 14% of the labour force being seasonal and around 6% self-employed. Around 51% of the working-age population was employed in 2024, with about 31% working full time. The unemployment rate was estimated to be about 9% overall in 2024, which has decreased over the years, particularly among men.

Table 5-44 Labour Market Indicators for Greenstone Municipality (2011, 2016, 2021, 2024)

Greenstone Municipality Labour Market Indicators	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Population 15+ (thousands)	3.8	1.9	1.9	3.8	1.9	1.9	3.5	1.8	1.7	3.8	2.0	1.9
Labour Force (thousands)	2.4	1.2	1.2	2.2	1.1	1.1	2.0	1.0	0.9	2.1	1.1	1.0
Participation Rate (%)	64	65	63	57	57	58	55	57	54	55	56	55
Employment Rate (%)	56	56	56	51	49	54	51	52	49	51	52	50
Employment Rate - Full Time (%)	48	52	45	31	31	30	31	31	31	31	31	31
Unemployment Rate	13	14	12	11	14	7	9	8	9	9	8	9

(Statistics Canada, c; e) (Statistics Canada, 2011j; 2016c; 2021c), AECOM Analysis
Note: e: estimate based on most recent labour force data

Based on Greenstone Municipality's labour force in 2024, the main industries overall include health care and social assistance, educational services, retail trade, and public administration. The largest industries for men were construction, transportation and warehousing, retail trade, and public administration. Women's labour force was largely concentrated in health care and social assistance, followed by educational services, retail trade, and public administration.

Table 5-45: Labour Force by Industry for Greenstone Municipality (2011, 2016, 2021, 2024)

Greenstone Municipality Labour Force by Industry	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	190	140	55	145	125	15	100	85	15	110	95	15
21 Mining, quarrying, and oil and gas extraction	125	80	0	70	70	0	90	80	10	100	85	10
22 Utilities	25	30	0	30	20	15	30	25	0	35	25	0
23 Construction	125	95	30	145	120	25	160	135	25	175	145	25
31-33 Manufacturing	80	70	0	65	65	0	70	45	25	75	50	25
41 Wholesale trade	50	25	20	15	15	10	10	10	0	10	10	0
44-45 Retail trade	205	105	100	210	115	95	225	125	100	245	135	110
48-49 Transportation and warehousing	180	150	35	145	120	30	160	135	25	175	145	25
51 Information and cultural industries	35	0	20	30	15	15	15	10	0	15	10	0
52 Finance and insurance	25	0	25	35	0	30	30	0	20	35	0	20
53 Real estate and rental and leasing	20	0	0	0	0	0	15	0	10	15	0	10
54 Professional, scientific and technical services	40	20	20	40	30	10	50	30	20	55	35	20
55 Management of companies and enterprises	0	0	0	0	0	0	0	0	0	0	0	0
56 Administrative and support, waste and remediation services	45	0	30	65	15	45	45	45	0	50	50	0
61 Educational services	260	35	225	350	55	290	295	75	220	320	80	240
62 Health care and social assistance	295	45	255	295	55	245	350	35	315	380	40	340
71 Arts, entertainment and recreation	40	35	0	20	15	10	10	10	0	10	10	0
72 Accommodation and food services	200	55	140	155	55	105	65	15	50	70	15	55
81 Other services (except public administration)	65	20	45	70	30	45	30	15	15	35	15	15
91 Public administration	395	265	135	245	150	100	195	110	85	210	120	90
Unclassified / Adjustment	30	70	50	35	15	0	5	25	5	0	35	15

(Statistics Canada, c; e) (Statistics Canada, 2011j; 2016c; 2021c), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings

The earnings table below for the Greenstone Municipality shows that the average after-tax income in 2024 was about $48,300. The average after-tax income for the Greenstone Municipality in 2024 was 48% higher than in 2011, which represents an annual growth of 3.0%. This is similar to Ontario's average after-tax income growth of 45% during this period, or 2.9% per year. The average after-tax income was higher for men ($52,100) than for women ($44,500). The average after-tax income for men grew 44% since 2011, or 2.9% per year, while for women it grew 52%, or 3.3% annually.

The median after-tax income for the Greenstone Municipality in 2024 was $42,900 overall, which was also higher for men ($45,100) than for women ($40,700). The median after-tax income for the Greenstone Municipality in 2024 represents a 46% increase since 2011, or

2.9% per year. This is similar to Ontario's median after-tax income growth of 46%, or 3.0% annually. The Greenstone Municipality's median after-tax income for men grew 37%, or 2.4% per year, while for or women it grew 63%, or 3.8% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.1, indicating slightly lower inequality than in Ontario overall (1.2).

Table 5-46: Earnings for Greenstone Municipality (2011, 2016, 2021, 2024)

Greenstone Municipality Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	32.7	36.1	29.3	37.1	41.8	32.3	43.7	47.1	40.3	48.3	52.1	44.5
Median after-tax income (thousands $)	29.4	32.9	25.0	31.8	37.0	27.1	38.8	40.8	36.8	42.9	45.1	40.7
Average-to-median after-tax income ratio	1.1	1.1	1.2	1.2	1.1	1.2	1.1	1.2	1.1	1.1	1.2	1.1

(Statistics Canada, b) (Statistics Canada, 2011j; 2016c; 2021c), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

Educational Attainment

Over the past decade, the Greenstone District has seen changes in the level of education attained by its residents. In 2021, 27.1% of the population aged 15 years and over had no certificate, diploma, or degree. This marks an improvement from 32.2% in 2016, indicating a positive trend towards higher educational attainment. This figure remains higher than the provincial average in Ontario, where only 15.3% of individuals lacked formal educational qualifications in 2021.

The percentage of Greenstone residents with a high school diploma or equivalency certificate has increased from 24.5% in 2016 to 30.4% in 2021. This increase suggests a growing emphasis on completing secondary education. In comparison, Ontario's figures are similar, with 27.2% of the population holding a high school diploma in 2021.

Apprenticeship or trades certificates and diplomas have declined in Greenstone, dropping from 8.1% in 2016 to 7.2% in 2021. As of 2021, 11.8% of men held such qualifications compared to only 2.6% of women. This discrepancy indicates that men are attaining apprenticeships at a higher rate than women. Ontario also experienced a lower percentage in this category, with 5.0% in 2021.

College-level qualifications have remained relatively stable in Greenstone, with 22.3% of the population holding a college, CEGEP, or other non-university certificate or diploma in 2021. This is higher than Ontario's 20.3% in the same year. In contrast, 10.1% of people in Greenstone have a bachelor's degree or higher, compared to 29.9% in Ontario. This

indicates that more people are attending bachelor's or higher programs in broader Ontario, while in Greenstone, more people attend college or equivalent programs.

In Greenstone, 17.9% of men hold a college or equivalent qualification, and 7.6% hold a bachelor's degree or higher. Among women in Greenstone, 26.6% hold a college or equivalent qualification, while 12.7% hold a bachelor's degree or higher. This suggests that a higher proportion of women are pursuing post-secondary education, both at the college and university levels.

Overall, the educational attainment levels in Greenstone District have shown positive trends over the past decade, with decreases in the percentage of individuals without formal qualifications and increases in those with high school diplomas and bachelor's degrees. The district's higher education levels remain lower than the provincial averages in Ontario. The census data also show a gender gap in educational attainment, with women generally achieving higher levels of education than men.

5.2.2.5 Ontario

Labour Force

Ontario's working-age population (15 years and older) in 2024 was 13.4 million, with slightly more women than men. The population has notably expanded since 2011 – about 28%, or 1.9% each year on average. Approximately 65% of the working-age population participated in the labour force in 2024 (same as the national average). About 8% of the labour force was seasonal, and around 15% was self-employed. Ontario's employment rate was 61% in 2024, with about half of the individuals working full time. The unemployment rate was about 7% overall in 2024 (for both men and women), which has normalized since its high 2021 level (12%).

Table 5-47: Labour Market Indicators for Ontario (2011, 2016, 2021, 2024)

Ontario	2011			2016			2021			2024[e]		
Labour Market Indicators	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**
Population 15+ (millions)	10.5	5.1	5.4	11.0	5.3	5.7	11.8	5.7	6.0	13.4	6.6	6.8
Labour Force (millions)	6.9	3.5	3.3	7.1	3.7	3.5	7.4	3.8	3.6	8.8	4.6	4.1
Participation Rate (%)	66	70	61	65	69	61	63	67	59	65	70	61
Employment Rate (%)	60	64	56	60	64	56	55	60	51	61	65	57
Employment Rate - Full Time (%)	49	57	42	35	40	30	34	39	29	50	56	44
Unemployment Rate (%)	8	8	8	7	8	7	12	11	13	7	7	7

(Statistics Canada, c; e) (Statistics Canada, 2011m; 2016d; 2021f), AECOM Analysis

The key industries of Ontario's labour force in 2024 have been health care and social assistance, retail trade, professional, scientific and technical services, and manufacturing. The largest industries for men were construction, manufacturing, retail trade, and professional, scientific and technical services. Women's labour force was largely

concentrated in health care and social assistance, followed by retail trade, educational services, and professional, scientific and technical services.

Table 5-48: Labour Force by Industry for Ontario (2011, 2016, 2021, 2024)

Ontario Labour Force by Industry (thousands)	2011			2016			2021			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
11 Agriculture, forestry, fishing and hunting	101	66	35	102	67	35	105	66	39	125	80	45
21 Mining, quarrying, and oil and gas extraction	30	26	4	32	28	4	34	29	5	40	35	5
22 Utilities	57	43	14	51	38	13	55	42	13	65	50	15
23 Construction	417	369	49	477	420	57	538	467	72	635	565	85
31-33 Manufacturing	697	493	204	683	483	201	656	458	198	775	550	230
41 Wholesale trade	305	198	107	271	179	92	245	158	87	290	190	100
44-45 Retail trade	751	344	407	784	367	417	798	384	414	945	465	480
48-49 Transportation and warehousing	307	225	82	329	242	87	380	282	97	450	340	115
51 Information and cultural industries	178	99	80	177	101	76	169	99	70	200	120	80
52 Finance and insurance	364	153	211	381	170	211	399	185	214	470	225	250
53 Real estate and rental and leasing	134	73	61	144	77	67	152	81	71	180	95	85
54 Professional, scientific and technical services	511	281	230	568	317	251	681	384	297	805	465	345
55 Management of companies and enterprises	6	4	3	12	5	7	26	13	14	30	15	15
56 Administrative and support, waste and remediation services	309	173	137	339	190	148	324	183	141	385	220	165
61 Educational services	499	163	337	529	164	365	531	165	366	630	200	425
62 Health care and social assistance	692	120	572	755	134	621	860	164	696	1015	195	805
71 Arts, entertainment and recreation	144	75	69	147	75	72	131	68	63	155	80	75
72 Accommodation and food services	417	177	240	478	201	277	391	172	219	460	205	255
81 Other services (except public administration)	296	134	163	297	133	164	283	131	152	335	160	175
91 Public administration	459	237	222	416	216	199	428	214	214	505	260	250
Unclassified / Adjustment	185	89	96	171	82	89	213	103	110	260	122	117

(Statistics Canada, c; e) (Statistics Canada, 2011m; 2016d; 2021f), AECOM Analysis
Note: e: estimate based on most recent labour force data

Earnings

Ontario's average after-tax income in 2024 was about $51,200, which was higher than the average after-tax income in the Kenora District ($47,200) and the Thunder Bay District ($48,800). The average after-tax income for Ontario in 2024 was 45% higher than in 2011, which represents an annual growth of 2.9%. Ontario's average after-tax income was higher for men ($57,400) than for women ($45,300). The average after-tax income for men grew 40% since 2011, or 2.6% per year, while for women it grew 52%, or 3.3% annually.

The median after-tax income for Ontario in 2024 was $41,100 overall, which was also higher for men ($45,600) than for women ($37,600). The median after-tax income for Ontario in 2024 represents a 46% increase since 2011, or 3.0% per year. Ontario's median after-tax income for men grew 36%, or 2.4% per year, while for or women it grew 57%, or 3.6% annually.

The overall average-to-median after-tax income ratio in 2024 was estimated to be 1.2, indicating slightly higher inequality than the 1.1 seen in some other mentioned regions (Kenora District, Thunder Bay District, and Greenstone Municipality). Along with higher

incomes for men relative to women, the income inequality among men has been slightly higher than the income inequality among women.

Table 5-49: Earnings for Ontario (2011, 2016, 2021, 2024)

Ontario Earnings	2011[e]			2016			2021[e]			2024[e]		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Average after-tax income (thousands $)	35.2	41.0	29.8	39.3	45.4	33.6	46.3	51.9	41.0	51.2	57.4	45.3
Median after-tax income (thousands $)	28.1	33.5	23.9	30.6	35.8	26.6	37.2	41.2	34.0	41.1	45.5	37.6
Average-to-median after-tax income ratio	1.3	1.2	1.2	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.3	1.2

(Statistics Canada, b) (Statistics Canada, 2011m; 2016d; 2021f), AECOM Analysis
Note: e: estimate based on most recent labour force data

Note that employment income is exempt from income tax under paragraph 81(1)(a) of the *Income Tax Act* and section 87 of the *Indian Act* only if the income is situated on a reserve.

5.2.3 Economy

Local Businesses and Commercial Activities

The City of Kenora serves as a central hub for construction activities. From 2010 to 2022, the City of Kenora issued construction permits valued at over $431 million. This valuation encompasses both commercial / governmental and residential projects, each representing approximately 50% of the total permit value (City of Kenora, 2025b). Upcoming projects include the twinning of the Trans-Canada Highway and the construction of the All-Nations Hospital (City of Kenora, 2025a). The city's Economic Development department facilitates connections between businesses and local contacts, as well as access to funding opportunities.

The City of Kenora has three educational institutions that provide post-secondary, college, and customized employer training (City of Kenora, 2025a):

- Lake of the Woods Campus of Confederation College;
- Seven Generations Education Institute; and
- Niiwin Wendaanimok (Four Winds) Partnership.

These institutions play a role in maintaining a well-trained work force capable of supporting various construction projects.

Construction businesses in Kenora can leverage support from several organizations, including (City of Kenora, 2025a):

- Northwest Business Centre;
- Lake of the Woods Business Incentive Corporation;
- Northwestern Ontario Innovation Centre;
- Kenora and District Chamber of Commerce;

- Ministry of Northern Development Northern Ontario Heritage Fund; and
- FedNor.

These organizations offer economic incentives and resources that are essential for the growth and sustainability of construction businesses in the region.

The City of Thunder Bay is the regional hub of Northwestern Ontario. The city sits on the shores of Lake Superior, which is the world's largest freshwater lake. It is a natural gateway by seaway, road, rail and air to western Canada. Northwestern Ontario is one of the world's leading mining exploration and development areas. Key sectors in the region include aerospace, mining, forestry, bioeconomy, health sciences, information and communication technologies, manufacturing, and tourism (Thunder Bay Community Economic Development Commission, n.d.).

There are three educational institutions that offer full-time and part-time studies leading to degrees, diplomas and certificates (City of Thunder Bay, 2025d):

- Confederation College;
- Lakehead University; and
- Northern Ontario School of Medicine University.

There are several grants, incentives, and funding programs that support Thunder Bay's business environment (City of Thunder Bay, 2025d):

- Build Thunder Bay (Housing Accelerator Fund) Grants;
- Community, Youth & Cultural Funding Program;
- Event Development Grant;
- Street Event Grant;
- Community Economic Development Commission Tourism Development Fund;
- Land-Related Financial Assistance Policy;
- Community Partnership Policy; and
- Downtown & Core Area Improvement Grants.

These initiatives are geared on making the City of Thunder Bay an ideal location for expansion and new construction. The city has a large amount of land zoned for new development, offering commercial, industrial and aviation space at low cost. The downtown urban cores also offer mixed-use and commercial property suitable for both business start-ups and expansions (Thunder Bay Community Economic Development Commission, n.d.).

The Project aims to build the Community Access Road that would improve the connectivity of Marten Falls First Nation with the provincial highways and communities. To gain a better sense of the larger economy within which the Project is occurring, this section considers some key economic indicators for Ontario across time, as shown in **Table 5-50**.

Ontario's real Gross Domestic Product, which shows the provincial economic value after adjusting for inflation, is estimated to have grown 29% from 2011 to 2024. That is equivalent to 2.0% on average each year, higher than Canada's growth rate of 1.8% during this period. Ontario is Canada's largest economy, accounting for 39% of its real Gross Domestic Product. Following the onset of COVID-19 in 2020, Ontario's economy was able to recover relatively quickly in 2021, surpassing its pre-COVID real Gross Domestic Product level. Most recent estimates show that Ontario's real Gross Domestic Product was $942.8 billion in 2024, recording an annual growth rate of 1.1% (growing at same pace as Canada's real Gross Domestic Product).

Employment in Ontario has grown 23% from 2011 to 2024, or 1.6% annually on average. The provincial employment grew 1.7% in 2024, which was slightly below Canada's growth rate of 1.9%. Ontario's employment reached 8.1 million in 2024, making up about 39% of Canada's employment, in line with the real Gross Domestic Product share.

Table 5-50: Ontario Economic Indicators

Ontario Economic Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024[e]
Real Gross Domestic Product (billions $)	728.4	738.0	748.3	767.1	785.9	802.4	825.0	852.0	869.8	830.3	880.7	916.9	932.8	942.8
(% change)	2.4	1.3	1.4	2.5	2.5	2.1	2.8	3.3	2.1	-4.5	6.1	4.1	1.7	1.1
Employment (millions)	6.6	6.7	6.8	6.8	6.9	6.9	7.1	7.2	7.4	7.0	7.4	7.8	8.0	8.1
(% change)	1.5	0.6	1.6	0.5	0.6	1.0	2.5	1.8	2.4	-5.0	5.1	4.9	3.1	1.7
Housing Starts (thousands)	67.8	76.7	61.1	59.1	70.2	75.0	79.1	78.7	69.0	81.3	99.6	96.1	89.3	74.6
(% change)	12.2	13.2	-20.4	-3.2	18.6	6.8	5.6	-0.5	-12.4	17.9	22.5	-3.5	-7.1	-16.5
Housing Starts - Singles (thousands)	26.9	25.6	23.3	23.7	25.0	30.1	29.7	23.8	19.3	22.7	31.4	25.5	17.9	15.0
(% change)	-4.3	-4.9	-9.0	1.8	5.3	20.5	-1.2	-19.9	-18.9	17.6	38.2	-18.7	-29.7	-16.2
Housing Starts - Multiples (thousands)	40.9	51.2	37.8	35.4	45.2	44.9	49.4	55.0	49.7	58.6	68.2	70.6	71.4	59.6
(% change)	26.6	25.0	-26.1	-6.3	27.5	-0.7	10.1	11.2	-9.6	18.0	16.4	3.5	1.1	-16.6
Consumer Price Index (2002=100)	120.1	121.8	123.0	125.9	127.4	129.7	131.9	135.0	137.5	138.4	143.2	152.9	158.7	162.5
(% change)	3.1	1.4	1.0	2.4	1.2	1.8	1.7	2.4	1.9	0.7	3.5	6.8	3.8	2.4

(Statistics Canada, c; f; g; i; Statistics Canada, j); AECOM Analysis
Note: e: Gross Domestic Product estimate based on most recent economic data

Housing starts, or homes under construction, indicate the availability of new housing. In Ontario, housing starts have grown 10% from 2011 to 2024, or 0.7% annually on average, which is lower than Canada's total growth of 27%, or 1.8% per year. The composition of housing starts has changed as well, with Ontario's share of single-dwelling homes (singles) going from 46% in 2011 to just 20% in 2024. A similar trend has occurred nationally, with the share of singles going from 49% to a low of 22% over the same period. There was a huge decrease (-16.5%) in Ontario's housing starts in 2024, both among singles (-16.2%) and among multiples (-16.6%), due in part to reduced migration expectations.

The Consumer Price Index captures the average prices of goods that are consumed domestically. Annual inflation rate is measured by the Consumer Price Index's annual percentage change. Increase in consumer prices decreases the real wealth and purchasing power of consumers. Looking at Ontario's Consumer Price Index during the 2011-2024 period, the province experienced a 35% increase in consumer prices, or about

2.4% annually on average. This is slightly above the national inflation of 34%, or 2.3% per year. Recently, following years of high inflation, Ontario's Consumer Price Index and Canada's Consumer Price Index both grew 2.4% in 2024. Both rates are considered high, as they remain above Canada's inflation target rate of 2.0%.

The experience of comparable road projects in Canada has been that the improved level of access provided by the new road leads to more consumer choices and lower prices of goods. It is reasonable to expect that the new Community Access Road will provide more consumption choices at lower prices. **Table 5-51** shows the results from a report published by Wendimu, Desmarais, and Martens (2018) in the University of Manitoba's Canadian Food Studies Journal, which looked at the effect of an all-weather road access on the prices of food items across stores in Manitoba.

Table 5-51: Average Food Prices (2018)

Food Item (Canadian Dollars)	Winnipeg (11 stores)	Non-First Nations Urban Centres in Northern Manitoba (7 stores)	First Nations Communities with All-weather Road (13 stores)	First Nations Communities without All-weather Road (6 stores)	First Nations Percentage Difference from All-weather Road
Skim milk (1 Litre)	1.55	1.56	2.23	2.65	-16
Low-fat milk (1 Litre)	1.58	1.57	2.43	2.42	0
Low-fat milk (2 Litre)	3.31	3.45	3.82	4.12	-7
Fat-reduced milk (1 Litre)	1.66	1.67	2.04	3.06	-33
Fat-reduced milk (2 Litre)	3.34	3.48	3.86	4.99	-23
Fat-reduced milk (4 Litre)	4.79	5.08	6.99	8.11	-14
Whole milk (4 Litre)	5.25	5.60	4.43	8.56	-48
Lactose-free milk (2 Litre)	5.32	5.70	5.84	6.15	-5
Chocolate milk (4 Litre)	5.29	6.43	8.73	9.64	-9
Ground beef	11.54	10.90	12.24	16.89	-28
Chicken breast	14.50	17.45	17.17	21.99	-22
Chicken thighs	8.77	9.27	10.93	15.49	-29
Pork chops	12.48	10.99	12.92	19.04	-32
Eggs	2.96	3.13	3.77	3.90	-3
Apples	3.36	4.36	5.66	7.41	-24
Bananas	1.81	1.64	2.76	4.72	-42
Oranges	3.52	3.45	4.65	3.80	22
Grapes	5.25	4.72	8.10	9.93	-18
Onions	1.83	2.93	2.92	3.17	-8
Tomatoes	3.94	5.17	6.54	10.86	-40
Potatoes	1.30	1.29	2.03	2.21	-8
Carrots	1.82	2.63	3.02	4.46	-32
Lettuce	1.84	2.20	2.37	2.58	-8
Energy drink	2.70	3.09	3.36	3.75	-10
Potato chips	3.39	3.39	4.57	5.72	-20
Pepsi (2 litre)	2.42	2.33	3.34	8.80	-62
Pepsi (12 pack)	5.57	5.88	7.61	20.25	-62
Wheat flour (10 kg)	17.01	-	22.84	35.34	-35
Coffee (930 grams)	17.58	-	21.09	26.12	-19
Sugar (2 kg)	3.58	-	4.89	6.97	-30

(Wendimu, Desmarais, & Martens, 2018); AECOM Analysis

Communities with an all-weather road generally showed significantly lower prices compared to communities without an all-weather road, with an average decrease of 22% given the above food items. Leading price differences were observed among Pepsi (-62%), whole milk (-48%), bananas (-42%), and tomatoes (-40%). It is important to highlight that

incomes are generally lower in remote and Indigenous communities compared to urban centres. Also, every Indigenous community is specific and differences in prices can occur due to other differences between communities, such as their consumption preferences. It is useful to recognize that experiences from other communities with new road access suggest that the overall cost of living is likely to decline over time.

Planning

The Prosperity and Growth Strategy for Northern Ontario was developed in 2018 by the Government of Canada to enhance and build on the ongoing federal and provincial programs and collaborations to address the needs of Northern Ontario's communities and its residents (Government of Canada, 2024d).

The Prosperity and Growth Strategy for Northern Ontario defines three main priorities for the region:

- Supporting innovation. Expand and strengthen the regional innovation ecosystems to support competitive businesses and economic growth.
- Growing companies. Enhance the delivery of supports for business start-ups and scale-ups to grow competitive companies and stimulate economic growth.
- Building stronger communities. Help communities better respond to opportunities and challenges.

Several Indigenous organizations and partnerships have developed in the Regional Study Area to meet these goals, including Minodahmun Development, a partnership between Animbiigoo Zaagi'igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation and a development corporation focused in the mining sector (Minodahmun Development LP, 2020).

"Matawa Economic Development works with the Matawa First Nations to develop, promote and support a diverse private sector and entrepreneurial culture. It works to create 'opportunity-ready' communities and foster economic growth through economic and business development. It assists Matawa First Nations develop infrastructure, businesses and human capital to grow local economies. It also works with Matawa First Nation community development corporations to build capacity and develop projects and business opportunities to become more self-sufficient" (Matawa First Nations, n.d.).

Member nations of Matawa Economic Development include:

- Webequie First Nation;
- Nibinamik First Nation;
- Neskantaga First Nation;
- Marten Falls First Nation;
- Long Lake #58 First Nation;
- Ginoogaming First Nation;
- Eabametoong First Nation;
- Constance Lake First Nation; and
- Aroland First Nation.

Matawa Economic Development assists Matawa First Nations to develop infrastructure, businesses, and human capital for growing local economies. It also works with Matawa First Nation community development corporations to build capacity and develop projects and business opportunities to become more self-sufficient (Matawa First Nations, n.d.).

Matawa Economic Development provides project incubation, project management, business management, and general management for a variety of regional initiatives across different sectors including mining, forestry, tourism, and energy. Committees in these areas provide leadership and guidance on strategic economic development initiatives (Matawa First Nations, n.d.).

Matawa Economic Development is currently undertaking two specific initiatives to support economic development (Matawa First Nations, n.d.):

- Rapid Lynx Telecommunications. The Broadband Project was established to improve the internet services and enhance the overall quality of life in six Matawa First Nation communities. The six communities that are part of the Broadband Project are: Aroland, Eabametoong, Marten Falls, Neskantaga, Nibinamik, and Webequie First Nations.
- Native Camp Operators Alliance. The alliance is a group of remote, fly-in fishing and hunting outpost camps owned and operated by First Nations Peoples in northwestern Ontario. For almost 20 years, they have been providing top-top wilderness vacations.

Marten Falls Community Based Land Use Plan

Marten Falls First Nation, and the Ministry of Natural Resources signed the Terms of Reference for the Marten Falls First Nation Community Based Land Use Plan in December 2013. Marten Falls First Nation has expressed the following goals with the hope that the planning process will:

- Represent a shared understanding among the Marten Falls First Nation, government and stakeholders;
- Guide the protection and orderly development of the land and its resources;
- Harmonize proposed new land uses with existing and customary land use practices of Marten Falls First Nation;
- Support Marten Falls First Nation customary stewardship responsibilities for the land to remain intact; and
- Promote land use planning to membership who may not know of the intent and / or status of the planning process.

In response to Marten Falls First Nation's expressed interest in planning, the Ministry of Natural Resources is engaging in this joint planning project in accordance with the Far

North Act. The Ontario government sets out the following objectives for land use planning in the *Far North Act*:

- A significant role for First Nations in the planning;
- The protection of areas of cultural value in the Far North and the protection of ecological systems in the Far North by including at least 225,000 square kilometres of the Far North in an interconnected network of protected areas designated in community-based land use plans;
- The maintenance of biological diversity, ecological processes and ecological functions, including the storage and sequestration of carbon in the Far North; and
- Enabling sustainable economic development that benefits the First Nations.

The following outcomes have been identified:

- Documentation of Indigenous Knowledge to support planning, as guided by Marten Falls First Nation;
- Assembly of all other available information to support planning;
- Definition of a planning area by the Draft Plan stage, to be documented in the Draft Plan and, recommended for designation under the *Far North Act*;
- Provisions for:
  - Marten Falls First Nation community members to be fully engaged in the planning dialogue;
  - Dialogue with adjacent communities to support understanding of shared areas and interests within the planning area; and,
  - At least two formal opportunities for input from the community, adjacent communities and all interested people and organizations;
- Preparation of a Draft Plan and Final Plan, to include identification of:
  - Land use areas and their designation (e.g., dedicated protected areas, general use areas, and enhanced management areas) including one or more protected areas;
  - Land uses and activities that are permitted or not permitted within each area;
  - How the plan has addressed the significant cultural and ecological features, land uses and land use designations for areas adjacent to the planning area; and
  - A plan review timeframe as well as direction for plan amendment;
- Opportunity for each of Marten Falls First Nation and Ontario to build consensus on documents and planning recommendations at each stage of planning; and
- Recommendation for joint approval of the Final Community Based Land Use Plan by Marten Falls First Nation and the Ministry of Natural Resources.

Planning incorporates Ontario's broader policy direction and emerging guidance (e.g., Far North Land Use Strategy). When prepared, the Far North Land Use Strategy will support community-based land use planning (Ontario, 2022).

Marten Falls and Webequie Workforce Development Strategy

The Ontario Ministry of Labour, Immigration, Training and Skills Development is providing funding to enable the First Nations to (North Superior Workforce Planning Board, n.d.):

- Develop of a comprehensive workforce development strategy that outlines the diversity of employment readiness and training pathways needed to help prepare community members for potential future employment opportunities.
- Develop priority recommendations to guide implementation decisions, budgets, and next step funding proposals, to advance Indigenous participation in the construction and operation of the proposed three roads in the Ring of Fire, together with other community projects that are planned.
- Build community capacity related to workforce development by leveraging community-based workforce developer trainee positions for each of Marten Falls First Nation and Webequie First Nation. These trainees will be provided with coaching and mentorship to help in their responsibilities as community workforce activists to help excite members in their own employment readiness and skills development objectives.

The North Superior Workforce Planning Board is providing subject matter expertise, project management assistance, and financial accountability stewardship, while the Ministry of Energy and Mines is facilitating relationship development and assisting with advancing project objectives. Additional community training partners may be engaged to provide input to the workforce development strategy.

Community Development Agreement

The Ontario government, Marten Falls First Nation, and Webequie First Nation have signed the Community Development Agreement to develop community infrastructure projects that could support future development opportunities in the area, including building all-seasons roads to the mineral-rich Ring of Fire region. The agreement, signed during a ceremony on March 5, 2024, commits the province to supporting shovel-ready infrastructure projects. Those could include construction of health and training facilities, recreation centres, commercial buildings and labour force development programs. These projects would help improve the well-being and readiness of the First Nations to participate fully in the construction of road projects that would connect the Ring of Fire critical mineral deposits with manufacturing hubs in the south.

"As we move forward to now begin to consider road construction and operations, our commitment remains to be strong stewards of our lands and our environment, in balance

with being active partners in growing economic opportunities and benefits for both our communities and other First Nation communities," said Marten Falls First Nation Chief Bruce Achneepineskum.

"Being at the table in the planning and implementation of road development is key to building a foundation for our future, a future that reflects our community vision, well-being and prosperity," said Webequie First Nation Chief Cornelius Wabasse.

Marten Falls First Nation and Webequie First Nation are working together to accelerate project timelines and prepares communities to participate in future economic development opportunities in the region. This collaboration is focused on enhancing the communities' well-being and livelihoods, including an emphasis on long-term sustainability to protect the land and the people's future.

Together, Marten Falls First Nation Community Access Road, Webequie Supply Road, and Northern Road Link would connect these two First Nation communities to the Ontario highway network and provide access to the mineral deposits in the Ring of Fire. Economic development in the Ring of Fire area will create opportunities to share economic benefits and support the long-term prosperity of Marten Falls First Nation and Webequie First Nation (Ontario, 2024f).

Regional Assessment in the Ring of Fire Area

The regional assessment will be conducted in the area centred on the Ring of Fire mineral deposits in northern Ontario (540 kilometres northeast of Thunder Bay). The regional assessment aims to gather information and data on the region; understand potential effects from past, existing and future development in the Ring of Fire area; and will inform and improve future impact assessments. Indigenous partners and the Impact Assessment Agency of Canada are co-leading the regional assessment and will provide Indigenous communities and organizations, federal and provincial governments, non-government organizations and the public opportunities to meaningfully participate.

Indigenous partners include: Aroland First Nation, Attawapiskat First Nation, Constance Lake First Nation, Eabametoong First Nation, Fort Albany First Nation, Ginoogaming First Nation, Kashechewan First Nation, Long Lake #58 First Nation, Marten Falls First Nation, Missanabie Cree First Nation, Moose Cree First Nation, Neskantaga First Nation, Nibinamik First Nation, Webequie First Nation, and Weenusk First Nation. Administrative support is provided by the Matawa and Mushkegowuk Councils.

On January 20, 2025, it was announced that First Nation partners and the Impact Assessment Agency of Canada have finalized the terms of reference to guide the Regional Assessment in the Ring of Fire Area (Government of Canada, 2025b).

5.2.4 Public Safety

5.2.4.1 Greenstone Municipality

Crime severity within the Greenstone Municipality must be considered in the context of its location within the Central Region of the Nishnawbe Aski Police Service (NAPS). While crime statistics are reported at the police service level rather than at the municipal level, these figures provide an overview of crime severity within the broader jurisdiction that includes Greenstone.

As presented in **Table 5-52**, the overall Crime Severity Index (CSI) for the Nishnawbe Aski Police Service was substantially higher than the provincial average for Ontario throughout the 2021 to 2023 period. In 2021, the NAPS CSI was 297, compared to Ontario's CSI of 56, representing a level approximately 5.3 times higher than the provincial average. In 2022, the CSI for NAPS declined slightly to 292, while Ontario's CSI increased to 59, maintaining a ratio of approximately 4.9 times the provincial level. In 2023, the NAPS CSI increased to 302, compared to Ontario's CSI of 61, corresponding to a ratio of approximately 5.0. Over the same period, the Canadian CSI ranged from 75 to 80, indicating that crime severity within the NAPS jurisdiction also exceeded national averages.

Violent crime severity represents a significant component of the overall CSI. The Violent Crime Severity Index for NAPS remained consistently elevated, ranging from 567 to 578 between 2021 and 2023. In comparison, Ontario's Violent Crime Severity Index ranged from 72 to 79, while the national index ranged from 93 to 99. This indicates that violent crime severity within the NAPS jurisdiction was approximately seven to eight times higher than the provincial average and approximately five to six times higher than the national average over the three-year period.

Non-violent crime severity also exceeded provincial and national benchmarks. The Non-Violent Crime Severity Index for NAPS ranged from 188 in 2021 and 2022 to 199 in 2023. By comparison, Ontario's non-violent index ranged from 50 to 54, and the Canadian index ranged from 68 to 74 during the same period. These figures place non-violent crime severity in the NAPS jurisdiction at approximately 3.5 to 4.0 times the provincial average and approximately 2.5 to 3.0 times the national average.

Table 5-52: Crime Severity Index, Violent Crime Severity Index and Non-Violent Crime Severity Index by Region

Index	Nishnawbe Aski Police Service			Ontario			Canada		
	2021	2022	2023	2021	2022	2023	2021	2022	2023
Crime Severity Index	297	292	302	56	59	61	75	79	80
Violent Crime Severity Index	578	569	567	72	79	79	93	99	99
Non-Violent Crime Severity Index	188	188	199	50	51	54	68	71	74

(Canada Crime Report, 2023; Nishnawbe Aski Police Service, 2024)

Traffic-related occurrences within the Central Region are summarized in **Table 5-53**. A total of 240 traffic-related incidents were reported, of which 195 involved general traffic-related offenses. In addition, 39 motor vehicle collisions were recorded, along with six incidents categorized as dangerous operation. These data provide further context regarding the range and frequency of non-criminal and criminal enforcement activities within the region.

Table 5-53: Offense Type in Central Region of the Nishnawbe Aski Police Service

	Offense Type	Central Region
Traffic Related Incidents	Traffic Related	195
	Motor Vehicle Collision	39
	Dangerous Operation	6

(Nishnawbe Aski Police Service, 2024)

5.2.4.2 Thunder Bay

The City of Thunder Bay consistently records higher crime severity index (CSI) values than the provincial average for Ontario. Between 2021 and 2023, Thunder Bay's overall Crime Severity Index ranged from 103 to 108, while Ontario's CSI over the same period ranged from 56 to 61. This places Thunder Bay's CSI at approximately 1.7 to 1.9 times the Ontario average across the three-year period. When compared to the national context, Thunder Bay's CSI also exceeds the Canadian average, which ranged from 75 to 80 during the same timeframe.

Violent crime indicators show a more pronounced difference. Thunder Bay's Violent Crime Severity Index increased from 177 in 2021 to a peak of 213 in 2022, before declining to 192 in 2023. In contrast, Ontario's Violent Crime Severity Index remained comparatively stable, ranging from 72 to 79 over the three years. As a result, Thunder Bay's violent crime severity levels were approximately 2.4 to 2.7 times higher than the provincial average. Relative to Canada as a whole, where the Violent Crime Severity Index ranged from 93 to 99, Thunder Bay also exhibited notably higher values throughout the period.

Non-violent crime severity in Thunder Bay follows a similar, though less pronounced, pattern. Thunder Bay's Non-Violent Crime Severity Index ranged from 67 to 79 between 2021 and 2023, compared to Ontario values ranging from 50 to 54. This represents non-violent crime severity levels approximately 1.3 to 1.6 times higher than the provincial average. When compared nationally, Thunder Bay's non-violent crime severity is generally comparable to, and in some years slightly below, the Canadian average, which ranged from 68 to 74 during the same period.

Table 5-54: Crime Severity Index, Violent Crime Severity Index and Non-Violent Crime Severity Index by Region

	Thunder Bay			Ontario			Canada		
	2021	2022	2023	2021	2022	2023	2021	2022	2023
Crime Severity Index	106	108	103	56	59	61	75	79	80
Violent Crime Severity Index	177	213	192	72	79	79	93	99	99
Non-Violent Crime Severity Index	79	67	68	50	51	54	68	71	74

(Canada Crime Report, 2023; Nishnawbe Aski Police Service, 2024)

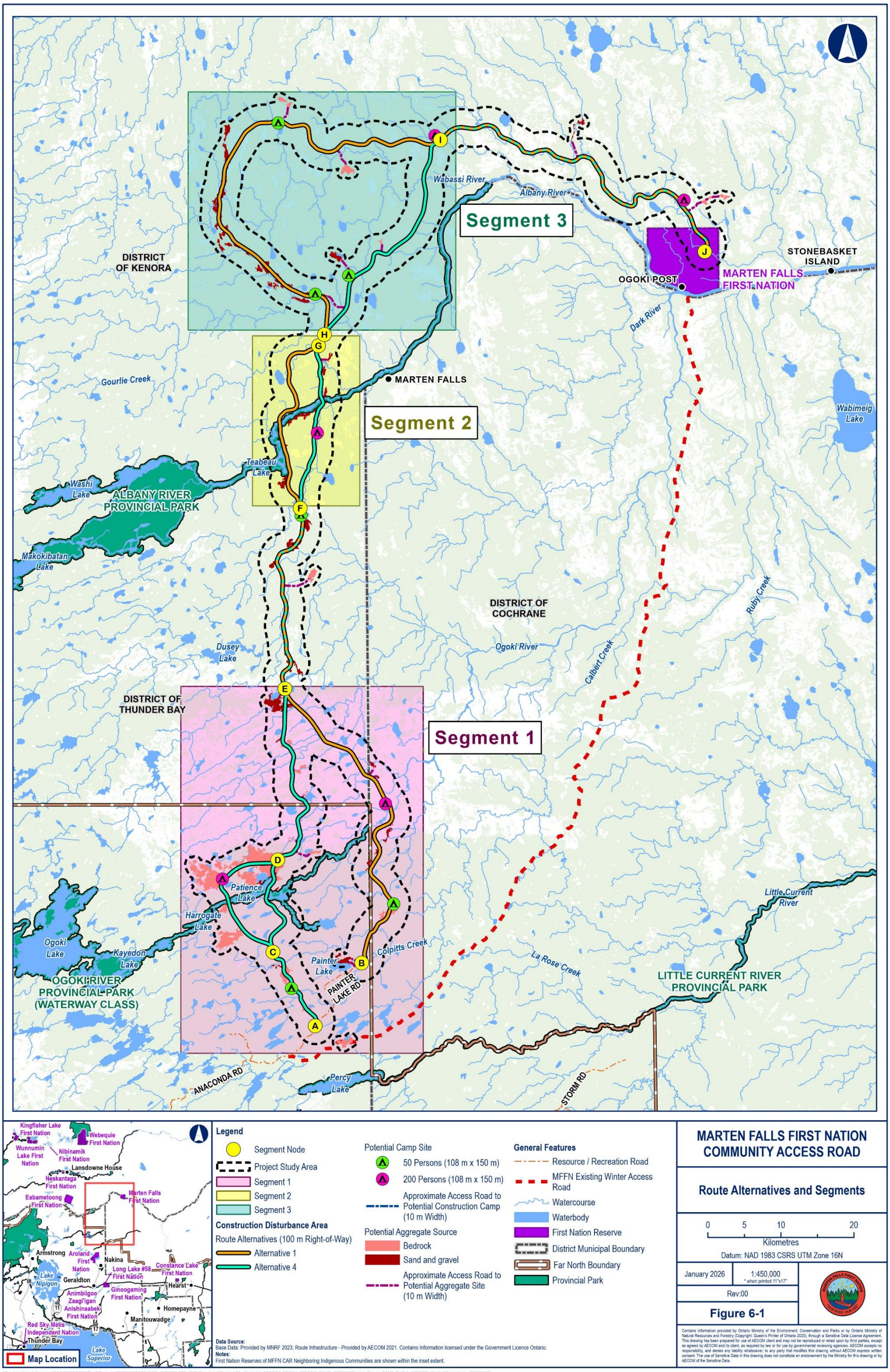
6. Selection of the Preferred Route

Following the collection of existing condition information on the two alternative route alignments described in **Section 4**, the Project undertook an exercise to select a Preferred Route. The methodology and detailed results of this exercise are described in the Environmental Assessment / Impact Assessment Report and are summarized at a high level below. The Preferred Route includes the footprint of any ancillary features such as pits and quarries, temporary access roads, and worker camps associated with the construction of that route. The effects assessment will be completed using the identified preferred route.

6.1 Alternative Segments and Routes Within Each Segment

In order to simplify the evaluation of the alternatives, the alternatives were divided into three separate segments based on their geographical locations. The segments were also determined so that any alternative route in one segment could connect with any alternative route in the next segment, allowing for decisions to be made based on the environment in each segment, and not based on the whole. This approach considers the variable environmental conditions within the project area. This grants decision-makers flexibility to avoid sensitive natural features encountered within the project disturbance area for each segment instead of balancing trade-offs of across the entirety of one alternative versus the other.

Figure 6-1: Route Alternatives and Segments



6.2 Preferred Route

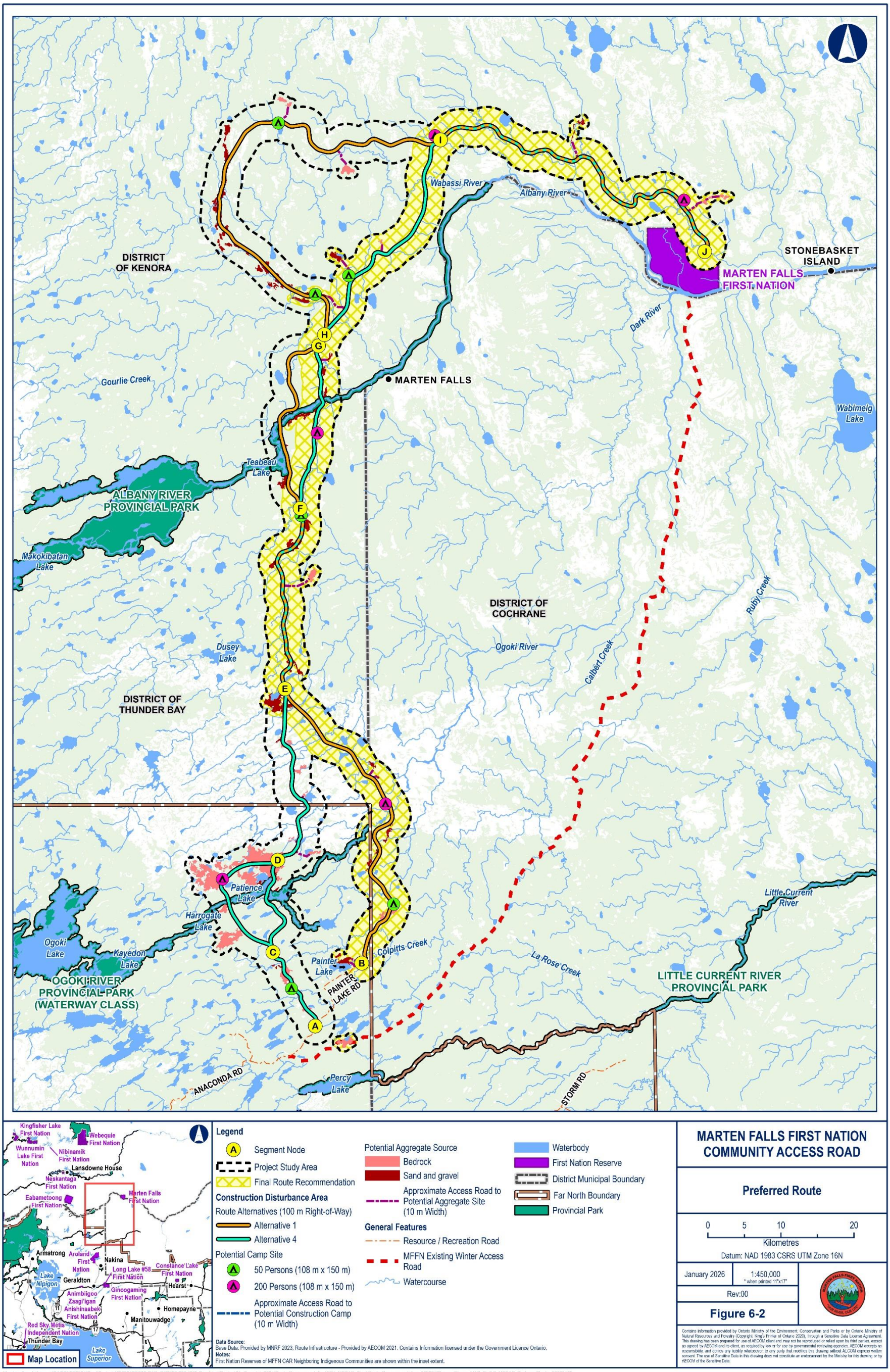
The selection of the Preferred Route within each segment involved a thorough analysis of technical, economic, natural, social and cultural factors. The route alternative evaluation studied the potential impacts and standard or known mitigation approaches to determine the net positive or negative effects of each alternative and was completed using the reasoned argument (trade-off) method. The reasoned argument method qualitatively compares the advantages and disadvantages of each alternative including the relative significance of the potential net effects.

Following the completion of the steps outlined above, and direction from the community of Marten Falls First Nation, Aroland First Nation and input from the public and regulators, the proponent identified a preferred route alignment for each segment.

- Segment 1 – Ogoki Crossing: Alternative 1
- Segment 2 – Albany Crossing: Alternative 4
- Segment 3 – North of the Albany: Alternative 4

The combination of Segments 1, 2 and 3 create the final Preferred Route.

Figure 6-2: Preferred Route



6.3 Refined Study Areas / Presumed Impact Areas

The selection of a Preferred Route did not impact the study areas for the community well-being discipline.

7. Effects Assessment of the Project

The effects assessment results are provided for the Preferred Route, by each temporal phase of the Community Access Road as described in **Section 4.2** This includes the potential effects (positive and negative), mitigation measures, enhancement measures, residual effects, and indirect effects for the Construction and Operations and Maintenance phases.

Due to the nature of the impacts, most effects will be concentrated or experienced in the Local Study Area. Furthermore, Marten Falls First Nation will experience the majority of potential effects, positive or negative, given the major changes anticipated in community during construction, Operations and Maintenance of the Community Access Road. Where effects are predicated for Aroland First Nation, Indigenous communities in the Regional Study Area with overlapping interests the Local Study Area, and regional municipal communities have been identified and assessed for each project phase. Please **see Section 4.3.5** for further methodological explanation. Mitigation measures to address predicted negative effects and enhancement measures to maximize positive outcomes are discussed for each valued component. Please note, where applicable Gender-Based Analysis Plus has been considered and integrated within the assessment for each valued component; see **Section 4.5** for more information.

7.1 Construction Phase

As described in **Section 4.2.1** the construction phase encompasses the time from start of construction, including site preparation activities, to the start of Operations and Maintenance of the Community Access Road. Decommissioning and rehabilitation of construction works (temporary pits and quarries, worker camps, temporary access roads) is included in the construction phase. The construction phase is anticipated to take approximately three to ten years to complete.

7.1.1 Potential Effects and Mitigation

7.1.1.1 Sustainable Population Growth Description of Potential Effects

Age Distribution

During the construction phase, employment opportunities may lead to an increase in the working-age population in Marten Falls First Nation and Aroland First Nation, including both members and non-members moving into the community. This demographic shift could have some **negative** effects, such as changes in family structures, community dynamics, and social cohesion, particularly if many of the returning or new residents are young men. Social integration (family reunification) challenges may arise for these individuals, especially if they have spent a long time away from the community.

Gender Distribution

Construction employment opportunities, which have historically been male dominated, may lead to a temporary rise in the male population, resulting in a **negative** effect of gender imbalance within the communities. The potential changes in employment dynamics requires Gender-Based Analysis Plus considerations, particularly for women and gender-diverse individuals, who may bear caregiving responsibilities if more male family-members are hired for the project.

Community Population

There is potential for an increase in the percentage of community members from Marten Falls First Nation living on-reserve versus off-reserve. As community members living off-reserve gain construction-related employment, it is possible that they may bring their spouse and children to live in the community so they can maintain close relationships with family on days off from work. This rapid population increase could have a negative effect on community members as it may reduce community cohesion during the construction phase.

7.1.1.2 Sustainable Population Growth Mitigations

Age Distribution, Gender Distribution, Community Population

To mitigate negative effects to sustainable population growth during construction, the following measures will be implemented:

- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics related to rapid population changes, social cohesion or (re)integration challenges.
- All construction workers (including on- and off-reserve members) will be housed in autonomous work camps to limit in-community demographic shifts and limit disruptions to social structures and community dynamics.
- Owner / operator to implement Diversity, Equity, and Inclusion hiring policy. This could be enhanced through training programs, job fairs, child-case supports, and outreach, to actively prioritize women in construction-related employment opportunities and reduce gender disparities in the work force and therefore reduce gender imbalances within the community.

7.1.1.3 Sustainable Population Growth Characterization of Residual Effects

With mitigation measures effectively implemented, there are no adverse residual effects related to sustainable population growth during the construction phase.

7.1.1.4 Labour Market Dynamics Description of Potential Effects

Labour Force

The construction spending for the project is expected to total $1.3 billion. There are barriers to employment which may prevent the hiring of local community members. Most of the jobs created during the construction phase are expected to be supplied from outside the local communities, due to limited local labour force capacity and available regional labour force capacity (as presented in **Sections 5.1.2** and **5.2.2**). As a result, there may be a shortfall in available labour in comparison to the demand for jobs during construction.

As shown in **Table 7-1**, around 3,490 direct jobs from the project are expected to occur in Ontario during the construction phase, accompanied by 3,240 indirect jobs and about 1,870 induced jobs. With a total employment effect of approximately 8,600 jobs in Ontario, the construction phase could lead to about 930 jobs in the rest of Canada. This totals about 9,530 jobs in Canada overall during the construction phase.

Table 7-1: Summary of Construction Effects on Labour Market Dynamics in the Effects Assessment Study Area

Construction Effects	Indicator	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	Employment (jobs)	3,488	3,240	1,873	8,601
	Labour Income (millions $)	360	252	109	723
	Gross Domestic Product (millions $)	485	424	270	1,179
	Labour Income per Employment ($)	103,243	77,849	58,293	84,039
	Gross Domestic Product per Employment ($)	139,023	130,819	144,344	137,092
Canada	Employment (jobs)	3,488	3,775	2,269	9,532
	Labour Income (millions $)	360	295	134	789
	Gross Domestic Product (millions $)	485	512	322	1,318
	Labour Income per Employment ($)	103,243	78,168	59,026	82,788
	Gross Domestic Product per Employment ($)	139,023	135,675	142,120	138,298

(Statistics Canada, b; h; l), AECOM Analysis)

Earnings

These employment effects are expected to directly create about $360 million in Ontario's labour income, along with an indirect effect of $252 million and an induced effect of $109 million. This implies an average labour income of around $84,000 per job. For Canada overall, the total labour income effect is $789 million, which gives an average labour income of about $82,800 per job. Considering the effects on Ontario's Gross Domestic Product (which measures the income produced, rather than income received), the expected total effect in Ontario is around $1.2 billion. This implies an average income produced of nearly $137,100 per job. The gap between this ratio and the labour income to employment ratio is largely due to net profits and net taxes. On the other hand, the expected total effect on Canada's Gross Domestic Product is over $1.3 billion, which

implies an average income produced of $138,300 per job. The ratio of Gross Domestic Product to employment is also sometimes used as a rough measure of productivity (amount produced relative to amount used).

There is potential for an increase in employment among men in both Marten Falls First Nation and Aroland First Nation, as they make up a slightly larger proportion of those participating in the labour force and may be more familiar with work environments related to construction or land based activities. In Aroland First Nation, men are represented in agriculture, manufacturing, and public administration, sectors that may offer some transferable skills to construction. In Marten Falls First Nation, men participate primarily in educational services and public administration, which offer fewer direct pathways into construction roles. Women in Marten Falls First Nation, who are represented in educational services, health care and social assistance, accommodation and food services, and public administration, may face additional challenges entering construction because these sectors are not closely aligned with typical construction occupations. In Aroland First Nation, women participate mainly in construction and educational services, with limited involvement in other sectors. As a result, any increase in employment during the construction phase is expected to be experienced unevenly between men and women across both communities.

Indirect input-output economic effects occur within the supply chain as a result of industry linkages. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth.

Educational Attainment

The construction phase of the project is not anticipated to have any effect on educational attainment.

7.1.1.5 Labour Market Dynamics Mitigation

To better meet the increase in demand for local labour, the following mitigation measures are recommended:

- Project owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road. The working group could explore support for unemployed community members by identifying employment barriers and offering job readiness programs to support community members facing unemployment.
- Project owner / operator will implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs through construction.

- Project owner / operator will provide information on available opportunities to help Marten Falls First Nation and Aroland First Nation community members understand the opportunities and provide time to obtain the necessary qualifications.
- Project owner / operator will create a Local Training Plan to complete a local skills assessment and utilize local labour force.
- Project owner will provide ongoing job readiness programs, continuously enhancing training opportunities to support community members in their transition into the workforce and long-term career growth. Timing of training and education will be co-ordinated in advance of hiring to reduce barriers to participation.
- Owner / operator will implement Diversity, Equity, and Inclusion hiring policy. This could be enhanced through training programs, job fairs, and outreach, to actively prioritize women in construction-related employment opportunities and reduce gender disparities in the work force.
- Owner / operator will implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles.

Enhancement measures focused on improving employment outcomes include:

- Collaboration between the project owner and organizations to provide training programs to prepare local labourers for project-related jobs in construction and transportation. Early investment in skills development will help support work force readiness when jobs become available several years in the future.
- Owner / operator should prioritize hiring Marten Falls First Nation and Aroland First Nation members, as well as other Indigenous community members.
- During detailed design, the project owner should explore funding opportunities through sources such as the Province of Ontario and Indigenous Services Canada.
- The project owner should work with Kiikenomaga Kikenjigewen Employment and Training Services and other Indigenous training organizations to provide culturally appropriate education, training, and employment opportunities for community members.
- The Owner / operator should collaborate with the Province of Ontario and training institutions to support work force development through apprenticeships and on-the-job training. This could be integrated into social procurement requirements, ensuring that hiring prioritizes local and Indigenous workers while addressing barriers to participation.

7.1.1.6 Labour Market Dynamics Characterization of Residual Effects

There are no adverse residual effects for the labour market dynamics during the construction phase of the Project, provided mitigation measures to promote local hiring and remove employment barriers are implemented.

There are potential **positive** residual effects on the economy and the labour market through wider economic benefits. Long-term economic growth requires either higher inputs (more labour and capital), or higher productivity (more productive labour and capital). The Project is expected to have a direct, positive effect on the productivity of individuals and businesses in the region, which can result in improved opportunities and higher earnings. This occurs through two effects:

- Improved access to inputs: Project can lead to increased connectivity that increases the accessibility to a variety of inputs for businesses in the region. This increased access to inputs improves the productivity of these businesses.
- Increased agglomeration: Project can lead to improvements in productivity of businesses through cost savings, knowledge spillovers, efficiency improvements, and facilitation of in-person meetings.

Another potential **positive** and beneficial residual effect is land value uplift. The Project's investment in the Community Access Road is expected to have a positive effect on the value of land that is surrounding the transportation infrastructure. Increased connectivity, greater access, improved travel times, higher safety benefits, and enhanced economic potential are some of the factors that positively affect the value of the land. This increase in land value can increase the wealth of the population and offer more opportunities for efficiency improvements in the labour market. The increase in land value can provide additional resources that allow people to be matched to their desired jobs in a more efficient manner.

Furthermore, increase in the value of land that is held collectively by a First Nation may generate additional revenue and benefits for the community. This increase in land value allows for the shared benefits to be distributed among community members in a way that reflects the community's values. This differs from an increase in value of land that is owned outright (freehold), where owners may extract benefits in a non-communal manner.

Additionally, with the increase in labour market opportunities, there is a **positive** effect on diversifying the economy, which boosts the health of the economy and the labour market. With greater connectivity comes great opportunity for diversification. For instance, as the number of vehicles increases, there will likely be a need for additional resources to maintain vehicles, leading to employment opportunities as a mechanic, doing safety inspections and regular vehicle maintenance.

Overall, the Project, opportunities exist for Marten Falls First Nation, Aroland First Nation, and neighbouring First Nations to develop service businesses due to the Community Access Road and the related economic growth.

7.1.1.7 Economy Description of Potential Effects

Local Businesses and Commercial Activities

Marten Falls First Nation, as the only community directly connected to the road from the Project, is expected to benefit from new business opportunities that extend beyond the economic benefits associated with the road's construction and operation.

The Project is expected to create business opportunities for Indigenous companies, particularly in road construction and related transportation and service sectors during the construction phase. Overall, these developments are anticipated to have a **positive** effect on the business environment for Marten Falls First Nation and neighbouring Aroland First Nation.

During the construction phase, there are potential concerns with respect to work zone effects. Construction of the Community Access Road may result in disruptions to certain individuals and businesses that are in the area close to where the road is being developed. There is therefore a potential **negative** effect of economic activity and construction interfering with local businesses or employers. This is arising from the direct effects of construction, as well as indirect effects through supply chain relationships.

Indirect input-output effects occur in the supply chain due to industry linkages. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth. If there is higher direct demand for some product in the economy, then the businesses in the industries supplying that product are indirectly affected.

Public Finances

The effects on public finances during the construction phase can be broken down in several components. **Table 7-2** below shows the breakdown of the total effects of the $1.3 billion construction spending on taxes by the type of taxes and by the level of government.

The Statistics Canada input-output tables provide multipliers for capturing the effects on taxes on products and taxes on production. Taxes on products are taxes payable per unit of a good or service sold, such as sales taxes. Taxes on production are taxes paid by enterprises and are related to operations, such as property taxes and payroll taxes. For taxes on income, the most recent Statistics Canada public finance data can be used to derive the personal income tax proportion of labour income, as well as the corporate income tax proportion of gross operating surplus. The three derived types of taxes on products, production, and income can then be broken down by level of government

(federal, provincial, local, and Indigenous), based on the most recent Statistics Canada public finance data.

Note that the public finances measures rely largely on proxy indicators. Overview of community finances provides insight to level of government transfers and funds. For example, if there is a First Nation Development corporation, it may not show up on the band ledger. Furthermore, the tax structure is not the same on a reserve as on other regions. Businesses on Indigenous reserves have specific tax rules. Generally, First Nation-owned businesses operating on reserves are exempt from certain taxes under Section 87 of the *Indian Act*. This exemption applies to business income earned on a reserve and to goods bought on or delivered to a reserve.

As the table below shows, the total effect on tax revenues in Ontario is expected to be around $299 million during the construction phase. The major component of this comes from taxes on income ($212 million), especially to the federal government ($137 million). Taxes on products are expected to total $48 million, with the majority being provincial government tax revenue ($29 million). Taxes on production are projected to be $39 million, mostly local tax revenue ($29 million).

Considering all the economic activity across Canada, the total effect on tax revenue is expected to be around $333 million during the construction phase. This is led by taxes on income ($236 million), mostly at the federal level ($147 million). Taxes on products are projected to be $53 million, with $31 million going to the provincial government, while taxes on production are expected to total $44 million, with $28 million going to the local government.

Table 7-2: Construction Effects on Taxes by Government

Construction Effects (millions $)	Type of Taxes	Federal	Provincial	Local	Indigenous	Total
Ontario	Products	18	29	1	0	48
	Production	1	9	29	0	39
	Income	137	75	0	0	212
	Total	**156**	**113**	**30**	**0**	**299**
Canada	Products	21	31	1	0	53
	Production	1	16	28	0	44
	Income	147	89	0	0	236
	Total	**168**	**136**	**29**	**0**	**333**

(Statistics Canada, b; h; k; l), AECOM Analysis

Additional indirect effects on public finances are described below.

- Indirect effects occur in the supply chain due to industry linkages. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth. If there is higher direct demand for some product in the economy, then the industries supplying that product are indirectly affected, which then leads to additional tax revenues.

- Other general indirect effects could arise from people moving back to the community given the increase in economic activity and jobs. This increase in population and income would lead to higher demand, including the demand for housing.

Regional Economy

Summary of the regional economic effects of the $1.3 billion construction spending is shown in **Table 7-3** and **Table 7-4**, followed by sections for each economic indicator.

Table 7-3: Ontario Construction Effects

Ontario Construction Effects (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Output	1,300	852	400	2,552
Gross Domestic Product	485	424	270	1,179
Labour Income	360	252	109	723
Gross Operating Surplus	134	168	113	415
Taxes on Products	4	7	38	48
Taxes on Production	7	12	21	39
Taxes on Income	93	78	41	212
Employment (jobs)	3,488	3,240	1,873	8,601

(Statistics Canada, b; h; l), AECOM Analysis

Table 7-4: Canada Construction Effects

Canada Construction Effects (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Output	1,300	1,031	495	2,826
Gross Domestic Product	485	512	322	1,318
Labour Income	360	295	134	789
Gross Operating Surplus	134	211	137	481
Taxes on Products	4	8	42	53
Taxes on Production	7	14	23	44
Taxes on Income	93	94	50	236
Employment (jobs)	3,488	3,775	2,269	9,532

(Statistics Canada, b; h; l), AECOM Analysis

Output

The $1.3 billion construction spending is expected to lead to total economic activity (output) in Ontario of $2.6 billion (**Table 7-3**). For Canada, the total effects on output are estimated to be over $2.8 billion (**Table 7-4**).

Table 7-5: Construction Effects on Output

Construction Effects on Output (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	1,300	852	400	2,552
Canada	1,300	1,031	495	2,826

(Statistics Canada, b; h; l), AECOM Analysis

Gross Domestic Product

Ontario's total economic value, measured by its Gross Domestic Product (income produced), is projected to be around $1.2 billion (**Table 7-3**). Meanwhile, the total effects on Canada's Gross Domestic Product are expected to be over $1.3 billion (**Table 7-4**).

Labour Income

Total effects on labour income are expected to be $723 million in Ontario, with half of those coming from the direct effects (**Table 7-3**). The total effects on Canada's labour income are estimated to be $789 million (**Table 7-4**).

Gross Operating Surplus

Ontario's gross operating surplus total effect is estimated to be $415 million, with the indirect effects being the most dominant (**Table 7-3**). That is even more pronounced for Canada, with the estimated total effects being $481 million (**Table 7-4**).

Taxes

The total effects on taxes in Ontario ($299 million) are led by taxes on income ($212 million), followed by taxes on products ($48 million) and taxes on production ($39 million) (**Table 7-3**). The total effects on taxes in Canada are estimated to be $333 million. This is led by taxes on income ($236 million), followed by taxes on products ($53 million) and taxes on production ($44 million) (**Table 7-4**).

Employment

The construction phase is expected to involve about 8,600 total jobs in Ontario, which includes around 3,490 direct jobs (**Table 7-3**). The overall employment effect for Canada is expected to be 9,530 jobs, with the indirect effects on employment being most prominent, which highlights the labour-intensive linkages of the supply chain industries (**Table 7-4**).

Indirect input-output effects occur in the supply chain due to industry linkages. If there is higher direct demand for some product in the economy, then the industries supplying that product are indirectly affected. In the context of the Project, the construction spending for the new Community Access Road directly affects the transportation engineering construction industry. The transportation engineering construction industry makes the first round of indirect expenditures on its supply chain industries. Those industries will then make their expenditures on their supply chain industries. The sum of all those indirect effects gives the total indirect effects, as discussed earlier, which represents a **positive** effect on the economy. The shares of expenditure by Ontario's transportation engineering construction industry on the main 20 industries that are indirectly affected is seen in **Table 7-6** below (based on the latest Supply and Use Tables, 2021, released by Statistics Canada on November 7, 2024).

Table 7-6: Ontario Transportation Engineering Construction Indirect Industries

Ontario Transportation Engineering Construction Indirect Industries	Expenditure Share (%)
Architectural, engineering and related services	10.1
Asphalt (except natural) and asphalt products	8.3
Ready-mixed concrete	5.1
Fabricated steel plate and other fabricated structural metal	3.7
Stone	3.3
Rental and operating leasing services of commercial and industrial machinery and equipment	2.2
Concrete products	1.8
Springs and wire products	1.5
Management, scientific and technical consulting services	1.2
Other communications equipment	1.1
Employment services	1.1
Diesel and biodiesel fuels	1.0
Sand, gravel, clay, and refractory minerals	1.0
Lubricants and other petroleum refinery products	1.0
Fabricated metal products	0.9
Communication and electric wire and cable	0.8
Vehicle insurance services	0.8
Cement	0.8
Iron and steel pipes and tubes (except castings)	0.7
Licensing of rights for commercial use of non-financial intangible assets (except software and other copyright licensing)	0.7

(Statistics Canada, a), AECOM Analysis

Prices

Based on the experience of other comparable communities, as discussed in **Section 5.2.3**, the new Community Access Road is expected to have **positive** effects on the overall quality of life, driven primarily by a reduction in prices and the cost of living, with better access to health care, social services, and family. There are no significant anticipated effects on Gender-Based Analysis Plus sub-groups related to the overall change in the prices of goods. There may be some potential beneficial effects for those who spend more on products that experience price decreases, such as women who spend more on personal health items.

7.1.1.8 Economy Mitigation

Local Businesses and Commercial Activities

Mitigation measures to address potential business environment issues include:

- Project owner / operator will implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs through construction.
- Project owner / operator will create a Local Content Plan to utilize a certain dollar value or share towards local businesses and contractors.

- Project owner / operator will consult with local businesses that would be potentially affected by work zone effects and determine the optimal times and conditions for the construction to take place, such as during off-peak times.

Enhancement measures focused on improving the business environment include:

- Owner / operator should prioritize hiring Marten Falls First Nation and Aroland First Nation members, as well as other Indigenous community members.
- During detailed design, the project owner should explore funding opportunities through sources such as the Province of Ontario and Indigenous Services Canada.

Public Finances

No mitigation or enhancement measures are proposed during the construction phase of the Project.

Regional Economy

The mitigation measure to address potential regional economy issues includes:

- Project owner / operator will consult with local businesses that would be potentially affected by work zone effects and determine the optimal times and conditions for the construction to take place, such as during off-peak times.

Enhancement measures focused on improving the regional economy include:

- Owner / operator should prioritize hiring Marten Falls First Nation and Aroland First Nation members, as well as other Indigenous community members.
- During detailed design, the project owner should explore funding opportunities through sources such as the Province of Ontario and Indigenous Services Canada.

7.1.1.9 Economy Characterization of Residual Effects

Local Businesses and Commercial Activities

There are no adverse residual effects for the business environment during the construction phase of the Project. Potential **positive** residual effects on the business environment through wider economic benefits. The Project is expected to have a **positive** effect on the productivity of individuals and businesses in the region. This can lead to improved economic opportunities and better long-run prospects for the community.

The Project's investment in the Community Access Road is expected to have a **positive** effect on the value of land that is surrounding the transportation infrastructure. This

increase in land value can provide an additional benefit to the population and the local businesses. Transportation infrastructure generally improves land value. Reserve lands are sometimes leased out by First Nations; any increase in land value in proximity to a reserve may drive up land lease income Diversifying the economy can have a positive effect by creating more opportunities, strengthening economic stability, and improving the overall business environment.

Overall, given the unprecedented nature of the Project, it is a great opportunity for Marten Falls First Nation, Aroland First Nation, and neighbouring First Nations to develop service businesses due to the Community Access Road and the related economic growth.

Public Finances

There are no adverse residual effects for the public finances during the construction phase of the Project. The **positive** effect is that the Project will generate government revenue.

Regional Economy

There are no adverse residual effects for the regional economy during the construction phase of the Project.

7.1.1.10 Community Access to Infrastructure and Services Description of Potential Effects

Methods of Transportation in and Out of the Community

The construction phase of the project is expected to increase reliance on winter roads and air transportation for the mobilization of equipment, supplies, and work force transportation to Marten Falls First Nation. The project is expected to increase road traffic related to the transport of employees, equipment, and supplies, particularly between key staging areas and construction sites. There may be **negative** effects of reduced safety along winter road transportation in and out of community, when heavy equipment or large shipments of materials may be brought into community. This increased use of the winter roads will be short-term, during the construction phase, until the new Community Access Road is operational.

The airports in Marten Falls and Aroland First Nations will experience **negative** effects of increased use as a transit hub for equipment and material delivery as well as employees, and their families, traveling to and from the work sites. This increase in use of existing airports may result in potentially negative effects of scheduling challenges for community members.

Essential Infrastructure and Services

The construction of the Community Access Road to Marten Falls First Nation may have a **negative** effect due to additional strain on the already limited infrastructure and services in

Marten Falls First Nation and Aroland First Nation. Both communities face major challenges related to water, wastewater, energy, and waste management systems, which may be worsened by the demands of road construction.

The Marten Falls First Nation water treatment plant has failed inspections over the past six years and remains under a boil-water advisory. Increased construction activity and a temporary influx of workers and community members returning home for employment, will heighten demand for potable water and wastewater treatment, placing further stress on an already overburdened system. The increased wastewater generation could exceed treatment capacity, heightening the risk of untreated sewage discharge into the environment, which could pose additional public health risks and threaten local water sources.

Construction activities will generate large amounts of waste, including residential and construction-related materials. Without adequate waste management systems, improper disposal could lead to soil and water contamination, negatively affecting local ecosystems and community health.

Both Marten Falls First Nation and Aroland First Nation rely on diesel-powered generators for electricity. The construction project may increase energy demand, potentially straining power infrastructure. Without supplemental power sources, the community could experience disruptions in essential power-driven services, such as brown outs, where the voltage drops below the standard level, leading to weakened power supply, dimming lights, and potentially affecting sensitive equipment. Grey-outs, caused by large voltage drops, could result in noticeable dimming of lights, malfunctioning of electrical devices, or disruptions in essential services such as heating, lighting, and refrigeration. Such disruptions could compromise the community well-being of residents.

Project construction will require a substantial supply of fuel for vehicles and machinery used throughout the construction phase. This includes fuel for construction vehicles, equipment, and transportation vehicles for workers and materials. Increased fuel consumption could lead to supply shortages and increased costs in both Marten Falls First Nation and Aroland First Nation communities.

No effect is anticipated on education facilities during construction.

7.1.1.11 Community Access to Infrastructure and Services Mitigation

Mitigation measures for community access to infrastructure and services during the construction phase for Aroland First Nation include:

Methods of Transportation in and Out of the Community

- Owner / operator will develop an Equipment Mobilization Plan with both Marten Falls First Nation and Aroland First Nation for the movement of equipment,

personnel, supplies, and resources. Where possible, construction traffic should be separated from community traffic to improve safety and minimize disruptions. The mobilization plan should also include a clear communications strategy to keep the community informed of the mobilization schedule, ensuring residents are aware of periods of increased heavy equipment traffic on the winter road.

- Owner / operator, when possible, will transport employees on a charter flight, to minimize disruption to existing passenger flight schedules servicing community needs.

Essential Infrastructure and Services

Mitigation measures for infrastructure and essential services during construction include:

- All construction workers (including on- and off-reserve members) will be housed in autonomous work camps equipped with independent water, wastewater, and power systems. These systems need to be properly maintained to reduce reliance on community infrastructure and to prevent contamination risks.
- The owner / operator will develop waste management policies to minimize waste production and support responsible disposal. Collaboration with the community will be prioritized to develop effective construction waste management and disposal strategies, incorporating local input.
- The owner / operator will establish a secure fuel storage facility and provide a reliable fuel supply throughout the construction season. Fuel deliveries will be planned in advance and transported via the winter road, reducing reliance on costly air transport and preserving community fuel resources. All fuel storage sites will comply with safety and environmental regulations to prevent spills and contamination.
- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics associated with increasing pressure on local, essential services and infrastructure.

7.1.1.12 Community Access to Infrastructure and Services Characterization of Residual Effects

Methods of Transportation in and Out of the Community

The anticipated effects are **negative** in direction, of **moderate** magnitude, and are limited in duration to the **short-term**. During construction, there may be a temporary increase in reliance on winter roads and air transport, despite co-ordination efforts. **Infrequent** but higher-than-usual traffic volumes on winter roads are **possible**, with **low** uncertainty, and

could lead to accelerated deterioration, potentially shortening operational periods or increasing maintenance needs **locally**. Effect is **reversible**, as once the project mobilization is completed, transportation demands should return to pre-construction levels. Long-term following the completion of construction of the road, the winter road will be decommissioned.

Essential Infrastructure and Services

No adverse residual effects are anticipated.

7.1.1.13 Housing Description of Potential Effects

Housing Suitability

During the construction phase, increased economic activity and job opportunities may lead to changes in household occupancy and housing demand within Marten Falls First Nation and Aroland First Nation. There is potential for a **negative** effect to housing suitability due to increased overcrowding as currently off-reserve community members return for construction-related employment to live with on-reserve family. This may further increase if families of workers also return, resulting in higher household occupancy and potential overcrowding. Spousal or family relocations during workers' time off could directly contribute to increased demand for suitable housing within the community.

As more families temporarily move to Marten Falls First Nation or Aroland First Nation, demand for housing will rise. This could intensify existing housing shortages, potentially leading to overcrowding and putting additional strain on local infrastructure and services. The increased housing demand could particularly affect lower-income families and women-led households, who may face greater challenges in accessing suitable housing options. Overcrowding could disproportionately affect women and children, who are more likely to spend time at home, reducing privacy, safety, means for study, and overall well-being. Without adequate planning, these pressures could result in longer wait times for housing placements or insufficient living space for larger families, negatively affecting residents' quality of life in both Marten Falls First Nation and Aroland First Nation.

Housing Adequacy

No effect on housing adequacy is anticipated during construction for Marten Falls First Nation or Aroland First Nation.

Accessibility of Building Homes and Shipping Materials

No effect on the accessibility of building homes and shipping materials is anticipated during construction for Marten Falls First Nation or Aroland First Nation.

7.1.1.14 Housing Mitigations

Mitigation measures for effects on housing during construction include:

- All construction workers, including on- and off-reserve members, will be housed in autonomous work camps. This will help limit demographic shifts, reduce disruptions, and reduce additional pressure on community housing.
- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, which could include considering if converting construction camps to permanent housing is feasible through working group discussions with Marten Falls First Nation and Aroland First Nation. With advanced planning, construction camps could be built to higher quality standards, making them suitable for long-term residential use and helping to address housing shortages in the community.

7.1.1.15 Housing Characterization of Residual Effects

Housing Suitability

With the planned mitigation measures, no adverse residual effects on housing availability during construction are expected.

Accessibility of Building Homes and Shipping Materials

No effects on housing availability are anticipated.

7.1.1.16 Cultural Preservation and Change Description of Potential Effects

Traditional Economy

The construction of the Community Access Road has the potential to have a negative effect on the traditional economy of Marten Falls First Nation and Aroland First Nation as land clearing for the road corridor, work camps, and pits and quarries, could lead to the loss of natural areas used for hunting, trapping, and gathering. Construction staging and active work zones may temporarily restrict community access to these areas, potentially during important seasons for traditional activities.

There may be increased competition for local resources if construction workers engage in hunting, fishing, or gathering, placing additional pressure on fish and wildlife populations. Habitat disturbances, noise, and increased human activity could alter wildlife movement patterns, affecting resource availability for the community.

Foraging and plant harvesting, activities central to the roles of women, youth, and Elders, could be affected. For example, the disturbance of wild blueberry harvesting sites, a key

resource for Aroland First Nation, could affect both cultural practices and economic opportunities. The Aroland Youth Blueberry Initiative, which focuses on cultural continuity and economic development, may face challenges if traditional harvesting areas are disturbed or overharvested by non-community members. If programs such as the Aroland Youth Blueberry Initiative experiences setbacks, this may further affect the community's economic and cultural sustainability.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects to their traditional economies as those identified for Marten Falls First Nation and Aroland First Nation community members. Potential effects include reduced access to hunting and trapping areas and disturbance of wildlife such as moose and caribou. These changes threaten subsistence practices, fur trading, and other potential commercial activities. Disruptions to these systems could erode food security, intergenerational knowledge transfer, and the economic resilience of these communities.

Participation in Cultural Activities

No effects anticipated to participation in cultural activities in Marten Falls First Nation or Aroland First Nation during construction as there will not be increased access to the community by road.

Use of Traditional Language

Between 2016 and 2021, language use fluctuated in both communities, with a decline in Ojibway speakers in Marten Falls First Nation and a slight increase in Aroland First Nation. The overall concern about decline in use of traditional languages remains, particularly in environments dominated by English. While most community members speak English, fluency levels vary, and for some members, traditional languages are their first language. In construction-related jobs, workers may feel pressure to speak only English, leading to reduced use of traditional languages in the workplace. This could be due to the use English in technical and safety communications, the presence of non-Indigenous workers, or a workplace culture that does not actively support multilingualism.

As a result, there may be a negative effect of reduced use of traditional language over time, contributing to language loss, particularly among younger workers who might already have limited fluency. As highlighted during community consultations, supporting use of traditional languages should be considered during project development. Women, especially Elders, are crucial to preserving language, and discouraging younger generations from using Ojibway in the workplace may increase the burden on women to maintain it within families and communities. Additionally, language barriers could limit economic opportunities for women, particularly if traditional language speakers face challenges in accessing employment or leadership roles in construction and resource industries.

7.1.1.17 Cultural Preservation and Change Mitigation

Traditional Economy

Mitigation measures for Traditional economy include:

- Prior to construction, owner / operator will develop Access Management Plans with Marten Falls First Nation and Aroland First Nation in relation to hunting, trapping and gathering activities. All activities must conform to licensing requirements and adhere to the rules and regulations under the Ministry of Natural Resources. This plan may include, but not be limited to:
  - Identifying key traditional hunting, trapping, and gathering areas to avoid, in order to minimize construction disturbance during peak harvest seasons.
  - Designating specific, approved locations for berry picking and recreational fishing for non-Indigenous workers while identifying restricted areas to protect community resources and minimize disturbance.
- Owner / operator to provide flexible work schedules for First Nation members during key hunting, trapping, and gathering seasons to support continued access to traditional food sources.
- Owner / operator to sponsor community-led harvesting initiatives in Marten Falls First Nation and Aroland First Nation.
- Owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including where to appropriately locate safety pull out areas to promote access, and other harvesting issues.

Enhancement measures for Traditional Economy that can be further explored during detail design include:

- Owner / operator to consider employment opportunities for First Nation community members as guides for construction workers participating in permitted outdoor activities.
- Owner / operator to source traditional foods for work camps when possible, supporting local harvesters and small businesses, for example the Aroland First Nation Blueberry Initiative.
- Owner / operator to consider supporting women-led initiatives, such as traditional food workshops or Indigenous-run catering services, to create economic benefits while reinforcing cultural identity.

Participation in Cultural Activities

No mitigation measures recommended.

Enhancement measures that could be further explored during detailed design for participation in cultural activities in the community include:

- If pull-out areas are identified along the route for safety, these could be enhanced to include picnic tables, a fire pit, and an opportunity to use a non-plumbed restroom (outhouse). The meeting point could include safety measures that would have to be further explored logistically, that could include an emergency phone, or establish a cell tower to receive cell service, and have solar-powered lights.

Use of Traditional Language

Mitigation measures for change in use of traditional language include:

- Owner / operator to provide Training and Work Materials in Indigenous Languages. Offer onboarding materials, safety protocols, and job-related paperwork in Indigenous languages alongside English to provide language accessibility for all workers.
- Owner / operator to implement multi-lingual worksite signage. Reduce language barriers at the worksite by using multi-lingual signage at work sites, including directional signs, safety notices, workplace policies, and equipment labels, to promote the use of Indigenous languages in the workplace.
- Owner / operator to provide Cultural Sensitivity and Language Awareness Training. Educate non-Indigenous supervisors and workers on the importance of Indigenous languages in cultural identity, knowledge transmission, and community well-being. Encourage an inclusive workplace where traditional language use is supported and valued.
- Owner / operator to implement a Zero-Tolerance Policy for Language Discrimination. Establish clear workplace policies ensuring that Indigenous workers are not discouraged from speaking their traditional language. Supervisors and project managers should actively reinforce language inclusivity and address any instances of discrimination or bias.
- Owner / operator to introduce a cultural safety mechanism. Introduce a workplace mechanism, such as a cultural safety flag, allowing employees to pause work or request support if they feel uncomfortable due to language-related issues. Propose a Cultural Safety and Stop Work Protocol.

Enhancement measures for change in use of traditional language include:

- Owner to consider incorporating Indigenous language in signage along the road. During detailed design with Marten Falls First Nation and Aroland First Nation, should explore naming key landmarks, stopping points, and significant locations along the road in Indigenous languages to promote language visibility and daily use.
- Owner / operator to encourage traditional language use in informal work settings. Promote the use of traditional greetings and phrases in the workplace. Create spaces for Indigenous language speakers to communicate in their language during breaks or informal settings.
- Owner / operator to consider designating dedicated gathering spaces in construction camps for cultural exchange and knowledge transfer.
- Owner / operator to consider efforts to enhance language transmission, such as providing funding or resources to support language education, intergenerational learning, and community-driven cultural revitalization initiatives, could help preserve traditional language in both Marten Falls First Nation and Aroland First Nation..

7.1.1.18 Cultural Preservation and Change Characterization of Residual Effects

Traditional Economy

Despite mitigation measures, there remains some **low** magnitude, effects are **negative in direction.** Effects include a **possible** shift from traditional economy activities due to loss of traditional harvesting areas or disturbance in the **local construction area**. This could reduce available land for traditional activities within the project footprint, but uncertainty is **high**. Once operational, the road may improve access to new areas (as discussed in the Operations Effects section).

During construction, **frequent** and **medium-term** disruptions to traditional land use are anticipated due to active work zones and **irreversible** land disturbance. While mitigation measures aim to minimize these effects, some access restrictions during key harvesting periods are likely

The residual effects remain for the Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Neskantaga First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake First Nation.

Participation in Cultural Activities in the Community

No residual effects during construction.

Use of Traditional Language

no residual effects are anticipated during construction, with proper implementation of mitigation measures.

7.1.1.19 Community and Public Health Description of Potential Effects

Access to Health Services

There are no anticipated effects related to access to health services during construction, as the road will not be completed and no additional access will be available.

Recreation

There are no anticipated effects related to access to recreation during construction, as the road will not be completed and no additional access will be available.

Mental Health and Well-being

The construction of the Community Access Road may have both **positive and negative effects** on the mental health and well-being of community members, primarily through employment opportunities, workplace conditions, and broader social dynamics within the community.

A potential **positive** effect is improved mental well-being due to employment in construction which can enhance financial stability, self-sufficiency, and pride, reduce financial stress, boost confidence, and build self-efficacy. Work force participation can lead to positive social interactions, teamwork, and professional development through training and experience, increasing individuals' self-esteem, strengthening internal and external relationships. Participating in the work force can create positive role models, inspiring younger generations through local employment success in construction.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, may experience similar **positive** effects from the Project.

The construction phase may also have a **negative** effect on mental health and well-being due to long hours, tight deadlines, and physically demanding tasks, leading to stress and fatigue. Working in a diverse cultural environment, particularly alongside non-Indigenous workers, could add challenges if cultural differences and language barriers are not addressed. High potential for Indigenous employees to experience micro aggressions, leading to elevated stress levels may result in high turnover, absenteeism, or workplace tensions if workers feel unsupported or struggle to adapt.

There is potential for social disconnection and emotional strain, as community members employed in construction may need to spend extended periods away from their families, leading to emotional distress, loneliness, and isolation.

Additionally, mental health and psychosocial wellbeing may be affected by increased sensory disturbances and restricted land access. Activities such as clearing, blasting, and heavy equipment operation introduce noise, dust, and visual changes that can disrupt the sense of place and diminish the quality of land-based experiences. For Indigenous communities, these changes can lead to feelings of disconnection and ecological grief, particularly when culturally significant areas are altered or temporarily inaccessible. The heightened industrial presence during construction may also exacerbate stress for individuals already facing mental health challenges, such as elevated suicide rates and addictions, by reducing opportunities for land-based healing and cultural practices.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects to their mental health and well-being as those identified for Marten Falls First Nation and Aroland First Nation community members. Potential effects include increased pressure from employment stress, community tension from employment disparities, and mental health and well-being effects related to changes to the land.

Substance Use

The introduction of a temporary work force into a remote First Nation community with no prior road access may have a **negative** effect of increasing alcohol and drug use. Construction workers may bring in prohibited substances, contributing to potential substance misuse issues within the community. Increased access to alcohol and drugs could affect vulnerable populations, such as youth and individuals recovering from substance dependence, leading to social and health challenges like family disruptions and addiction-related concerns. An increased availability of alcohol and drugs could have social effects on Elders who may be at risk due to potential abuse or neglect within the family unit, while women and girls, especially those in caregiving roles or experiencing domestic violence, could face increased vulnerability. An increased presence of alcohol and drugs could negatively affect sexual health among as substance misuse can increase the likelihood of unsafe sexual practices, raising the risk of sexually transmitted infections or unwanted pregnancies.

Substance use within the work force may compromise workplace safety, leading to a higher risk of accidents, absenteeism, and reduced productivity. Impairment on the job could pose serious risks in a construction setting, particularly in operating heavy machinery or working in hazardous conditions. For community members employed in construction, exposure to workplace substance use could normalize unhealthy coping mechanisms for stress and fatigue, potentially leading to increased substance use among workers.

Road construction, especially in remote locations, is physically demanding and time-sensitive, requiring workers to endure long hours in harsh weather conditions. The stress of meeting deadlines and maintaining safety standards can lead to mental fatigue contributing to mental health concerns like anxiety or depression. This emotional strain may increase the likelihood of substance use as a coping mechanism. Additionally, the intense physical labour, including excavation, grading, and operating heavy machinery, can lead to physical exhaustion. Some workers, particularly men, may resort to alcohol or drugs to manage the discomfort, escape from isolation, or unwind after long, grueling workdays.

7.1.1.20 Community and Public Health Mitigation

Access to Health Services

No mitigations required.

Recreation

No mitigations required.

Mental Health and Well-being

Mitigation measures to address potential negative effects on mental health, well-being, and employment challenge include:

- Owner / operator to collaborate with Marten Falls First Nation and Aroland First Nation to provide mental health counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being, support skill development and workplace adjustment.
- Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles.
- Owner / operator to provide cultural safety training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences, to promote a safe and inclusive work environment.
- Owner / operator to hold training session on violence and harassment prevention.
- Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included.

Enhancement measures to enhance overall mental health and well-being include:

- Owner / operator to offer flexible work schedules to accommodate family responsibilities and cultural activities, which may reduce employee stress and to improve employee retention. This can include:
  - Family related leave where shift adjustments may be requested for family emergencies or events (e.g., funerals, childcare).
  - Leave for participation in cultural activities, such as the annual pow wow, traditional harvest, or ceremonies.
  - Shift flexibility for employees to swap shifts or adjust work hours to accommodate personal needs.
- Owner / operator to designate a local hiring liaison to support Indigenous hiring, match skills with job opportunities, and to advocate for community member's needs.

Substance Use

Mitigation measures to address risks of substance use include:

- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, which could include topics in relation offering mental health supports, counselling and addiction support services
- All construction workers (including on- and off-reserve members) will be housed in autonomous work camps to limit demographic shifts and limit disruptions to social structures and community dynamics.
- The owner / operator to develop and implement monitoring and enforcement, including regular security checks at work camps and entry points (e.g., airport) for alcohol and substances to prevent entry into the community.
- Owner / operator to collaborate with the community (Marten Falls First Nation and Aroland First Nation) to provide mental health counseling, addictions counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being.
- Owner / operator to enforce a zero-tolerance policy for alcohol and substance use at work camps via mandatory onsite alcohol and drug testing.
- Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles.

- Owner / operator to provide cultural safety training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences, to promote a safe and inclusive work environment.
- Owner / operator to hold training session on violence and harassment prevention.
- Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included.
- Owner / operator to provide cultural and recreational activities (e.g., cards, board games, sports), when possible, to promote well-being and reduce boredom or stress-related substance use.

7.1.1.21 Community and Public Health Characterization of Residual Effects

Access to Health Services

There are no residual effects.

Recreation

There are no residual effects.

Mental Health and Well-Being

Most residual effects are expected to be neutral to **positive** with mitigation and enhancement measures implemented. Work force integration programs should alleviate initial stress and improve long-term job retention. On-site mental health and peer support services are expected to help with stress management, job satisfaction, and workplace well-being. Cultural training and zero-tolerance policies are expected to create a more inclusive and respectful work environment, reducing workplace tensions and supporting Indigenous employees' mental well-being.

Despite these measures, likelihood is **possible** some **negative** residual effects may persist **locally** at a **moderate** magnitude. Individual experiences will vary, however; some workers may continue to face stress, burnout, or emotional strain. Separation from family during work shifts may lead to social disconnection or emotional distress, particularly for those unaccustomed to extended absences. Stigma around mental health support may prevent some workers from seeking available resources, leading to unaddressed stress or workplace challenges. Psychosocial wellbeing may be affected by increased sensory disturbances and restricted land access while construction effects could exacerbate stress for individuals already facing mental health challenges. Additionally, not all community members will secure jobs, which could result in ongoing frustration, stress, or community tensions, particularly if employment opportunities remain limited. These negative effects have a **high** level of uncertainty, are likely to be **infrequent**, **short-term** and are **reversible.**

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects to their mental health and well-being as those identified for Marten Falls First Nation and Aroland First Nation community members. Potential effects include increased pressure from employment stress, community tension from employment disparities, and mental health and well-being effects related to changes to the land.

Substance Use

No adverse residual effects are anticipated if mitigation measures to reduces the likelihood of alcohol and drugs entering the community and to establish a safe and healthy work environment are implemented.

7.1.1.22 Access to Clean Water Description of Potential Effects

Access to Clean Water

The construction of a Community Access Road may have a negative effect on Marten Falls First Nation and Aroland First Nation of increasing demand for drinking water due to the presence of workers and additional infrastructure needs. If the local supply is insufficient, the communities may become more reliant on bottled water flown in. This assumes the water treatment plant remains non-operational. These factors could strain local resources. Construction activities may also cause an indirect effect of increasing the cost of water, including bottled water delivered into community during the boil water advisory, adding add financial pressure on both the First Nation communities and the Project.

Quality of Drinking Water

The quality of drinking water (groundwater and / or surface water) may be **negatively** affected by construction activities. An assessment of the quality of surface water can be found in the Problem Formulation for Human Health Risk Assessment (Attachment A). Potential effects on human health may be from chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Volatile substances in water may be inhaled during activities such as cooking and bathing. Construction activities that may affect groundwater and / or surface water quality include:

- Clearing the right-of-way for the Community Access Road and supporting access roads;
- Blasting rock;
- Construction of the Community Access Road;
- Construction and installation of bridges and culverts; and
- Construction and operations and decommissioning of temporary infrastructure

Construction may negatively affect surface water, groundwater and sediment quality through runoff, suspended solids, contaminants, and physical disturbance. Dust and emissions during construction and maintenance could also contribute. Contaminant levels from these activities have not been modeled.

Groundwater and surface water in the area is not suitable for potable usage without treatment. Elevated levels of some metals are present in soils, in the area. The residual effects from project activities can increase concentrations in groundwater. Predicted groundwater concentrations have not been modelled.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, face similar risks and potential negative effects to quality of surface water as those identified for Marten Falls First Nation and Aroland First Nation community members.

7.1.1.23 Access to Clean Water Mitigation

Access to Clean Water

Mitigation measures to access to clean drinking water include:

- All construction workers, including on- and off-reserve members, will be housed in autonomous work camps, reducing pressure on community water resources.
- Owner / operator to implement temporary water storage tanks or other measures to accommodate peak water demands during construction, reducing reliance on flown-in water and helping to balance the construction and community needs. Aligning water delivery schedules, using water-efficient equipment, and co-ordinating bulk water orders, to mitigate any significant effects on the community's water supply. As a result, the indirect of increased water costs will be negligible, and any potential strain on transportation logistics for water delivery will be managed effectively, ensuring that the community continues to receive its necessary water supply without disruption.
- Groundwater and / or surface water in the region will not be used as a potable water source without treatment.

Enhancement measures include:

- Owner / operator to promote water conservation strategies within the construction camps, including education on water-saving techniques and encouraging sustainable water usage habits e.g. low flow / water saving faucets.

Quality of Drinking Water

Mitigation measures to support quality of drinking water include:

- Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to quality of surface water.
- Waste, fuel, and hazardous materials will be handled under approved plans with spill prevention measures—following strict environmental standards and regulations, and continuous monitoring will support compliance and address any unexpected changes in water quality.

7.1.1.24 Access to Clean Water Characterization of Residual Effects

Access to Clean Water

There are no anticipated adverse effects on access to clean water if proactive mitigation measures and co-ordination between the construction activities and the community's water supply needs are implemented.

Quality of Drinking Water

Construction activities may result in **negative** residual changes to groundwater and / or surface water quality and sediment quality from surface runoff and releases of suspended solids, chemical, biological and physical contaminants and physical disturbance and debris. Additionally, the deposition of particulate from air emissions and dust generated during construction and Operations and Maintenance activities may also negatively affect groundwater, surface water and sediment quality. See the Problem Formulation for Human Health Risk Assessment for more details (Attachment A).

7.1.1.25 Traditional Foods Description of Potential Effects

Access to Traditional Foods

The construction of the Community Access Road may have a **positive** effect on the access to traditional food in Marten Falls First Nation and Aroland First Nation. Increased income from construction jobs could help community members purchase equipment, fuel, and supplies for hunting and trapping, support traditional harvesting, and increase access to traditional goods. The effect of the Community Access Road on traditional foods are further explored in the Aboriginal Treaty Rights and Interests assessment.

Availability of Traditional Foods

Construction activities, including land clearing for the road corridor, work camps, and pits and quarries, may have a **negative effect** due to disturbances that reduce the availability of some traditional foods during key harvest seasons.

Reliance on Store-bought Foods

There is no predicted effect to the access to non-traditional, or store-bought, foods during the construction phase as the road will not be operational yet and no change in food access or costs are anticipated.

Quality of Traditional Foods

Construction activities, including land clearing for the road corridor, work camps, and pits and quarries, may lead to disturbances that have a **negative** effect on the quality of traditional foods during key harvest seasons. The quality of traditional or country foods is closely linked to the health of the surrounding environment. For instance, fish thrive in clean, unpolluted waters, and their health directly affects the safety and nutritional value of the fish consumed. Similarly, berries and other wild fruits depend on clean air and soil to grow robustly, free from harmful contaminants. Wildlife, a common source of traditional meats, requires a healthy and suitable habitat to flourish; polluted environments can lead to diseases and reduced populations. Residual effects of project activities in surface water, groundwater, air, soils, peatlands, and noise-induced stress can cause contamination to the local and regional environment. When country foods are harvested from contaminated environments, the contaminants can pose a direct risk to those who consume them.

Indigenous communities with overlapping interests in the Local Study Area, which include Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation, may face similar potential **negative** effects related to the quality and availability of some traditional foods as those identified for Marten Falls First Nation and Aroland First Nation.

7.1.1.26 Traditional Foods Mitigation

Access, Availability and Quality of Traditional Foods

Mitigation measures for potential negative effects on the accessibility, availability and quality of traditional foods include:

- Owner / operator should provide flexibility in work schedules during key hunting, trapping, and gathering seasons to support continued access to traditional food sources.
- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation, and other affected Indigenous communities, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road to identify key harvesting areas to implement measures that can minimize construction disturbances and contamination to traditional food resources during harvesting seasons. This may include adjusting construction activities to avoid peak harvesting periods.

7.1.1.27 Traditional Foods Characterization of Residual Effects

Access to Traditional Foods

If mitigation measures are implemented there is anticipated to be minimal to no adverse residual effect on the accessibility of traditional foods because of the increased flexibility for community members to balance employment and traditional harvesting.

Availability of Traditional Foods

There is a **negative** effect on the availability of traditional foods, due to disturbances from construction activities, that may not be fully mitigated. This effect is **possible**, expected to be of **low** magnitude, **local** and **short-term**. The effect may be **infrequent** and **reversible**, and has a **high uncertainty.**

Quality of Traditional Foods

There is also a **possible negative** effect on the quality of traditional foods, due to contamination from construction activities that may not be fully mitigated. This effect is expected to be of **moderate** magnitude, **local,** and **short-term**. The effect may be **infrequent, irreversible**, with a **high** uncertainty.

The quality of fish, vegetation, wildlife, birds, and ungulates as a traditional food is dependent on the quality of their habitat or namely the surface water, air and soil quality to which they are exposed. Effects from soil contamination leaching, emissions of criteria air contaminants and deposition to surface water, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have

the potential to affect the quality of fish, vegetation, wildlife, birds, and ungulates as country foods and potentially affect human health.

These potential negative residual effects on the availability and quality of traditional foods apply to the Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation may face similar potential negative effects related to the quality and availability of traditional foods as those identified for Marten Falls First Nation and Aroland First Nation.

7.1.1.28 Public Safety Description of Potential Effects

Drivers Licence

During construction, employment opportunities in road building will increase, particularly in roles such as truck driving, equipment operation, and material transport. Holding a valid driver's licence will be required for many community members to access on-site and community-based jobs. This is likely to increase demand amongst individuals in both Marten Falls and Aroland First Nation to hold a valid Driver's Licence. However, there are barriers to community members obtaining a driver's licence, such as the cost of travel to urban centres, challenges in completing the necessary assessments, and difficulties accessing required documentation. Unless barriers are addressed, there is likely to be the **negative** effect that demand for workers with Driver's licences exceeds those available, thereby limiting the community benefits of the Project.

Road Safety

The construction phase will have a **negative** effect of decreasing road safety due to traffic of heavy machinery, construction vehicles, and material transport on the winter road to Marten Falls First Nation. Local residents traveling on the same road may be at risk, especially when large vehicles such as trucks and construction equipment share the road. The increased vehicle movement heightens the potential for accidents, particularly in areas with narrow or poorly maintained road segments. Traffic congestion on these narrow or difficult-to-navigate sections could increase the risk of collisions, especially with large construction vehicles. Inadequate signage and unfamiliarity with the route further elevate the risk for workers or truck drivers not accustomed to traveling on the winter road.

Emergency Services

The construction of the Community Access Road is expected to have a **negative** effect on emergency services due to higher risks of potential workplace injuries, vehicle accidents, and other construction-related incidents. As a result, emergency response teams serving Marten Falls First Nation and Aroland First Nation may experience a higher number of service calls related to construction site injuries and traffic incidents. This could divert resources from responding to other emergencies in the communities, potentially delaying access to timely medical care for residents.

Severe injuries requiring advanced medical treatment may need medical evacuations to Thunder Bay or other regional hospitals. A higher frequency of medical transports may place additional pressure on limited local resources responsible for co-ordinating medical flights, further delaying or reducing emergency services for community Women, Elders, and caregivers may face greater challenges accessing emergency services, such as maternal health, chronic illnesses, or Elder care, if local resources are strained due to construction-related incidents.

An increase in emergency response demands may result in the **indirect negative** effect of increased demands on community health service workers, who provide administrative, operational, maintenance, and prevention-focused care through programs such as Building Healthy Communities, the Aboriginal Diabetes Initiative, and the National Native Alcohol and Drug Abuse Program. Increased pressure on these workers could reduce the capacity to deliver essential services such as maternal and child health programs, mental health support, and preventative care.

Violence and Harassment

The construction of the Community Access Road may have a **negative** effect of increasing violence and harassment within the community, particularly with the presence of outside workers and the interaction between these workers and community members.

The presence of outside workers may increase aggression or disruptive behaviour, intensified by cultural differences, lack of familiarity with the community, and challenges in integrating into the local social fabric. An influx of workers, especially if the work force is primarily from outside the community, may increase risks of racial, ethnic, or gender-based harassment of Indigenous community members, particularly women and gender-diverse individuals. This could include verbal abuse, inappropriate behaviour, or physical harassment and may be compounded by power dynamics of non-community workers and local residents.

If some individuals are excluded from construction-related employment, this may have the **indirect, negative** effect of increasing lateral violence, conflicts among Indigenous community members, verbal or physical altercations, rumours, or social divisions, ultimately disrupting community cohesion and furthering social tensions.

These risks, ranging from interpersonal conflict and harassment to domestic strain and community fragmentation, create conditions in which gender-based violence may become more prevalent. Gender-based violence refers to harmful acts rooted in gender inequality and power imbalances, disproportionately affecting women, girls, and gender-diverse individuals. In the context of the Community Access Road, the presence of outside workers, cultural and social tensions, and economic disparities may intensify vulnerabilities among Indigenous community members, particularly women and gender-diverse people. Prolonged shift work and separation from family may increase marital strain, potentially leading to higher instances of domestic violence or family breakdown. Communication challenges between partners, particularly in the context of work-related stress, can intensify these issues. Recognizing and addressing these risks is essential to safeguarding community well-being and ensuring that mitigation strategies are inclusive, culturally sensitive, and trauma informed.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, as well as regional municipalities Thunder Bay and Greenstone face similar risks and potential negative effects related to increases in violence and harassment.

7.1.1.29 Public Safety Characterization of Mitigation Measures

Driver's Licence

To the barriers to obtaining a driver's licence in Marten Falls First Nation, the following mitigation measures should be further explored in Detailed Design to increase the number of local Driver Licence holders:

- Operator and owner of the road to explore opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, partnering with organizations such as:
  - Kiikenomaga Kikenjigewen Employment and Training Services, or other trusted organizations, to offer driving training programs to support community members in passing their assessments;
  - Third-party organizations that provide drivers licence testing for remote communities.

Road Safety

Mitigation measures to support road safety during construction include:

- Owner / operator will develop an Equipment Mobilization Plan with both Marten Falls First Nation and Aroland First Nation for the movement of equipment, personnel, supplies, and resources. Where possible, construction traffic should

be separated from community traffic to improve safety and minimize disruptions. The mobilization plan should also include a clear communications strategy to keep the community informed of the mobilization schedule, ensuring residents are aware of periods of increased heavy equipment traffic on the winter road. The plan should include the following components:

- Weight restrictions. Implement weight restrictions for loads to road damage and support safe transport.
- Designate transport times. Work to establish transport peak periods suitable for the First Nation, where possible.
- Establish communication protocols. Establish and maintain clear communication with surrounding communities, providing advanced notice of transport schedules and real-time updates on road conditions.
- Peak hour avoidance. Schedule heavy equipment transport outside of peak community traffic hours.
- Use pilot vehicles to escort large or heavy equipment when necessary to support safe passage.

- Owner / operator to implement mandatory driver safety training for all employees. This could include training tailored to winter road conditions and remote community travel.

Emergency Services

Mitigation measures for emergency services include the following:

- Owner / operator must develop an on-site safety and emergency preparedness program to include:
  - Implement on-site fire suppression systems, including sprinklers and fire extinguishers, to minimize reliance on local fire services.
  - Provide on-site medical care (paramedics, first aid stations, medics) to reduce pressure on local emergency response services.
  - Train and employ on-site security personnel to monitor safety compliance and enforce safety policies, reducing the strain on local police.
  - Work with the Ministry of Health and other appropriate government agencies to develop a co-ordinated emergency response plan with local responders for efficient handling of construction-related incidents requiring additional personnel.
  - Establish clear communication protocols between the construction teams and local emergency responders.

- Owner / operator must compliance with *Ontario's Occupational Health and Safety Act* (Ontario, n.d.a). The owner / operator will adhere to all relevant health and safety requirements, including (but not limited to):
  - Preparation of a Health and Safety Policy covering:
    - Worker safety training (e.g., WHMIS, new job procedures)
    - Workplace hazard analysis and incident investigations
    - Communication and feedback mechanism for worker safety concerns
    - Emergency procedures, first aid and rescue procedures
    - Engineering, administrative, and personal protective equipment controls. Enforcement of Stop Work Policies if unsafe conditions are identified

Implementing these measures will minimize accident risks, ensuring the continued availability of emergency medical flights for non-construction-related community needs, such as medical evacuations for high-risk patients (e.g., pregnant women, Elders, and individuals with chronic conditions).

Violence and Harassment

Mitigation measures for violence and harassment include the following:

- Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities and municipalities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road including:
- Financial literacy programs for workers and families to help manage income fluctuations and reduce financial stress, addressing economic disparities that could contribute to resentment and lateral violence.
- Measures to strengthen cultural programming and land-based activities to reinforce community cohesion and well-being. Strengthening cultural identity and offering community-driven programs can provide positive coping mechanisms for workers and families experiencing stress due to shift work and can offer a protective factor against violence and social disruption by strengthening support networks and reducing isolation, support for unemployed community members by identifying employment barriers and offering job readiness programs to support community members facing unemployment.
- All construction workers, including on- and off-reserve members, will be housed in autonomous work camps to limit unsupervised interactions with the community, reducing the risks of harassment, social conflict, and misconduct. The owner / operator will prioritize gender-divided living quarters in the

workcamps, offering structured environments with oversight to minimize opportunities for violence or inappropriate behaviour.

- The owner / operator will enforce a zero-tolerance policy towards harassment, discrimination, and violence in work camps and on construction sites with strict enforcement and disciplinary actions in compliance with *Ontario's Occupational Health and Safety Act* (Ontario, n.d.a), it will include:
  - Clear anti-harassment policies defining unacceptable behaviour and consequences.
  - Mandatory reporting mechanisms for safe, confidential reporting of harassment or violence.
  - Third-party oversight for transparency and for unbiased investigations and enforcement. Deliver a violence and harassment training session for employees.
- Owner / operator to provide cultural safety and language awareness training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences to understand Indigenous cultural norms and appropriate community interactions to reduce instances of harassment or violence.
- The owner / operator will comply with the Human Rights Code (Ontario, 2024b) to prevent workplace discrimination and uphold employee rights to reduce work force tensions.
- The owner / operator will provide mental health counseling, mentorship, and peer support at work camps to reduce stress-related aggression. On-site Elders or cultural liaisons will offer emotional support and traditional guidance to workers, helping to address conflicts before they escalate into violence or harassment.
- The owner / operator will implement a gradual work force integration for community members, starting with shorter workdays and shift rotations (e.g., 2-3 days on, followed by a break) to reduce workplace stress and minimize the potential for lateral violence, burnout, and community tensions.
- Owner / operator to implement Diversity, Equity, and Inclusion hiring policy which can contribute to a more balanced work force and reduce the risks of harassment in male-dominated work environments.

7.1.1.30 Public Safety Characterization of Residual Effects

Drivers License

No adverse residual effects are anticipated, provided mitigation measures are implemented to support community acquisition of Driver's Licences.

Road Safety

Even with mitigation measures, likelihood is **probable** that the increased traffic during construction could lead to an increased risk of accidents. This could include serious incidents such as trucks or heavy equipment breaking through the ice on the winter road. These **negative** effects are anticipated to be **moderate** in magnitude, **infrequent**, **reversible**, **short-term**, with **low uncertainty**, given the limited duration of the winter road use during the construction phase.

Emergency Services

Even with the proposed mitigations, it is **possible** there will be **negative** effects, increasing pressure on emergency services within the Local Study Area. With proper on-site emergency management, including on-site medical personnel and co-ordination with local emergency services, major disruptions to emergency response in Marten Falls First Nation and Aroland First Nation are not expected. However, despite the presence of on-site medical staff, certain injuries or health concerns may still require transport to community health facilities in Marten Falls First Nation. This could lead to short-term increases in demand for the local nursing station and medevac services. While mitigation measures will reduce workplace injuries, some serious cases may still require evacuation to regional hospitals, such as Thunder Bay. This may place some additional demand on local emergency response and co-ordination services, though effects are expected to be **moderate** and **infrequent**. These pressures are expected to be **local, short-term, reversible,** with **low uncertainty**.

Violence and Harassment

While mitigation measures will reduce risks of violence, harassment, and family strain, they may not eliminate them entirely for Local Study Area communities, Indigenous communities with interests in the Local Study Area or for regional municipal communities of Thunder Bay and Greenstone. It is **possible** that **negative** residual effects are expected to include occasional workplace conflicts, ongoing family stress from shift work, and potential lateral violence due to economic disparities, with **low uncertainty**.

Predicted residual effects after mitigation include:

- Violence and harassment between workers and community members is expected to be low risk after mitigation. Work camps will limit direct interactions between works and the community, and mandatory training will promote respectful behaviour, but occasional conflicts may still occur.
- Lateral violence within the community may persist at a low to moderate levels, with some individuals feeling excluded from economic opportunities, potentially leading to resentment and social tensions.

- Workplace harassment and discrimination will be reduced but not entirely eliminated. Training and zero-tolerance policies will help prevent incidents, but ongoing oversight and enforcement will be needed to address any incidents.
- Family and relationship strain due to shift work may lead to stress-related conflicts. Although shorter shifts and financial literacy training may help, prolonged separations may still cause tension within households, potentially increasing domestic disputes.
- Emotional strain and burnout among workers may continue despite mental health supports. On-site Elders, cultural liaisons, and peer support programs will provide relief, but the demanding nature of construction work, isolation in work camps, and shift work pressures may still contribute to stress-related conflicts or frustration-driven workplace tensions

Continued investment in mental health, family support, and economic opportunities will be essential for long-term well-being. With sustained collaboration between the community and owner / operator, these effects can be managed over time as they are anticipated to be **local, short-term, moderate** in magnitude and **reversible**.

7.1.1.31 Biophysical Determinants to Human Health Potential Effects

The full extent of biophysical effects during construction are discussed in the Problem Formulation (**Attachment A**). A summary of contaminant release during construction and their potential to affect the environment influencing human health has been included for each biophysical indicator.

For the purpose of this assessment, changes to the quality of the environment where country foods are harvested, will be used to evaluate the potential residual effects associated with project-related activities that may affect the quality of these foods. Biophysical determinants to human health may be affected by chemical exposures through the consumption of contaminated country foods, depending on the type, magnitude, and frequency of exposure. Further information on potential effects is included in the Problem Formulation in **Attachment A**.

Air Quality

A summary of contaminant releases during Construction and their potential to affect the environment for air quality influencing human health include:

- Potential **negative** effects on human health may result from chemical exposures through the inhalation of volatile contaminants, particulate material, and the ingestion of inhaled dust. Air quality will be affected during the construction of the Project. Chemicals of particular concern for air quality include nitrogen dioxide, total suspended particulates, particulate matter less than 10

micrometers, particulate matter less than 2.5 micrometers, sulphur dioxide, carbon monoxide, acrolein, benzo(a)pyrene, diesel particulate matter and dust deposition. Construction activities that may affect air quality include:

- Quarry blasting
- Burning of biomass
- Construction and installation of bridges
- Community Access Road construction
- Aggregate operations
- Emissions of volatile substances (i.e., burning of fossil fuels in vehicles and equipment during Construction)

Noise and Vibration

A summary of exposure during construction and their potential to affect the environment for noise and vibration influencing human health include:

- Biophysical human health may be **negatively** affected by exposure to noise and vibration. Noise represents a distinct environmental change, as it introduces energy into air. Prolonged exposure to noise can lead to sleep disturbances and long-term high annoyance. Human responses to noise vary by individual sensitivity, the type of noise, and specific situations. The most common community reactions to noise include complaints and heightened annoyance. Construction activities that may affect noise and vibration include:
  - Project construction activities including clearing, grading, earthmoving, grubbing, and stockpiling;
  - Temporary access road reclamation and decommissioning
  - Construction of infrastructure including access roads, bridges, temporary laydown areas, turn-around areas and temporary construction camps; and
  - Pit and quarry work.

Soil Quality

A summary of contaminant releases during construction and their potential to affect the environment for soil quality influencing human health include:

- Construction activities that may affect soil quality include:
  - Leaks and spills during equipment, supplies and personnel mobilization; and
  - Deposition of dust and air contaminant emissions from construction, blasting and mobilization activities.

Soil quality may be **negatively** affected by hazardous material leaks, spills, or deposition of air emissions and dust during construction and operations. Accidental spills and leaks

will be limited to the construction disturbance footprint. Existing soil analysis shows some concentrations exceeding applicable standards, and any residual effects could compound these exceedances, however predicted soil concentrations have not been modeled, and no residual effects are predicted.

Sediment Quality

A summary of contaminant releases during construction and their potential to affect the environment for sediment quality influencing human health include:

- Biophysical health may be **negatively** affected from chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Construction activities that may affect sediment quality include:
  - Clearing the right-of-way for the Community Access Road and supporting access roads;
  - Quarry blasting
  - Construction of the Community Access Road;
  - Construction and installation of bridges and culverts; and
  - Construction and operations and decommissioning of temporary infrastructure.

Similar to soils, effects on sediment quality during construction are predicted to be short-term and limited to the local study area, with no residual effects predicated.

Land Use

A summary of contaminant releases during construction and their potential to affect the environment influencing human health include:

- Human health may be **negatively** affected from chemical exposures through the inhalation of contaminated air, consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact with contaminated water, soils or sediment. Volatile substances in water may be inhaled during activities such as bathing and cooking. Construction activities that may affect human health include:
  - Clearing the right-of-way for the Community Access Road and supporting access roads;
  - Quarry blasting
  - Construction of the Community Access Road;
  - Construction and installation of bridges and culverts; and
  - Construction and operations and decommissioning of temporary infrastructure.

There is a possible **negative** effect to Land Use in the construction phase due to increased duration, extent, frequency and number of seasons people spend engaged in land use within the Construction Disturbance Area. However, effects on human health from construction activities are predicted to be short term and limited to where human activities intersect with construction activity impacts to the Construction Disturbance Area, with no residual effects predicated.

Peatlands

A summary of contaminant releases during construction and their potential to affect the environment for peatlands influencing human health include:

- Within the Local Study Area, peatlands are existing sources of carbon dioxide and methane. Construction activities will remove portions of the wetland, reducing the amount of carbon dioxide and methane released by natural processes, having a **positive** effect over the long-term. Peatlands Technical Support Document [Appendix I].

Accidents and Malfunctions

A summary of contaminant releases during construction and their potential to affect the environment for accidents and malfunctions influencing human health include:

- Accidents and malfunctions can affect the quality of soils, sediment, surface water and groundwater, and therefore Country Foods. Potential **negative** effects on human health may be through chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Construction phase activities which may affect soil, sediment, surface water and groundwater quality include:
  - Clearing the right-of-way for the Community Access Road and supporting access roads;
  - Blasting rock;
  - Construction of the Community Access Road;
  - Construction and installation of bridges and culverts; and
  - Construction and decommissioning of temporary infrastructure.

Residual effects due to accidents and malfunctions are difficult to predict based on the unknown nature of specific accidents and / or malfunction. With proposed mitigations for spill response and clean up, it is anticipated that effects will be short-term and limited in extent to the Construction Disturbance Area and therefore, with proper mitigations deployed, no adverse residual effects are predicated.

7.1.1.32 Biophysical Effects with Potential to Influence Human Health Mitigation

Additional details related to mitigations during construction can be found in the individual technical support documents. Identified in those technical reports are mitigation measures to address biophysical factors influencing human health during construction include but not limited to:

- Owner / operator to obtain all required permits, authorizations, and approvals prior to conducting specific construction activities.
- Owner / operator must comply with all applicable regulations, legislation, permit requirements, and best practices regarding all work.
- Owner / operator to develop and comply with Project specific Management and monitoring plans, including, but not limited to, a Construction Best Management Practice Plan, Blasting and Communication Management Plan, Erosion and Sediment Control Plan, Fugitive Dust Management Plan.
- Owner / operator should plan timing of construction activities to minimize environmental effects.
  - The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, including Animbiigoo Zaagi'igan Anishinaabek First Nation, Attawapiskat First Nation, Constance Lake First Nation, Fort Albany First Nation, Ginoogaming First Nation, Kashechewan First Nation, Long Lake #58 First Nation, and Neskantaga First Nation, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.

7.1.1.33 Biophysical Determinant for Human Health Characterization of Residual Effects

To determine the magnitude and extent of residual effects of project construction activities on biophysical human health requires the modelling of predicted concentrations based on expected Project activities. For this Project, air concentrations during the construction phase were the only aspect modelled. Residual effects to surface water, groundwater, soils, and sediment, including deposition of dust onto surface water soils and sediment, were not fully evaluated in the individual technical studies, and modelling was not completed, and as a result, not all biophysical determinants residual effects characterizations can be predicated.

With the information available, the following adverse residual effects are predicted:

Air Quality

Possible, continuous, negative effects on air quality of **high magnitude** limited to the **Construction Disturbance Area** are predicted with **high** uncertainty. However, the air quality assessment determined no significant residual effects to human health, due to **reversible** and **short-term** duration of air quality effects from construction activities.

Noise and Vibration

Certain, negative effects of **high** magnitude due to blasting, quarrying, road construction noise are predicted residual effects, with **low** uncertainty. However, the noise and vibration assessment determined no significant residual effects to human health during construction as effects are predicted to be **short-term** and **infrequent, reversible** and limited to the **Construction Disturbance Area**.

7.2 Operation and Maintenance Phase

As described in **Section 4.2.1**, the operation and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The Operations and Maintenance phase of the Project is considered to be permanent based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.

7.2.1 Potential Effects and Mitigation

7.2.1.1 Sustainable Population Growth Description of Potential Effects

Age Distribution

With the Community Access Road operational, improved transportation and access to services is likely to have the **positive** effect of gradually leading to a more balanced age distribution. Improved transportation access will make it easier for families to travel for employment, education, and services without permanently relocating. The road will not only improve local job opportunities but also allow parents to visit their high-school-aged children more frequently and at a lower cost, reducing disruption to family life.

For older adults, the road will enhance access to medical care, reducing the need for long-term relocation to urban areas. In remote communities, limited healthcare often forces Elders to move closer to hospitals and long-term care facilities. With year-round road access, individuals can travel for medical appointments and return home, leading to increased Elder retention and growing demand for in-community healthcare and Eldercare services.

All potential effects may contribute to a gradual shift from the current youth-dominated demographic toward a more balanced age distribution of children, working-age adults, and

senior individuals. This predicated shift toward national or regional norms could support future community growth, economic development, and intergenerational knowledge transfer.

Gender Distribution

There are no anticipated changes to gender distribution anticipated for the operation and maintenance phase.

Community Population

The operation of the Community Access Road is expected to have a **positive** effect of increasing the community population in Marten Falls First Nation, Aroland First Nation and regional municipal communities of Thunder Bay and Greenstone. Engagement feedback indicates that some off-reserve members are interested in returning once year-round access is established. The new road access may attract both off-reserve members and external workers seeking employment in road maintenance, infrastructure development, and new businesses to Indigenous and regional municipal communities in the region. Families may be more likely to remain in these communities as their children reach high school age, as the road will allow for easier travel to visit students instead of requiring permanent relocation. Over time, this could lead to a stronger community identity and improved social cohesion as residents are able to live closer to family, traditional lands, and cultural resources.

7.2.1.2 Sustainable Population Growth Mitigation

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the project.

7.2.1.3 Sustainable Population Growth Characterization of Residual Effects

No adverse residual effects are anticipated for the operation and maintenance phase of the project.

7.2.1.4 Labour Market Dynamics Description of Potential Effects

Labour Force

Operation and maintenance spending is expected to total $11 million on average per year. As shown in the table below, about 30 direct jobs are expected to occur in Ontario during the operation and maintenance phase on average per year, which along with indirect and induced employment effects would result in about 80 jobs overall. This could lead to about 10 jobs in the rest of Canada, with a total of 90 jobs in Canada overall. These jobs can be filled with the existing labour force in Marten Falls First Nation, as well as the surrounding communities and districts (as discussed earlier in **Sections 5.1.2** and **5.2.2**).

These employment effects are expected to directly create about $2.0 million in Ontario's labour income, along with an indirect effect of $2.7 million and an induced effect of $0.8 million. This implies a total labour income effect of $5.5 million and an average labour income of around $68,200 per job. For Canada overall, the total labour income effect is $6.1 million, which gives an average labour income of about $68,300 per job. The expected total effect on Ontario's Gross Domestic Product is $9.9 million. This implies an average income produced of about $123,600 per job. On the other hand, the expected total effect on Canada's Gross Domestic Product is about $11.2 million, which implies an average income produced of $125,600 per job.

The operation and maintenance of the Community Access Road is anticipated to create a **positive** effect on educational attainment for Marten Fall First Nation. Road connectivity may support children pursuing secondary education in regions such as Geraldton or Thunder Bay.

Indirect effects related to labour market dynamics include:

- Indirect input-output effects are expected across the supply chain industries. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth.
- Other general indirect effects could arise from people moving back to the community given the increase in economic activity and jobs. This increase in population and income would lead to higher demand, including the demand for housing.

Table 7-7: Operation and Maintenance Effects on Labour Market Dynamics

Operation and Maintenance Effects	Indicator	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	Employment (jobs)	27	39	14	80
	Labour Income (millions $)	2.0	2.7	0.8	5.5
	Gross Domestic Product (millions $)	3.6	4.3	2.0	9.9
	Labour Income per Employment ($)	73,787	68,086	58,824	68,225
	Gross Domestic Product per Employment ($)	133,306	109,274	143,963	123,599
Canada	Employment (jobs)	27	45	17	89
	Labour Income (millions $)	2.0	3.1	1.0	6.1
	Gross Domestic Product (millions $)	3.6	5.1	2.5	11.2
	Labour Income per Employment ($)	73,787	68,736	58,638	68,288
	Gross Domestic Product per Employment ($)	133,306	114,560	141,866	125,587

(Statistics Canada, b; h; l), AECOM Analysis

7.2.1.5 Labour Market Dynamics Mitigation

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the Project.

7.2.1.6 Labour Market Dynamics Characterization of Residual Effects

Labour Force

There are no significant adverse residual effects for the labour market dynamics during the operation and maintenance phase of the Project. There are potential **positive** residual effects on labour market dynamics through increased employment and training opportunities during the operation and maintenance phase of the Project.

Earnings

There are no significant adverse residual effects for the labour market dynamics during the operation and maintenance phase of the Project.

Educational Attainment

The operation and maintenance of the Community Access Road is anticipated to create a **positive** effect on educational attainment for Marten Fall First Nation.

7.2.1.7 Economy Description of Potential Effects

Local Businesses and Commercial Activities

The operation and maintenance phase of the Project presents an ongoing opportunity for business development related to road Operations and Maintenance. There could be potential services created during the operation and maintenance phase of the Project, such as establishing a community transportation system (shuttle bus or van), designed to transport community members to medical appointments, grocery shopping, recreational opportunities and to ship goods and materials. This service would provide flexibility in scheduling, allowing for more efficient and reliable access to and from the community, and better co-ordination for essential travel needs. At the same time, however, barriers to new or expanding business opportunities during Community Access Road operation and maintenance may still exist.

Indirect effects related to the business environment include:

- Indirect input-output effects occur in the supply chain due to industry linkages. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth. If there is higher direct demand for some product in the economy, then the businesses in the industries supplying that product are indirectly affected.

- Other general indirect effects could arise from people moving back to the community given the increase in economic activity and jobs. This increase in population and income would lead to higher demand, including the demand for housing.

Public Finances

As with the construction phase, the effects on public finances during the operation and maintenance phase can be broken down in several components. **Table 7-8** below shows the breakdown of the total effects of the $11 million operation spending on taxes by the type of taxes and by the level of government.

As **Table 7-8** shows, the total effect on tax revenues in Ontario is expected to be around $2.7 million during the operation phase. The major component of this comes from taxes on income ($1.7 million), mostly to the federal government ($1.1 million). Taxes on products are expected to total $0.5 million, with $0.3 million going to the provincial government. Taxes on production are projected to be $0.5 million, with most of it being local tax revenue ($0.4 million).

Table 7-8: Operation and Maintenance Effects on Taxes by Government

Operation and Maintenance Effects (millions $)	Type of Taxes	Federal	Provincial	Local	Indigenous	Total
Ontario	Products	0.2	0.3	0	0	0.5
	Production	0.0	0.1	0.4	0	0.5
	Income	1.1	0.6	0	0	1.7
	Total	1.3	1.0	0.4	0	2.7
Canada	Products	0.2	0.3	0	0	0.6
	Production	0	0.2	0.3	0	0.5
	Income	1.2	0.7	0.0	0	2.0
	Total	**1.4**	**1.2**	**0.3**	**0**	**3.0**

(Statistics Canada, b; h; l), AECOM Analysis

Considering all the economic activity across Canada, the total effect on tax revenue is expected to be $3.0 million during the operation phase. This is led by taxes on income ($2.0 million), mostly at the federal level ($1.2 million). Taxes on products are projected to be $0.6 million, with approximately half of that going to the local government, while taxes on production are expected to total $0.5 million, with $0.3 million going to the local government.

Indirect effects related to public finances include:

- Indirect effects occur in the supply chain due to industry linkages. When demand for a specific product or service increases, the industries supplying the necessary materials, labour, or support services also experience growth. If there is higher direct demand for some product in the economy, then the industries supplying that product are indirectly affected, which then leads to additional tax revenues.

- Other general indirect effects could arise from people moving back to the community given the increase in economic activity and jobs. This increase in population and income would lead to higher demand, including the demand for housing.

Regional Economy

Summary of the regional economic effects of the $11 million operation spending is shown in **Table 7-9** and **Table 7-10**, followed by sections for each economic indicator.

Table 7-9: Ontario Operation and Maintenance Effects

Ontario Operation and Maintenance Effects (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Output	11.0	8.4	3.0	22.4
Gross Domestic Product	3.6	4.3	2.0	9.9
Labour Income	2.0	2.7	0.8	5.5
Gross Operating Surplus	1.5	1.5	0.9	3.9
Taxes on Products	0.1	0.1	0.3	0.5
Taxes on Production	0.2	0.2	0.2	0.5
Taxes on Income	0.6	0.8	0.3	1.7
Employment (jobs)	27	39	14	80

(Statistics Canada, b; h; l), AECOM Analysis

Table 7-10: Canada Operation and Maintenance Effects

Canada Operation and Maintenance Effects (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Output	11.0	10.0	3.8	24.8
Gross Domestic Product	3.6	5.1	2.5	11.2
Labour Income	2.0	3.1	1.0	6.1
Gross Operating Surplus	1.5	1.9	1.1	4.5
Taxes on Products	0.1	0.1	0.3	0.6
Taxes on Production	0.2	0.2	0.2	0.5
Taxes on Income	0.6	0.9	0.4	2.0
Employment (jobs)	27	45	17	89

(Statistics Canada, b; h; l), AECOM Analysis

Output

The $11 million operation and maintenance spending is expected to lead to total economic activity (output) in Ontario of $22.4 million on average per year. The total effects on output are estimated to be $24.8 million for Canada.

Table 7-11: Operation and Maintenance Effects on Output

Operation and Maintenance Effects on Output (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	11.0	8.4	3.0	22.4
Canada	11.0	10.0	3.8	24.8

(Statistics Canada, b; h; l), AECOM Analysis

Gross Domestic Product

Ontario's total economic value, measured by its Gross Domestic Product (income produced), is projected to be $9.9 million annually. Meanwhile, the total effects on Canada's Gross Domestic Product are expected to be $11.2 million.

Table 7-12: Operation and Maintenance Effects on Gross Domestic Product

Operation and Maintenance Effects on Gross Domestic Product (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	3.6	4.3	2.0	9.9
Canada	3.6	5.1	2.5	11.2

(Statistics Canada, b; h; l), AECOM Analysis

Labour Income

Total effects on labour income are expected to be $5.5 million per year in Ontario. The total effects on Canada's labour income are estimated to be $6.1 million, with approximately half of those coming from the indirect effects.

Table 7-13: Operation and Maintenance Effects on Labour Income

Operation and Maintenance Effects on Labour Income (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	2.0	2.7	0.8	5.5
Canada	2.0	3.1	1.0	6.1

(Statistics Canada, b; h; l), AECOM Analysis

Gross Operating Surplus

Ontario's gross operating surplus total effect is estimated to be $3.9 million annually. The estimated total effects on gross operating surplus are expected to be $4.5 million, with the indirect effects being the most dominant.

Table 7-14: Operation and Maintenance Effects on Gross Operating Surplus

Operation and Maintenance Effects on Gross Operating Surplus (millions $)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	1.5	1.5	0.9	3.9
Canada	1.5	1.9	1.1	4.5

(Statistics Canada, b; h; l), AECOM Analysis

Taxes

The total effects on taxes in Ontario ($2.7 million) are led by taxes on income ($1.7 million), followed by taxes on products ($0.5 million) and taxes on production ($0.5 million). The total effects on taxes in Canada are estimated to be $3.0 million. This is led by taxes

on income ($2.0 million), followed by taxes on products ($0.6 million) and taxes on production ($0.5 million).

Table 7-15: Operation and Maintenance Effects on Taxes

Operation and Maintenance Effects on Taxes (millions $)	Type of Taxes	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	Products	0.1	0.1	0.3	0.5
	Production	0.2	0.2	0.2	0.5
	Income	0.6	0.8	0.3	1.7
	Total	**0.9**	**1.0**	**0.8**	**2.7**
Canada	Products	0.1	0.1	0.3	0.6
	Production	0.2	0.2	0.2	0.5
	Income	0.6	0.9	0.4	2.0
	Total	**0.9**	**1.2**	**0.9**	**3.0**

(Statistics Canada, b; h; l), AECOM Analysis

Employment

The operation and maintenance phase is expected to engage about 80 total jobs in Ontario, which includes around 30 direct jobs. The overall employment effect for Canada is expected to be around 90 jobs, with the indirect effects on employment being most prominent.

Table 7-16: Operation and Maintenance Effects on Employment

Operation and Maintenance Effects on Employment (jobs)	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Ontario	27	39	14	80
Canada	27	45	17	89

(Statistics Canada, b; h; l), AECOM Analysis

Indirect effects related to the regional economy include:

- Indirect input-output effects occur in the supply chain due to industry linkages. If there is higher direct demand for some product in the economy, then the industries supplying that product are indirectly affected. In the context of the Project, the operating spending for the new Community Access Road directly affects the support activities for transportation industry. The support activities for transportation industry makes the first round of indirect expenditures on its supply chain industries. Those industries will then make their expenditures on their supply chain industries. The sum of all those indirect effects gives the total indirect effects, as discussed earlier. The shares of expenditure by Ontario's support activities for transportation industry on the main 20 industries that are indirectly affected is seen in **Table 7-17** below (based on the latest Supply and Use Tables, 2021, released by Statistics Canada on November 7, 2024).

Table 7-17: Ontario Support Activities for Transportation Indirect Industries during Operations and Maintenance

Ontario Support Activities for Transportation Indirect Industries	Expenditure Share (%)
Road transportation services for specialized freight	14
Repair construction services	13.8
Road transportation services for general freight	8.0
Rail freight transportation services	6.1
Rental and operating leasing services of commercial and industrial machinery and equipment	4.5
Rental of non-residential real estate	4.4
Motor vehicle transmission and drive train components	3.8
Employers' social contributions	3.7
Other miscellaneous motor vehicle parts	3.5
Other transportation equipment and related parts	3.0
Prepared meals	2.6
Tires	1.4
Warehousing and storage services (except grain storage)	1.4
Commercial and service industry machinery	1.3
Management, scientific and technical consulting services	1.3
Computer systems design and related services (except software development)	1.2
Water freight transportation services	1.1
Lubricants and other petroleum refinery products	1.1
Other membership services	1.1
Plastic and foam building and construction materials	1.1

(Statistics Canada, a), AECOM Analysis

7.2.1.8 Economy Mitigation

Local Businesses and Commercial Activities

Mitigation measures to address potential business environment issues include:

- Project owner / operator will implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs through construction and prepare for Operations and Maintenance.
- Project owner / operator will create a Local Content Plan to utilize a certain dollar value or share towards local businesses and contractors for Operations and Maintenance.

Enhancement measures focused on improving the business environment include:

- Owner / operator should prioritize hiring Marten Falls First Nation and Aroland First Nation members, as well as other Indigenous community members.

Public Finances

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the Project.

Regional Economy

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the Project.

7.2.1.9 Economy Characterization of Residual Effects

Local Businesses and Commercial Activities

There are no adverse residual effects for the business environment during the operation and maintenance phase of the Project. Possible **positive** residual effects are anticipated on the economy through potential productivity improvements, land value uplift, and higher economic diversification.

Public Finances

There are no adverse residual effects for the public finances during the operation and maintenance phase of the Project.

Regional Economy

There are no significant adverse residual effects for the regional economy during the operation and maintenance phase of the Project. Possible **positive** residual effects are anticipated on the business environment through potential productivity improvements and higher economic diversification.

7.2.1.10 Community Access to Infrastructure and Services Description of Potential Effects

Methods of Transportation In and Out of the Community

The construction of a permanent Community Access Road will eliminate the Marten Falls First Nation's reliance on the seasonal winter road, which is limited by climate variability and short operational periods. Year-round access will eliminate reliance on flight schedules and the limited winter road, improving the predictability of available travel means for essential services, education, and employment opportunities. This will result in a **positive** effect of reliable, year-round, all-season road-access for people and goods, increasing supply delivery and reducing the community's dependency on costly air transport.

The road will also reduce dependence on air transportation, having the **indirect positive** effect of improving access to goods, services, and supplies. Year-round road access will reduce travel costs considerably for community members, particularly families. With one tank of gas costing between $100-$200, compared to up to $2,120 for return flights for a family of four using ZAM Air out of Nakina, or $4,000 using North Star Air from Thunder Bay **Section 5.1.4.1.1.2**), the road provides major financial savings. The ability to make

day trips to nearby towns like Geraldton or Nakina also eliminates the need for overnight accommodation costs. Road access also reduces the travel costs for out-of-community healthcare appointments, reducing this community cost. Food prices are also expected to decrease, easing the financial strain on community members, especially lower-income residents, who may otherwise face limited access to affordable, nutritious food. Reduced costs may help alleviate food insecurity, improve overall health outcomes, and support community well-being. For example, as of 2025, the price of a 10 kg bag of flour at Superstore in Thunder Bay ranges from $10.99 to $18.97, and $15.97 for a 10 kg bag of sugar. In contrast, communities like Neskantaga First Nation (and based on similar remote location to Marten Falls First Nation we can assume prices are similar) were paying $40 to $70 for a 10 kg bag of flour and $30 for sugar in 2023 (**Section 5.1.9.1**). These major price differences highlight the financial strain on community members, particularly lower-income residents, who are already facing limited access to affordable food options.

While these savings represent a direct positive benefit to all community members, members of the Gender-Based Analysis Plus groups, such as youth, single parents, lower-income earners, and Elders, will particularly feel the **positive** effects.

No direct effects on methods of transportation in or out of Aroland First Nation are anticipated.

Essential Infrastructure and Services

The road will have a **positive** effect of facilitating easier access for contractors and service providers, improving the local delivery of key services, such as healthcare, education, and community-based programs, potentially enhancing the availability and quality of these services for both current and new residents.

The road's development may have an **indirect positive** effect of reducing the logistical challenges and costs associated with transporting building materials and equipment, making it more cost-effective to service and expand local infrastructure. This could lead to faster development, including the expansion of essential infrastructure including power, water, wastewater, or education facilities.

7.2.1.11 Community Access to Infrastructure and Services Mitigation

Methods of Transportation In and Out of the Community

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the project.

Essential Infrastructure and Services

No mitigation or enhancement measures are proposed during the operation and maintenance phase of the project.

7.2.1.12 Community Access to Infrastructure and Services Characterization of Residual Effects

Methods of Transportation In and Out of the Community

Residual effects on transportation methods in and out of the community are expected to be **positive**

Essential Infrastructure and Services

The residual effects on essential infrastructure and services are expected to be **positive,** given increased ease of access for service providers and reduced friction associated with infrastructure upgrades or improvements.

7.2.1.13 Housing Description of Potential Effects

Housing Suitability

The improved access from the Community Access Road may lead to a short-term, **negative** effect of decrease in housing suitability, as off-reserve residents and potential new residents choose to live in Marten Falls. This influx of new, permanent residents will put pressure on existing supply in Marten Falls which could disproportionately affect women, children, and Elders, particularly in overcrowded or substandard conditions. Women, especially those in single-parent households, may face added challenges managing limited space and resources.

Housing Adequacy

The Community Access Road will contribute to the **positive** effect of reduced costs and logistically challenges associated with building new homes and shipping materials to Marten Falls First Nation, improving the amount of adequate housing within the community.

Improved housing adequacy is expected to contribute to an **indirect positive effect** of improved health due to reduction in mold, poor ventilation, and overcrowding. This can lower the incidence of respiratory illnesses and other health problems often worsened by inadequate housing. The long-term benefits will include better mental health, particularly for women and children who are often the primary caregivers and spend the most time at home. Women, who are more likely to be responsible for maintaining the household environment, will experience improved health outcomes due to a healthier living space. Additionally, Elders, who may have more sensitive health conditions, will benefit from better air quality and safer living conditions.

Access to Building Materials for Housing

The Community Access Road will contribute to a **positive** effect of improving reliable access to construction materials and supplies, allowing more frequent repairs, upgrades, and construction of new homes. With continuous access to materials, repairs can be completed proactively, preventing them from escalating into larger issues. The availability of materials will help address long-standing housing needs within the community, improving living conditions for residents, particularly women, children, and Elders, who are more vulnerable to substandard housing.

While the Community Access Road will likely lower the cost and logistical barriers to transporting building materials, the community's existing infrastructure such as electricity, wastewater treatment, and access to clean drinking water, is already at capacity and would need upgrades to support future housing growth. To fully realize the benefits of improved transportation, an infrastructure review and planning process would be beneficial to identify and prioritize necessary upgrades. While responsibility for such planning falls outside the scope of the road project, Marten Falls First Nation may consider working with Indigenous Services Canada and other partners to explore opportunities for infrastructure investment and long-term community development.

There are no effects to housing anticipated for Aroland First Nation from the operations of the road as it is already road-connected year-long.

7.2.1.14 Housing Mitigation

Mitigation measures to meet changes in housing needs throughout Operations and Maintenance phase include:

- The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the Community Access Road, including topics associated with housing, such as tracking of housing demand and local infrastructure adjustments to meet changes in housing needs. This could include converting housing from the autonomous work camps as additional, permanent housing.

7.2.1.15 Housing Characterization of Residual Effects

There are no adverse residual effects associated with housing during the operations phase.

There are no residual effects expected for Aroland First Nation for housing from the operations of the road.

7.2.1.16 Cultural Preservation and Change Description of Potential Effects

Traditional Economy

With the road in place, new harvesting areas may become accessible for Marten Falls First Nation and Aroland First Nation, which could have the **positive** of effect of renewing interest among youth and younger adults in participating in the Traditional Economy. Previously, access would have been limited to snowshoe, snowmobile, all-terrain vehicles, canoe, or boat, transportation options that require more time and potentially more safety concerns compared to using the new all-season road.

From a Gender-Based Analysis Plus perspective, the increased ability to easily access to hunting, fishing, trapping, and gathering areas is expected to have a **positive** effect, as it may encourage more youth and younger adults to engage in traditional activities. Easier access would reduce travel time to these locations, allowing community members to participate in traditional practices while balancing work or school commitments. For Elders and those with mobility challenges, the road provides an opportunity to reconnect with traditional activities like fishing, berry picking, and medicinal gathering, which may have been difficult to reach without this improved infrastructure.

Easier transportation of traditional foods may have a **positive** effect of creating new economic opportunities, such as selling fish, berries, and wild meats and other traditional goods, such as harvested berries, fish, and furs, to external markets. The road will also allow for increased trade or business partnerships between Marten Falls First Nation and Aroland First Nation, helping continue to build a strong relationship between the two communities.

The potential **positive** effects associated with the traditional economy may positively affect the road-connected Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation.

The potential **positive** effects associated with the traditional economy are not anticipated to affect the remote Indigenous communities with overlapping interests in the Local Study Area, including Neskantaga First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, as they will not experience a change in accessibility.

Participation in Cultural Activities

The road will have a **positive** effect of increasing access for off-reserve members to attend cultural events such as pow wows, community feasts, and cultural weeks, in Marten Falls First Nation. Members of Marten Falls First Nation and Aroland First Nation expressed excitement that the road would increase their ability to attend traditional gatherings and pow wows in Marten Falls First Nation, noting that driving to the community would save a lot of money on flights (AECOM, 2025). The road may encourage increased participation

by Marten Falls First Nation members in activities in Aroland First Nation, as there will be a road connecting the communities. Nations collaborating to host and celebrate events may further strengthen the relationship between the communities, strengthening inter- and intra-community cohesion. Finally, improved access may increase participation in cultural education from off-reserve community members and make it easier for Elders and knowledge keepers that reside off-reserve to travel to the community strengthening intergenerational knowledge sharing. Younger community members may become more engaged and invested in learning and preserving cultural practices.

Use of Traditional Language

According to the 2021 Census, the percentage of Ojibway speakers in Marten Falls First Nation declined from 22% in 2016 to 18%. In contrast, the percentage of Ojibway speakers in Aroland First Nation increased from 35.6% in 2016 to 36.1% in 2021. With a lower population than Aroland First Nation, reasons for decreased traditional language use in Marten Falls First Nation may include out-migration, aging fluent speakers, fewer opportunities for language transmission, or Census data variability.

The road could increase interactions between Indigenous communities and traditional language users, particularly between Marten Falls First Nation and Aroland First Nation. This may lead to more opportunities for community members, particularly youth, to hear and practice the language and resulting in a **positive** effect of increased traditional language use.

7.2.1.17 Cultural Preservation and Change Mitigation

Traditional Economy

No mitigation measures are proposed.

Participation in Cultural Activities

No mitigation measures are proposed.

Enhancement measures for participation in cultural activities include:

- Owner / operator to consider sponsoring community-driven cultural events that can take advantage of the improved access, incorporating local and regional participation. The road can help bring in off-reserve members, including those residing in Aroland, Municipality of Greenstone, Thunder Bay, and other communities, enriching the event experience without overshadowing the values of the community, and potentially strengthening the cultural values of both on- and off-reserve members. This could include festivals, gatherings, or knowledge-sharing initiatives that use the road as a tool for cultural exchange, and organization of traditional events like canoe races, fishing trips, or nature walks, that use the road as a tool to deepen the connection to the land and water.

- Owner / operator to consider sponsoring Elders and Indigenous Knowledge holders to travel to Marten Falls First Nation to provide cultural programming that may include workshops on teaching traditional skills related to hunting, trapping, traditional music, storytelling, or preparation of traditional foods.

Use of Traditional Language

No mitigation measures are proposed.

Enhancement measures for language use include:

- Owner / operator to consider sponsoring Elders and knowledge holders that reside outside the community travel to community to teach the language to interested community members, through formal and informal settings.

7.2.1.18 Cultural Preservation and Change Characterization of Residual Effects

Traditional Economy

Residual effects for participation in the traditional economy are expected to be **positive**.

Participation in Cultural Activities

Residual effects for participation in cultural activities are anticipated to be **positive**.

Use of Traditional Language

Residual effects for change in use of traditional language is anticipated to be **positive**.

7.2.1.19 Community and Public Health Description of Potential Effects

Access to Health Services

The Community Access Road to Marten Falls First Nation is expected to have **positive** effects on access to health services due to reliable, year-round connection by an all-season road for both community members to access services only available in other regional centres and, for more reliable delivery of services in community.

Recreation

The Community Access Road to Marten Falls First Nation is expected to have **positive** effects on recreation, including youth sporting activities, cultural events, and other leisure activities etc., due to reliable, year-round connection by an all-season road for both community members to more easily engage in recreational activities outside the community and, to increase the planning and participation in recreational activities within the community year-round.

Mental Health and Well-being

The Community Access Road to Marten Falls First Nation is expected to have **positive** effects on mental health by improving access to care, reducing isolation, and enhancing opportunities for cultural and social engagement, including improved access to medical health services, faster response for mental health crises, reduced feelings of isolation, and improved effect on mental health and well-being.

The road will reduce logistical challenges in accessing mental health care, including counseling, addiction treatment, and crisis support services in regional centres such as Sioux Lookout and Thunder Bay. Currently, medical transportation for mental health services is limited by the availability of flights and the need for advanced planning. The road will allow for more timely access to appointments and emergency psychiatric care, reducing delays in treatment. The road will enable faster emergency interventions by allowing regional crisis teams paramedics, and police services to reach the community more efficiently, potentially preventing self-harm or overdose fatalities. Given the high rates of mental health service calls in the Nishnawbe Aski Police Service Central Region (404 calls related to mental health or suicide attempts in 2023-2024), reducing response times will be critical to community well-being.

Isolation has been a longstanding challenge in Marten Falls First Nation, contributing to mental health concerns such as depression, anxiety, suicide, and substance abuse (see **Section 5.1.7.1.3**). The road will allow community members to visit out-of-community family members, participate in cultural events outside the community, and connect with external networks, without relying on expensive flights in and out of the community. This may increase social interaction and reduce feelings of disconnection.

The road removes transportation barriers to accessing mental health services, reducing emergency response times, potentially improving out-of-community social connections, and increasing participation in cultural practices, which contributes to overall improvements in mental health outcomes.

Although the road will enhance access to traditional lands and may support more frequent participation in land-based healing and cultural activities that have been identified as protective factors for mental health, there may also be **negative** effects due to the permanent, visual presence of the road contributing to feelings of disconnect and ecological grief. For some community members, the transformation of a familiar environment into a developed corridor may evoke sadness, anxiety, or a diminished sense of belonging, as the road may symbolize a disruption or fragmentation of relationships with the environment.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects to their

mental health and well-being as those identified for Marten Falls First Nation and Aroland First Nation community members. Potential negative effects to mental health and well-being may be experienced due to permanent, visual changes to the land.

Substance Use

The Community Access Road to Marten Falls First Nation may have a **negative** effect on substance use within the community. A large percentage of the community (75%) is accessing substances despite current transportation limitations **Section 5.1.4.1.1**. The new all-season road access will reduce costs and logistical barriers for bringing all items, including alcohol and drugs, into the community. This could lead to increased frequency and / or quantity of use among existing users, given the reduced financial and logistical barriers.

While easier access to drugs and alcohol is a concern, the road may contribute to **positive** effects due to improved access to treatment options, providing a more balanced consideration of potential effects. With the road in operation, travel to treatment centres outside of the community and options to bring treatment programs and services to the community will become more affordable, reducing barriers for individuals seeking help for substance use. This could include day programs, counseling services, and follow-up support services, potentially improving long-term recovery outcomes. Service delivery, including access to withdrawal medications like suboxone, is likely to improve. Community members have historically identified cultural activities as key to substance use prevention, emphasizing the importance of reconnecting with traditions and engaging in recreational, outdoor, and creative pursuits. Increased accessibility through the road can make it easier to access land-based programs while strengthening cultural ties.

It was identified that Marten Falls First Nation is working to build a community treatment centre in the community. The road will improve access to building materials and decrease transportation costs, making the construction of a community-based culturally relevant treatment centre feasible. This facility could integrate traditional healing methods with clinical care, providing a holistic and culturally appropriate recovery environment.

7.2.1.20 Community and Public Health Mitigation

Access to Health Services

No mitigation required.

Recreation

No mitigation required.

Mental Health and Well-being

Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, the Road Operator, and the Road Owner to co-develop a Safety and Wellness Plan that addresses project-related mental health and wellbeing concerns.

Substance Use

Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, the Road Operator, and the Road Owner to co-develop a Safety and Wellness Plan that addresses project-related substance use concerns.

7.2.1.21 Community and Public Health Characterization of Residual Effects

Access to Health Services

Residual effects for access to health services are expected to be **positive**.

Recreation

Residual effects for recreation are expected to be **positive**.

Mental Health and Well-being

In general, mental health and well-being effects during Operations and Maintenance phase are anticipated to be **positive** related to increased availability of mental health resources, treatment options, and decreased feelings of isolation. Increased access to care may lead to long-term improvements in mental health outcomes, reduce crisis incidents, reduce substance abuse and increase overall well-being. There is likely to be improvement in mental health resources, crisis response, and overall well-being, supported by evidence of current service gaps and high crisis call rates, and local as primary benefits will occur within Marten Falls First Nation. This is likely to permanently improve access, reducing isolation and improving mental health outcomes over time, and this will occur on an ongoing basis once the road is operational.

However, mental health effects will not be experienced uniformly across the entire community, and here are **possible negative** residual effects related to a lost feeling of connectivity to land due to social and cultural sensitivities related to sense of place and identity. While the effect may be experienced by some individuals, it is not expected to affect the entire community uniformly and thus magnitude is **medium**. The effect is **local** because it is confined to the areas where construction will be occurring and may be **long-term** and **continuous** because it may persist as long as the road corridor exists. However, it may be **reversible** given increased access to mental-health supports and community and land-based activities. Uncertainty is **high**, because while feelings of ecological grief are relatively well-documented, the extent and intensity of this effect may vary individually.

Substance Use

There are **positive** residual effects expected with respect to substance use due to increased access to addictions treatment services and therapies, alongside increased mental health services.

However, a **possible negative** residual effect, even with mitigation, is the increased access to drugs and alcohol, which could lead to continued increases in substance use in the community. Especially given the increased access to mental health and addictions supports that the road connectivity will bring, the is **reversible** and uncertainty is **high**. Furthermore, increase in substance abuse is not expected to affect the community uniformly and thus magnitude is **medium**. The effect is **local, continuous** and **long-term** because the opportunity to access drugs and alcohol easily may persist as long as the road corridor exists.

7.2.1.22 Access to Clean Water Description of Potential Effects

Access to Clean Water

The Community Access Road will have a **positive** effect on the access to clean water as supply chain reliability will be improved, reducing disruptions in the delivery of essential resources, including clean water. Improved road access will also facilitate more frequent servicing and maintenance of the community's water treatment plant. With easier transportation for technicians, equipment, and materials, there is greater potential for necessary upgrades and repairs to be completed efficiently. This increased capacity may help the facility reach and maintain operational standards, improving clean water access and reliability for residents.

Quality of Drinking Water

There is a potential for the quality of groundwater and / or surface water and ground water to be **negatively** affected by the Operations and Maintenance activities. A full assessment of the quality of groundwater and surface water can be found in the Problem Formulation for Human Health Risk Assessment (Attachment A). Potential effects on human health may be affected from chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Volatile substances in water may be inhaled during activities such as cooking and bathing. Operations and Maintenance activities that could affect quality of surface water include:

- Maintaining the Community access road, permanent access roads, bridges and culverts; and
- Operate the Community access road and permanent access roads.

Operations may negatively affect surface water, groundwater and sediment quality through runoff, suspended solids, contaminants, and physical disturbance. Dust and emissions during operations could also contribute. Contaminant levels from these activities have not been modeled.

Groundwater and surface water in the area is not suitable for potable usage without treatment. Elevated levels of some metals are present in soils, in the area. The residual effects from project activities can increase concentrations in groundwater. Predicted groundwater concentrations have not been modelled.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, face similar risks and potential **negative** effects to quality of surface water as those identified for Marten Falls First Nation and Aroland First Nation community members.

7.2.1.23 Access to Clean Water Mitigation

Access to Clean Water

Surface water and groundwater will not be used as a drinking water source without appropriate treatment.

Best practices for construction and operations will be used to minimize dust formation and to reduce the risks of accidents or malfunctions.

Quality of Drinking Water

To mitigate negative effects on drinking and recreational water:

- Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to contamination of ground and surface water.

7.2.1.24 Access to Clean Water Characterization of Residual Effects

Access to Clean Water

Residual effects for access to clean water are expected to be positive. The road will allow for easier access to maintain the community's water treatment system and will allow easier and cheaper access to bottled water.

Quality of Drinking Water

Adverse residual effects to groundwater and surface water quality are possible from the emission and deposition of airborne particulate matter to nearby waterbodies, sediment quality due to changes in land cover, changes in channel hydraulics at waterbody crossings, and wash off of accidental spills and leaks to nearby waterbodies. However, groundwater is not used as a source of drinking water for Marten Falls First Nation. Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, face similar risks and potential **negative** effects to quality of groundwater and surface water as those identified for Marten Falls First Nation and Aroland First Nation community members.

7.2.1.25 Traditional Foods Description of Potential Effects

The impact of the Community Access Road on traditional foods are explored further in the Aboriginal Treaty Rights and Interests assessment.

Access to Traditional Foods

The operation of the Community Access Road will have a **positive** effect on the accessibility of traditional foods. Key harvesting sites will be more accessible by the all-season road, making it easier for community members to participate in traditional activities such as hunting, trapping, fishing, and plant gathering. Elders and youth, who may currently face challenges reaching traditional lands due to distance or winter road conditions, could find it easier to participate, supporting intergenerational knowledge transfer. Aroland First Nation may benefit from greater access to traditional fishing and berry harvesting sites with the road providing more consistent access to key fishing areas along the Albany River, including Ogoki Falls and Amy Falls, supporting traditional fishing practices. Easier transportation of harvested fish and berries may encourage greater community participation in food-sharing networks. The Aroland Youth Blueberry Initiative could benefit from improved transportation, allowing more youth to participate in harvesting and selling blueberries. Increased access to markets may enhance economic opportunities for community-led food security programs.

The potential **positive** effects associated with the increased accessibility of traditional foods may be experienced by the following road-connected Indigenous communities with overlapping interests in the Local Study Area including Constance Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation.

However, the following remote Indigenous communities with overlapping interests in the Local Study Area are not expected to experience any change: Fort Albany First Nation, Attawapiskat First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug

First Nation, Kingfisher Lake First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, and Wunnumin Lake First Nation.

Availability of Traditional Foods

The operation of the Community Access Road will have a **negative** effect on the availability of traditional foods The road will open access to new areas for the general public, increasing access to hunters and fishermen to areas that were previously not easily accessible. Easier, year-round access may lead to a reduction in availability of traditional foods, due to over-harvesting and environmental strain. There may be increased pressure on fish populations on the Albany River, moose hunting, and on berry harvests, supporting the need for sustainable management practices. Members of Marten Falls First Nation have expressed concerns about increased access as higher numbers of outsiders hunting and fishing, which may reduce the availability of traditional hunting grounds (Three Roads Forum, personal communication, Feb 27, 2025).

Road access may increase hunting pressure on game and traditional foods, particularly caribou, which is valued by Aroland First Nation. While caribou hunting is prohibited for the general public in Ontario, Indigenous hunters from outside the region and poachers may contribute to increased harvest. Hunting of birds and other game by the general public could further reduce the availability of traditional foods. There is concern that additional pressure on caribou could lead to a reduction in availability or their disappearance from the region. Road access may also increase hunting pressure on moose, which is valued by Marten Falls First Nation and Aroland First Nation. Increased access to previously remote areas along the Community Access Road may facilitate an increase in access by the general public.

The potential **negative** effects associated with the availability of traditional foods may also be experienced by the regional communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations.

Reliance on Store-Bought Foods

The operation of the Community Access Road will have a **positive** effect on the reliance on store-bought foods. Road transportation is expected to reduce the cost of groceries by lowering shipping costs, making store-bought food more affordable for community members. With fewer transportation delays and a more reliable supply chain, perishable foods such as fruits, vegetables, dairy, and meats will arrive fresher and in better condition, reducing consumption of near-expired or lower-quality goods. Fewer delays due to flight schedules and weather disruptions could enhance food security and reduce food waste. Access to fresher, higher-quality foods could support improved nutrition and health outcomes, particularly if paired with nutrition education initiatives promoting health food choices.

Aroland First Nation is already road accessible, but there is potential with increased store-bought food shipments to Marten Falls First Nation, that Aroland First Nation may also see increased shipments and supply-chain reliability along the delivery route, which could increase reliance on store-bought foods.

Quality of Traditional Foods

A full assessment of the potential effects to the Quality of Traditional Foods is included in the Problem Formulation for Human Health Risk Assessment (Appendix A). Potential **negative** effects that could arise through contaminant releases during Operations and Maintenance and their potential to affect the environment influencing human health could result in changes to the Quality of Traditional Foods. The quality of traditional or country foods is closely linked to the health of the surrounding environment. For instance, fish thrive in clean, unpolluted waters, and their health directly affects the safety and nutritional value of the fish consumed. Similarly, berries and other wild fruits depend on clean air and soil to grow robustly, free from harmful contaminants. Wildlife, a common source of traditional meats, requires a healthy and suitable habitat to flourish; polluted environments can lead to diseases and reduced populations. Residual effects of road Operation and Maintenance in surface water, groundwater, air, soils, peatlands, and noise-induced stress can cause contamination to the local and regional environment. When country foods are harvested from contaminated environments, the contaminants can pose a direct risk to those who consume them.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation, face similar potential **negative** effects related to the quality and availability of traditional foods as those identified for Marten Falls First Nation and Aroland First Nation.

7.2.1.26 Traditional Foods Mitigation

Mitigation measures for the consumption of traditional foods:

- Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including discussions about pathways to contamination through traditional foods and

opportunities to prevent contamination e.g. signage related to washing dust off gathered foods.

- Further discussion during detailed design between the operator, the project owner to work with Ontario's Ministry of Natural Resources to encourage more frequent patrols of Conservation Officers along the Community Access Road to confirm hunters and fishermen are not exceeding their limits and that they have the proper tags and licenses.
- Owner / operator to work with communities and governments, as required, to support education and development of Indigenous Conservation Officer (Game Warden) program.
- Owner / operator to sponsor community-led harvesting initiatives in Marten Falls First Nation and Aroland First Nation.

Enhancement measures for the consumption of traditional foods:

- Owner / operator to consider sourcing traditional foods for the work camps, where it is possible, to support local harvesters and small businesses.

7.2.1.27 Traditional Foods Characterization of Residual Effects

Access to Traditional Foods

Positive residual effects on traditional foods include long-term improved access to harvesting areas, stronger support for traditional food programs and youth initiatives, improving local food security and Indigenous Knowledge transmission.

Availability of Traditional Foods

Possible negative residual effects on availability traditional foods include a **local** decrease in availability of traditional food resources, due to disruption from the road itself or the result of increased harvesting due to increased access. This effect may be of **moderate** magnitude, **local** and **long-term**. This effect may be **infrequent** and **reversible** and has a **high** uncertainty.

Reliance on Store-Bought Foods

Positive effect of increased access to store-bought foods as a result of reduced costs due to less-expensive road transport.

Quality of Traditional Foods

The quality of fish, vegetation, wildlife, birds, and ungulates as a traditional food is dependent on the quality of their habitat or namely the surface water, air and soil quality to which they are exposed. Effects from soil contamination leaching, emissions of criteria air

contaminants and deposition to surface water, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have the potential to **negatively** affect the quality of fish, vegetation, wildlife, birds, and ungulates as country foods and potentially affect human health.

These **negative** residual effects on the availability and quality of traditional foods may apply to the Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation.

7.2.1.28 Public Safety Description of Potential Effects

The operations the Community Access Road to Marten Falls First Nation is expected to influence public safety, including licenced driving, road safety, access to emergency services and experiences of violence and harassment.

Driver's Licence

During the operations phase of the Community Access Road, there is potential for increased employment opportunities with the operation and maintenance of the road. As during the construction phase, a valid driver's license will help enable Marten Falls First Nation and Aroland First Nation residents to access direct and indirect jobs related to the operation and maintenance of the road, such as equipment operation, truck driving, delivery services, and potentially community shuttles. The lack of a driver's license may limit access to training programs related to direct or indirect jobs related to the Operations and Maintenance of the road, as some training programs may require a valid driver's license as a prerequisite. This could limit the ability of residents to qualify for certain roles during the operation and maintenance phase, potentially effecting their opportunities to take full advantage of training and employment opportunities.

The absence of a driver's license, due to barriers to successfully completing a driver's licence assessment or difficulties accessing required documentation, could limit community member's ability to gain the necessary qualifications for employment opportunities, ultimately restricting the benefits of the project to the community. Unless barriers are addressed, there is likely to be the **negative** effect that demand for workers with Driver's licences exceeds those available, thereby limiting the community benefits of the Project.

Road Safety

During the operations phase, the Community Access Road is expected to have higher traffic volumes compared to the winter road and therefore likely a **negative** effect on road safety due to increased number of road-related injuries and accidents.

It is important to distinguish that, on a per-kilometre basis, the Community Access Road is expected to provide safer and more predictable driving conditions, reducing risks associated with weak ice, poor construction, and inadequate signage. The Community Access Road will be built to mandatory technical and safety standards, unlike the winter road, which follows voluntary guidelines. The new road will offer consistent safety standards year-round, unlike the winter road, where conditions fluctuate daily. While these improved road conditions may reduce the risk per vehicle, the overall number of accidents is likely to increase due to the higher number of vehicles/increased frequency of trips. As a result, the existing road near Aroland First Nation may also see a higher frequency of collisions and traffic-related incidents. Furthermore, the barriers to obtaining driver's licenses and vehicle registration may continue to be an issue for some Marten Falls First Nation and Aroland First Nation residents. Without these, drivers may be at higher risk for accidents and non-compliance with the *Highway Traffic Act*.

Additionally, the perceived reliability of the Community Access Road may encourage higher speeds and may lead to overconfidence in dangerous conditions (e.g., driving in poor weather without proper precautions) potentially increasing opportunities for accidents and more high-speed collisions. Easier access to drugs and alcohol may also contribute to increased driving incidents. Clear signage and speed limits, as well as consistent enforcement of traffic laws will help mitigate dangerous driving behaviours, reduce total number of accidents, and support road safety.

The **negative** effect on road safety due to increased number of road-related injuries and accidents may also be experienced outside the Loca Study Area, by regional municipal communities of Thunder Bay and Greenstone.

Access to Emergency Services

The Community Access Road is expected to have a **positive effect** on access to emergency services as it will allow for quicker emergency response by police, fire and medical services for road-related accidents and community emergencies in the Local Study Area. The road will also facilitate better co-ordination of regional resources and equipment for natural disasters such as wildfires and floods, while reducing reliance on air transport. Although Marten Falls First Nation does have local emergency responders, regional responders will be able to access the community more quickly to address issues.

Access to medical transportation by road will reduce reliance on air transport, which can be delayed due to weather conditions or higher-priority patients elsewhere in the region.

Faster access to out-of-community hospitals could lower mortality rates and prevent complications from delayed care. Residents will have the option to drive themselves to medical centres, improving access to both urgent and routine healthcare. Women may have more flexibility in accessing prenatal care and may be able to stay in the community longer before relocating to give birth. Provincial policies, known as forced birth evacuations, may still require expectant mothers to leave weeks in advance (National Council of Indigenous Midwives, 2020). The road may improve comfort and reduce travel costs, though, it will not change the requirement for expecting mothers to leave their communities to give birth.

Violence and Harassment

The Community Access Road may influence violence crime dynamics the Local Study Area by increasing accessibility to and from the communities. While improved policing response times could help address violent incidents more effectively, increased road access to Marten Falls First Nation may also contribute to new safety concerns.

There is potential for road access to lead to an influx of drugs, alcohol, and other external influences that could contribute to higher crime rates, including assaults and property-related offenses. Increased mobility may also heighten risks of human trafficking, particularly for Indigenous women and gender-diverse individuals, who are already disproportionately affected by trafficking. Indigenous people in remote northern communities face additional vulnerabilities due to unstable housing, lack of social supports, family violence, and early exposure to sex, making them more susceptible to exploitation, including through the “boyfriend method” of human trafficking. Hitchhiking is a common tactic used by traffickers to recruit victims, and while the remoteness of Marten Falls First Nation may reduce the likelihood of hitchhiking, traffickers often adapt to available transportation methods. This combined with the lack of cell service in the corridor surrounding the road, could pose additional risk for people travelling the road, especially women and girls. Through the Indigenous Knowledge Program, Aroland First Nation have noted that the Community Access Road will increase access to the area from outsiders, potentially jeopardizing the safety of their community members (Indigenous Knowledge Program see **Table 3-1**).

The increased movement of people and external influences may intensify existing social tensions, contributing to lateral violence, including bullying, exclusion, and intimidation. Greater exposure to outside perspectives and economic disparities could heighten divisions within the community, particularly if access to new opportunities is not equitably distributed. Increased interaction with non-community members may also lead to shifts in social dynamics, potentially reinforcing existing power imbalances or conflicts related to governance, employment, and resource access.

With year-round road access, emergency responders, peace officers and support workers can respond more quickly to violent crimes, domestic disputes, and other emergencies requiring additional personnel. Easier transportation for social services, crisis intervention

teams, and mental health supports may provide more timely assistance to victims of violence and harassment. Increased connectivity may allow for greater collaboration between Marten Falls First Nation, law enforcement, and social agencies to implement community-led safety programs.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects related to crime, violence, and safety. This is also possible for regional municipal communities including Thunder Bay and Greenstone. Potential effects include increase in violence and criminal activity, particularly human trafficking.

7.2.1.29 Public Safety Mitigation

Drivers Licence

To address the barriers to obtaining a driver's licence in Marten Falls First Nation, the following mitigation measures should continue from the construction phase into the operational and maintenance phase to support community goals of public safety:

- Owner / operator of the road to explore or continue to support opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, partnering with organizations such as:
  - Kiikenomaga Kikenjigewen Employment and Training Services, or other trusted organizations, to offer driving training programs to support community members in passing their assessments;
  - Third-party organizations that provide drivers licence testing for remote communities.

Road-related Injuries and Safety Standards

Mitigation measures for road-related injuries and safety standards include:

- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the road safety during operation of the Community Access Road, such as traffic challenges; emergency preparedness plans, safe driving campaigns etc.
- The road owner will need to engage with law enforcement to implement increased monitoring; prepared for the opening of the road, allowing for an increased presence to monitor traffic, enforce speed limits, and deter impaired or reckless driving; and

- The owner to consider alternative methods to using salt on roadways to prevent attracting wildlife, minimizing the potential for vehicle-wildlife collisions.
- The owner to consider the installation of road signage in both English and traditional languages indicated speed limits, sharp turns, wildlife crossings, and other hazards.

Enhancement measures for road-related injuries and safety standards includes:

- The project owner should consider launching public awareness campaigns to educate Marten Falls First Nation community members on safe driving practices, the benefits of the new road, and responsible road use.

One mitigation measure heard from the community- installing a gate to block outsiders from accessing the area – would be difficult to implement for practical and safety challenges. If the road ownership is public, a private gate cannot be installed on a public road preventing access. A logistical concern is the need for personnel stationed at the gate 24-hours a day to allow community members to freely travel in and out of the community. Even if members were given a key to use the gate, there are safety implications if someone forgot their key and did not have enough gas to turn around to get to Aroland First Nation or to cell service. For these practical and safety-related reasons, this mitigation is not being proposed at this time.

Marten Falls First Nation continues to engage in discussions with the Province regarding the ownership and future Operations and Maintenance of the Community Access Road. Access and ownership including gating security / ID system, will require further dialogue between the communities and the Province.

Access to Emergency Services

No mitigation measures are proposed.

Violence and Harassment

Mitigation measures related to violence and harassment include:

- The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation, and other interested Indigenous and municipal communities, to meet regularly to discuss community-proposed topics in relation to the operation and maintenance of the Community Access Road, could include the consideration of developing community-based violence prevention programs, including safe shelters and crisis support for victims; strengthening mental health, addictions, harm reduction programs, and family support services to address root causes.

7.2.1.30 Public Safety Characterization of Residual Effects

Driver's Licence

No adverse residual effects are anticipated.

Road Safety

Despite the implementation of mitigation measures, some **probable negative** residual effects on **local** road safety may persist at a **moderate** magnitude with **low** uncertainty. It is anticipated this residual effect will be **infrequent**, but **continuous** and **irreversible**. These negative residual effects on road safety due to increased number of road-related injuries and accidents may also be experienced outside the Loca Study Area, by regional municipal communities of Thunder Bay and Greenstone, even though the risk per vehicle may decrease due to overall improved all-reason road conditions.

Access to Emergency Services

No adverse residual effects are anticipated.

Violence and Harassment

Even with the mitigation measure, there is still the potential for a **possible negative** residual effects associated with an increase in human trafficking and criminal activity and family and social conflicts, which may continue as economic and social shifts occur **locally**. This residual effect is anticipated to be of **moderate** magnitude with **low** uncertainty while being **infrequent** and **continuous** but **reversible.**

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative residual effects related to crime, violence, and safety. These residual effects are also possible for regional municipal communities including Thunder Bay and Greenstone. Potential residual effects include increase in violence and criminal activity, particularly human trafficking.

7.2.1.31 Biophysical Determinants to Human Health

Full biophysical effects during operation and maintenance are discussed in the Problem Formulation for Human Health Risk Assessment (**Attachment A**). The biophysical factors potential influencing human health during operation and maintenance are similar to those during construction. In some instances, reduced activity during operation and maintenance may lessen the potential effects, while in other cases, certain activities may increase, amplifying the potential effects. A summary of contaminant release during operation and maintenance and their potential to affect the environment influencing human health has been included for each biophysical indicator.

For the purpose of this assessment, changes to the quality of the environment where traditional (country) foods are harvested, as described above, will be used to evaluate the potential residual effects associated with project-related activities that may affect the quality of these foods. Biophysical determinants to human health may be affected by chemical exposures through the consumption of contaminated country foods, depending on the type, magnitude, and frequency of exposure. Further information on potential effects is included in the Problem Formulation for Human Health Risk Assessment in **Attachment A**.

Air Quality

A summary of contaminant releases during Operations and Maintenance and their potential to affect the environment influencing human health include:

- Emissions of volatile substances (i.e., burning of fossil fuels in vehicles and equipment)
- Elevated concentrations of particulate matter resulting from fugitive road dust.

High magnitude **negative** effects were predicted for the air quality contaminants, as shown in **Table 7-18**.

Table 7-18: Air Quality Contaminant Modelling

Parameter	Duration	Location	Extent
Particulate Matter Less than 2.5 Micrometres	24-hour	North-south road segment	115 metres from roadway
Particulate Matter Less than 2.5 Micrometres	Annual	North-south road segment	134 metres from roadway
Particulate Matter Less than 10 Micrometres	24-hour	North-south road segment	1,986 metres from roadway
Particulate Matter Less than 10 Micrometres	24-hour	Community road segment	50 metres from roadway
Total Suspended Particulate	24-hour	North-south road segment	3,004 metres from roadway
Total Suspended Particulate	24-hour	Community Access Road segment	119 metres from roadway
Total Suspended Particulate	Annual	North-south road segment	899 metres from roadway
Dust deposition	30 day	North-south road segment	45 metres from roadway
Dust Deposition	annual	North-south road segment	681 metres from roadway
Dust Deposition	annual	Community Access Road segment	28 metres from roadway

Source: Air Quality and Greenhouse Gas Technical Support Document [Appendix S]: Volume 1 – Air Quality.

Noise and Vibration

The most common community reaction to noise are complaints and annoyance. Two long-term noise monitoring sites were set up in the community. **Negative** interactions between road usage and maintenance activities and noise and vibration are anticipated.

Soil Quality

Soil quality may be **negatively** affected by hazardous material leaks, spills, or deposition of air emissions and dust during operation.

A summary of contaminant releases during Operations and Maintenance and their potential to affect the environment influencing human health include:

- potential effects on human health may occur through incidental ingestion of soils on country foods, inhalation of dust, or dermal absorption (through the skin). Operations and maintenance activities that may affect soil quality include:
  - Leaks and spills during equipment, supplies and personnel mobilization; and
  - Deposition of dust from blasting and mobilization activities.

Sediment Quality

A summary of sediment during Operations and Maintenance and the potential **negative** effect on the environment influencing human health include:

- Potential effects on human health may be affected by chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Both surface water and groundwater have the potential to be used as potable water sources and could be used for cooking and bathing. Operation and maintenance phase activities which may affect sediment quality include:
  - Maintaining the Community access road, permanent access roads, bridges and culverts; and
  - Operate the Community access road and permanent access roads. Operation of the road is expected to result in increased dust generation in comparison to the construction phase.

Effects on sediment quality during Operations and Maintenance are predicted to be limited to the extent of dust fall, with no residual effects predicated, following mitigations.

Land Use

A summary of effects on Land Use by humans during Operations and Maintenance and their potential effect on the environment influencing human health include:

- Human health may be affected from chemical exposures through the inhalation of contaminated air, consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact with contaminated water, soils or sediment. Volatile substances in water

may be inhaled during activities such as bathing and cooking. Construction activities that may affect Human health include:

- Maintaining the Community access road, permanent access roads, bridges and culverts; and
- Operate the Community access road and permanent access roads. Operation of the road is expected to result in increased dust generation in comparison to the construction phase.

There is a possible **negative** effect to land use in Operations and Maintenance phase due to increased duration, extent, frequency and number of seasons spent engaged in land use within the Local Study Area.

Peatlands

A summary of contaminant releases during construction and their potential **positive** effect on the environment influencing human health include:

- Within the Local Study Area peatlands are existing sources of carbon dioxide and methane. Construction activities will remove portions of the wetland, reducing the amount of carbon dioxide and methane released by natural processes. Peatlands Technical Support Document [Appendix I].

Accidents and Malfunctions

A summary of contaminant releases during Operations and Maintenance and their potential **negative** effect on the environment influencing human health include:

- Accidents and malfunctions can affect the quality of soils, sediment, surface water and groundwater, and therefore Country Foods. Potential effects on human health may be through chemical exposures through the consumption of contaminated water or through dermal absorption (through the skin) during recreational activities, bathing, or other direct contact. Operation and maintenance phase activities which may affect soil, sediment, surface water and groundwater quality include:
  - Maintaining the Community access road, permanent access roads, bridges and culverts;
  - Operation of the road is expected to result in increased dust generation in comparison to the construction phase.

7.2.1.32 Biophysical Determinants to Human Health Mitigation

In general mitigations during Operations and Maintenance include but not limited to:

- Obtaining all required permits, authorizations, and approvals prior to conducting specific maintenance activities;
- Complying with all applicable regulations, legislation, permit requirements, and best practices regarding all work;
- Development and compliance with Project specific Management and monitoring plans. Examples include a Construction Best Management Practice Plan, Blasting and Communication Management Plan, Erosion and Sediment Control Plan, Fugitive Dust Management Plan;
- Timing maintenance activities to minimize environmental effects;
- Owner / operator to develop a community-based reporting system that enables community members and employees to report concerns, including those related to water quality, country foods quality and the biophysical environment;
- The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area—including Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation—to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.

Additional details on specific mitigations can be found in the individual technical support documents for each study discipline.

7.2.1.33 Biophysical Determinants to Human Health Characterizations of Residual Effects

Determining the magnitude and extent of residual effects of project operations activities on biophysical determinants to human health requires the modelling of predicted concentrations based on expected Project activities. For this project, air concentrations during the operation and maintenance phase were the only aspect modelled as part of the technical study.

Residual effects to surface water, groundwater, soils, and sediment, including deposition of dust onto surface water soils and sediment, were not fully evaluated in the individual technical studies.

With the information available, the following adverse residual effects are predicted:

Air Quality

High magnitude effects were predicted for the air quality contaminants in the **Construction Disturbance Area**; therefore, the air quality assessment determined **certain, negative** residual effects to human health, due to **irreversible**, **continuous**, **long-term** duration of air quality effects from operations activities with **high uncertainty**. These potential residual effects are considered **significant,** with moderate confidence.

Noise and Vibration

The **certain**, **negative** residual effects from the increased noise and vibrations due to road operations and ongoing quarry activities are predicted to be of **high** magnitude**, irreversible**, **infrequent, long-term,** with **high** uncertainty, and are limited to the **Construction Disturbance Area.** The noise and vibrations technical support team determined residual effects during operations are assessed as **not significant,** with **moderate** confidence.

Soil Quality

Existing soil analysis shows some concentrations exceeding applicable standards, and any residual effects could compound these exceedances. **Probable, negative** effects to soils (subsequent to effects to air quality), are predicated to be **moderate** in magnitude, **continuous, irreversible, long-term** and extend to the limits of dustfall within the **Construction Disturbance Area**. However, predicted soil concentrations have not been modeled and there is **high** uncertainty in predications. Residual effects are considered **significant**, with **moderate** confidence.

Land Use

Possible, negative effects on land use of **moderate** magnitude are predicted in the operations phase to be **continuous, irreversible, long term** and limited to the **Construction Disturbance Area** e.g. where human activities intersect with extend of the areas impacted with dust deposition and effects to soil, surface water and sediment in the local study area). This predicated effect has **high** uncertainty, but is considered **significant,** with a **low** level of confidence.

Accidents and Malfunctions

Residual effects are difficult to predict based on the expected, but unknown nature, of specific accidents and / or malfunction. **Probable, infrequent, negative** effects of **moderate** magnitude to accidents and malfunctions are predicated, with **high** uncertainty. With proposed mitigations for spill response and clean up, it is anticipated that effects will be **short-term, reversible** and limited in extent to the **Construction Disturbance Area**. Residual effects are predicted to be **significant,** with **low** confidence.

7.3 Decommissioning Phase

There are currently no plans to decommission the Project as there is no expected / known end date for its need. Therefore, future suspension, decommissioning, and eventual abandonment will not be considered in this report. Should a future need to decommission or abandon the road arise, a separate study will be required to assess those effects due to the change in environment over time around the roadway.

7.4 Summary of the Assessment of Effects

Table 7-19: Summary of Effects and Residual Effects Characterization

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Sustainable Population Growth	■ Negative effect to community cohesion due to rapid changes in the on-reserve population in age and gender distribution as well as overall community population	■ Construction	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to discuss community concerns and proposed topics, including those in relation to changes in population or social demographics. ■ Owner / operator to implement Diversity, Equity, and Inclusion hiring policies to prioritize women and reduce gender disparities. ■ Owner / operator to house workers in autonomous camps to limit demographic shifts and disruptions in community.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Sustainable Population Growth	■ **Positive** effect of shift towards a balanced age distribution due to reduced out-migration among younger families, improved Elder retention; easier travel for employment, education, and services.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Sustainable Population Growth	■ **Positive** effect of increasing community population due to attraction of off-reserve members and external workers.	■ Operation and Maintenance	■ Yes ■ Regional municipal communities of Thunder Bay and Greenstone.	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Labour Market Dynamics	■ **Negative** effect of a shortfall in local labour availability compared to demand for employment.	■ Construction	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to discuss construction-related issues and unemployment by identifying and removing employment barriers, offering job readiness programs, and providing counseling and addiction support services to support community members. ■ Owner / operator to implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs. ■ Owner / operator to provide information on available opportunities to help community members obtain necessary qualifications. ■ Owner / operator to create a Local Training Plan to complete a local skills assessment and utilize local labour force. ■ Owner / operator to offer ongoing job readiness programs and coordinate training timing to support workforce transition and career growth. ■ Owner / operator to implement Diversity, Equity, and Inclusion hiring policy, enhanced through training programs, job fairs, and outreach, to actively prioritize women in construction-related employment opportunities and reduce gender disparities in the work force. ■ Owner / operator to gradually integrate new workers into the workforce through shorter days and shift rotations. ■ All construction workers to be housed in autonomous work camps to limit disruptions to communities.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Labour Market Dynamics	■ **Positive** effect of the creation of direct, indirect, and induced jobs ■ **Positive** effect of increased labour income and Gross Domestic Product contributions.	■ Construction	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Labour Market Dynamics	■ **Positive** effect of the creation of direct, indirect, and induced jobs ■ **Positive** effect of increased labour income and Gross Domestic Product contributions.	■ Operation and Maintenance	■	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Labour Market Dynamics	■ **Positive** effect on educational attainment.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** new business opportunities for Indigenous businesses related to construction contracts and services.	■ Construction	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Negative** disruptions to local businesses during construction.	■ Construction	■ No	■ Owner / operator to implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs. ■ Owner / operator to create a Local Content Plan to utilize a certain dollar value or share towards local businesses and contractors. ■ Owner / operator to consult with local businesses that would be potentially affected by work zone effects and determine the optimal times and conditions for the construction to take place, such as during off-peak times.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect of ongoing opportunities for Indigenous businesses in road operation and maintenance and transportation services.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect of significant tax revenue generation.	■ Construction	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect of total tax revenue effect of $2.7 million in Ontario and $3.0 million in Canada.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect on Gross Domestic Product, labour income, gross operating surplus, and tax revenues.	■ Construction	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ Total economic activity of $22.4 million in Ontario and $24.8 million in Canada. ■ **Positive** effect on Gross Domestic Product, labour income, gross operating surplus, and tax revenues.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect on the productivity of individuals and businesses in the region.	■ Construction ■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect on the value of land that is surrounding the transportation infrastructure.	■ Construction ■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Economy	■ **Positive** effect on diversifying the economy.	■ Construction ■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community Access to Infrastructure and Services	■ **Negative** effect due to increased traffic congestion to and from the community.	■ Construction	■ No	■ Owner / operator will develop an Equipment Mobilization Plan with both Marten Falls First Nation and Aroland First Nation for the movement of equipment, personnel, supplies, and resources. Where possible, construction traffic should be separated from community traffic to improve safety and minimize disruptions. The mobilization plan should also include a clear communications strategy to keep the community informed of the mobilization schedule, ensuring residents are aware of periods of increased heavy equipment traffic on the winter road. ■ Owner / operator, when possible, will transport employees on a charter flight.	■ Context: Possible increase in access to community via winter road/ air ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: Low	■ Not Significant	■ High

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Community Access to Infrastructure and Services	■ **Negative** effects due to increased pressure on local infrastructure and essential services.	■ Construction	■ No	■ The owner / operator will establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics avoiding pressure on local, essential services and infrastructure. ■ All construction workers (including on- and off-reserve members) will be housed in autonomous work camps equipped with independent water, wastewater, and power systems. These systems need to be properly maintained to reduce reliance on community infrastructure and to prevent contamination risks. ■ The owner / operator will develop waste management policies to minimize waste production and support responsible disposal. Collaboration with the community will be prioritized to develop effective construction waste management and disposal strategies, incorporating local input. ■ The owner / operator will establish a secure fuel storage facility and provide a reliable fuel supply throughout the construction season. Fuel deliveries will be planned in advance and transported via the winter road, reducing reliance on costly air transport and preserving community fuel resources. All fuel storage sites will comply with safety and environmental regulations to prevent spills and contamination.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community Access to Infrastructure and Services	■ **Positive** effects due to increasing year-round access to and from the community.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community Access to Infrastructure and Services	■ **Indirect positive** effect due to increased access to goods and services (including reduced costs).	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community Access to Infrastructure and Services	■ **Positive** effects due to increased delivery of essential services in community.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community Access to Infrastructure and Services	■ **Indirect positive** effect due to reduced costs and logistical challenges to building and maintaining essential infrastructure.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Housing	■ **Negative** effect on housing suitability due to increased demand for housing, potential overcrowding.	■ Construction	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics associated with housing adequacy, converting construction camps to permanent housing, etc. ■ House workers in autonomous camps to limit demographic shifts and reduce pressure on community housing.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Housing	■ **Negative** effect on housing suitability due to increased demand for housing, potential overcrowding.	■ Operation and Maintenance	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the Community Access Road, including topics associated with housing, such as monitoring of housing demand and adjustments to meet changes in housing needs.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Housing	■ **Positive** effect on housing adequacy due to reduced transportation costs and logistical challenges to building new homes.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Housing	■ **Indirect positive** effect on health due to improved housing adequacy e.g. reduced mold / overcrowding etc.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Housing	■ **Positive** effect of improved accessibility of building materials.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Cultural Preservation and Change	■ **Negative** effect due to disruption to traditional economy.	■ Construction	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including where to appropriately locate safety pull out areas to promote access, and other traditional harvesting issues. ■ Prior to construction, owner / operator will develop Access Management Plans with Marten Falls First Nation and Aroland First Nation in relation to hunting, trapping and gathering activities. All activities must conform to licensing requirements and adhere to the rules and regulations under the Ministry of Natural Resources. ■ Provide flexible work schedules during key hunting, trapping, and gathering seasons to support continued access to traditional food sources. ■ Owner / operator to sponsor community-led harvesting initiatives.	■ Context: Possible shift from traditional economy activities ■ Direction: Negative ■ Magnitude: Low ■ Geographic Extent: Construction Disturbance Area ■ Duration: Medium-term ■ Frequency: Frequent ■ Reversibility: Irreversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not Significant	■ Moderate
Cultural Preservation and Change	■ **Negative** effect due to traditional language decline.	■ Construction	■ No	■ Owner / operator to provide Training and Work Materials in Indigenous Languages. Offer onboarding materials, safety protocols, and job-related paperwork in Indigenous languages alongside English to provide language accessibility for all workers. ■ Owner / operator to implement multi-lingual worksite signage. Reduce language barriers at the worksite by using multi-lingual signage at work sites, including directional signs, safety notices, workplace policies, and equipment labels, to promote the use of Indigenous languages in the workplace. ■ Owner / operator to provide Cultural Sensitivity and Language Awareness Training. Educate non-Indigenous supervisors and workers on the importance of Indigenous languages in cultural identity, knowledge transmission, and community well-being. Encourage an inclusive workplace where traditional language use is supported and valued. ■ Owner / operator to implement a Zero-Tolerance Policy for Language Discrimination. Establish clear workplace policies ensuring that Indigenous workers are not discouraged from speaking their traditional language. Supervisors and project managers should actively reinforce language inclusivity and address any instances of discrimination or bias. ■ Owner / operator to introduce a cultural safety mechanism. Introduce a workplace mechanism, such as a cultural safety flag, allowing employees to pause work or request support if they feel uncomfortable due to language-related issues. Propose a Cultural Safety and Stop Work Protocol.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Cultural Preservation and Change	■ **Positive** effects on traditional economy; enhanced participation in cultural activities; increase in traditional language due to increased access and connection for community members.	■ Operation and Maintenance	■ Yes	■ No mitigation measures proposed	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community and Public Health	■ **Positive** effect of improved mental well-being through employment in construction, increased financial stability, and greater self-sufficiency, which can reduce financial stress, and improve sense of pride and confidence.	■ Construction	■ Yes	■ No mitigation measures proposed	■ No adverse residual effect anticipated.	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Community and Public Health	■ **Negative** effect on mental health and well-being due to long hours, tight deadlines, and physically demanding tasks, leading to stress and fatigue; potential for social disconnection and emotional strain from extended periods away from families; employment disparities; and sensory disturbances and restricted land access etc.	■ Construction	■ Yes	■ Owner / operator to collaborate with Marten Falls First Nation and Aroland First Nation to provide mental health counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being, support skill development and workplace adjustment. ■ Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles. ■ Owner / operator to provide cultural safety training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences, to promote a safe and inclusive work environment. ■ Owner / operator to hold training session on violence and harassment prevention. ■ Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included.	■ Context: Possible negative mental health effects. ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not Significant	■ Low
Community and Public Health	■ **Negative** effects from increased risk of substance use.	■ Construction	■ No	■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, which could include topics in relation offering mental health supports, counselling and addiction support services. ■ All construction workers (including on- and off-reserve members) will be housed in autonomous work camps to limit demographic shifts and limit disruptions to social structures and community dynamics. ■ The owner / operator to develop and implement monitoring and enforcement, including regular security checks at work camps and entry points (e.g., airport) for alcohol and substances to prevent entry into the community. ■ Owner / operator to collaborate with the community (Marten Falls First Nation and Aroland First Nation) to provide mental health counseling, addictions counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being. ■ Owner / operator to enforce a zero-tolerance policy for alcohol and substance use at work camps. ■ Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles. ■ Owner / operator to provide cultural safety training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences, to promote a safe and inclusive work environment. ■ Owner / operator to hold training session on violence and harassment prevention. ■ Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included. ■ Owner / operator to provide cultural and recreational activities (e.g., cards, board games, sports), when possible, to promote well-being and reduce boredom or stress-related substance use.	■ No adverse residual effect anticipated	■ N/A	■ N/A
Community and Public Health	■ **Positive** effect on health due to improved access to health services	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Community and Public Health	■ **Positive** effect recreation due to improved access with other communities and recreational / event areas.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community and Public Health	■ **Positive** effect on mental health and well-being due to improved access to mental health services and reduced isolation.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Community and Public Health	■ **Negative** effect on mental health and well-being due to loss of connectivity to the land, change in sense of place and identity due to presence of the road.	■ Operation and Maintenance	■ Yes	■ Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to co-develop a Safety and Wellness Plan that addresses project-related mental health and wellbeing concerns.	■ Context: Decrease in mental well-being ■ Direction: Negative ■ Magnitude: Medium ■ Geographic Extent: Local ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Significant	■ Low
Community and Public Health	■ **Negative** effect due to potential increase in substance use due to easier access to drugs and alcohol.	■ Operation and Maintenance	■ No	■ Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, the Road Operator, and the Road Owner to co-develop a Safety and Wellness Plan that addresses project-related substance use concerns.	■ Context: Increase in substance abuse. ■ Direction: Negative ■ Magnitude: Medium ■ Geographic Extent: Local ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Significant	■ Low
Community and Public Health	■ **Positive** effect due to improved access to addictions treatment options.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Access to Clean Water	■ **Negative** effect due to increased demand for drinking water.	■ Construction	■ No	■ Construction workers will be housed in autonomous work camps, reducing pressure on community water resources. ■ Owner / operator to implement temporary water storage tanks or other measures to accommodate peak water demands during construction.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Access to Clean Water	■ **Negative** effect on quality of surface and / ground water as a result of construction and accidents, spills.	■ Construction	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area—including Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kashechewan First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Eabametoong First Nation, Mishkeegogamang First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation—to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to contamination of ground and surface water. ■ Surface water and groundwater is not to be used as potable water. Water treatment will mitigate any potential negative effects.	■ Context: Possible negative effect on quality of drinking water ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local Study Area ■ Duration: short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not Significant	■ Moderate
Access to Clean Water	■ **Positive** effects on access to clean water due to lower transportation costs for shipping drinking water; improved supply chain reliability, and enhanced maintenance of the water treatment plant.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed	■ No adverse residual effect anticipated.	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Access to Clean Water	■ **Negative** effect on quality of drinking water as a result of road Operations and Maintenance, accidents, spills etc.	■ Operations and Maintenance	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to contamination of ground and surface water. ■ Surface water and groundwater is not to be used as potable water. Water treatment will mitigate any potential negative effects.	■ Context: Possible negative effect on quality of drinking water ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local Study Area ■ Duration: Long-Term ■ Frequency: Continuous ■ Reversibility: Irreversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not significant	■ Moderate
Traditional Foods	■ **Positive** effect on access to traditional foods as increased income from construction jobs will allow community members to buy supplies for hunting and trapping.	■ Construction	■ No	■ No mitigations proposed	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Traditional Foods	■ **Negative** effect of reduction in availability of traditional foods due to construction disturbances to traditional food sources.	■ Construction	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including identifying key harvesting areas to implement measures that can minimize construction disturbances to traditional food resources during harvesting seasons, adjusting construction activities to avoid peak harvesting periods etc. ■ Owner / operator should provide flexibility in work schedules during key hunting, trapping, and gathering seasons to support continued access to traditional food sources.	■ Context: Possible disturbance to traditional food sources from construction-related activities ■ Direction: Negative ■ Magnitude: Low ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not significant	■ Low
Traditional Foods	■ **Negative** effect on the quality of traditional foods due to potential contamination.	■ Construction	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including identifying key harvesting areas to implement measures that can minimize construction disturbances to traditional food resources during harvesting seasons, adjusting construction activities to avoid peak harvesting periods etc.	■ Context: Possible disturbance to traditional food sources from construction-related activities ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not Significant	■ Low
Traditional Foods	■ **Positive** effect of increased access to traditional harvesting sites	■ Operation and Maintenance	■ Yes	■ No mitigation required	■ No adverse residual effect anticipated	■ N/A	■ N/A
Traditional Foods	■ **Negative** effect of reduction in availability of traditional foods due to overharvesting and environmental strain from the road	■ Operation and Maintenance	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including discussions about pathways to contamination through traditional foods and opportunities to prevent contamination e.g. signage related to washing dust off gathered foods etc. ■ Owner to work with Ontario's Ministry of Natural Resources to encourage more frequent patrols of Conservation Officers along the Community Access Road to confirm hunters and fishermen are not exceeding their limits and that they have the proper tags and licenses. ■ Owner / operator to work with communities and governments, as required, to support education and development of Indigenous Conservation Officer (Game Warden) program. ■ Owner / operator to sponsor community-led harvesting initiatives in Marten Falls First Nation and Aroland First Nation.	■ Context: Possible disturbance to traditional food sources from the road or overharvesting ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Long-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not significant	■ Low

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Traditional Foods	■ **Positive** effect of reduced cost of groceries and improved access to fresher, higher-quality foods.	■ Operation and Maintenance	■ No	■ No mitigation measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Traditional Foods	■ Potential **negative** effect on quality of traditional foods due to potential contamination)	■ Operation and Maintenance	■ Yes	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including discussions about pathways to contamination through traditional foods and opportunities to prevent contamination e.g. signage related to washing dust off gathered foods etc.	■ Context: Possible disturbance to quality of traditional food sources ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Irreversible ■ Likelihood: Possible ■ Uncertainty: High	■ Significant	■ Low
Public Safety	■ **Negative** effect that demand for workers with Driver's licences exceeds those available.	■ Construction	■ No	■ Explore opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, including partnerships with third-party remote licence providers.	■ No adverse residual effect anticipated	■ N/A	■ N/A
Public Safety	■ **Negative** effect of increased traffic and road-related injuries	■ Construction	■ No	■ Develop Equipment Mobilization Plans with local First Nations for the movement of equipment, personnel, and supplies. ■ Implement driver safety training tailored to winter road conditions and remote community travel.	■ Context: Increase in construction-related traffic ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Probable ■ Uncertainty: Low	■ Not Significant	■ High
Public Safety	■ **Negative** effect of increased strain on emergency services. ■ **Indirect negative** effect of increased demands on community health service workers, who provide administrative, operational, maintenance, and prevention-focused care	■ Construction	■ No	■ Develop, with the Ministry of Health, on-site safety and emergency preparedness programs to include fire suppression systems, medical care, security personnel, monitor safety compliance, emergency response and clear communication protocols between construction teams and emergency responders. ■ Comply with all relevant health and safety requirements, including but not limited to, preparation of a Health and Safety Policy.	■ Context: Increased strain on emergency services ■ Direction: Negative ■ Magnitude: Low ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: Low	■ Not Significant	■ High
Public Safety	■ **Negative** effect of increased risk of violence and harassment. ■ **Indirect, negative** effect of increasing lateral violence, conflicts among community members, verbal or physical altercations, rumours, or social divisions, ultimately disrupting community cohesion and furthering social tensions	■ Construction	■ Yes ■ Indigenous communities with overlapping interests in the LSA ■ Regional municipal communities of Thunder Bay and Greenstone	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including: ■ financial literacy programs for workers and families to help manage income fluctuations and reduce financial stress, addressing economic disparities that could contribute to resentment and lateral violence. ■ measures to strengthen cultural programming and land-based activities to reinforce community cohesion and well-being. Strengthening cultural identity and offering community-driven programs can provide positive coping mechanisms for workers and families experiencing stress due to shift work and can offer a protective factor against violence and social disruption by strengthening support networks and reducing isolation. ■ supports for unemployed community members by identifying employment barriers and offering job readiness programs to support community members facing unemployment. ■ House workers in autonomous work camps to limit unsupervised interactions with the community and prioritize gender-divided living quarters in the work camps.	■ Context: Occasional workplace conflicts, ongoing family stress from shift work, and potential lateral violence from economic disparities ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: Low	■ Not Significant	■ Moderate

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
				■ Enforce zero-tolerance policies for harassment and violence. ■ Provide cultural safety and language awareness training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences to understand Indigenous cultural norms and appropriate community interactions to reduce instances of harassment or violence. ■ Comply with the Human Rights Code (Ontario, 2024b) to prevent workplace discrimination and uphold employee rights to reduce work force tensions. ■ Mental health counseling, mentorship, and peer support at work camps to reduce stress-related aggression. On-site Elders or cultural liaisons will offer emotional support and traditional guidance to workers. ■ Implement a gradual work force integration for community members, starting with shorter workdays and shift rotations. ■ Implement Diversity, Equity, and Inclusion hiring policy.			
Public Safety	■ **Negative** effect that demand for workers with Driver's licences exceeds those available.	■ Operation and Maintenance	■ No	■ Explore opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, including partnerships with third-party remote licence providers.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Public Safety	■ **Negative** effect of increased in road-related injuries due to increase in road traffic.	■ Operation and Maintenance	■ Yes ■ Indigenous communities with overlapping interests in the LSA ■ Regional municipal communities of Thunder Bay and Greenstone	■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the road safety during operation of the Community Access Road, such as traffic challenges; emergency preparedness plans, safe driving campaigns etc. ■ The owner to engage with law enforcement to implement increased monitoring; prepared for the opening of the road, allowing for an increased presence to monitor traffic, enforce speed limits, and deter impaired or reckless driving. ■ The owner to consider alternative methods to using salt on roadways to prevent attracting wildlife, minimizing the potential for vehicle-wildlife collisions. ■ The owner to consider the installation of road signage in both English and traditional languages indicated speed limits, sharp turns, wildlife crossings, and other hazards.	■ Context: Increased traffic may lead to increased number of accidents Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Continuous ■ Frequency: Infrequent ■ Reversibility: Irreversible ■ Likelihood: Probable ■ Uncertainty: Low	■ Not Significant	■ High
Public Safety	■ **Positive** effect of improved access to emergency services.	■ Operation and Maintenance	■ No	■ No mitigation or enhancement measures proposed.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Public Safety	■ **Negative** effect of increase in violence and harassment.	■ Operation and Maintenance	■ Yes ■ Indigenous communities with overlapping interests in the LSA ■ Regional municipal communities of Thunder Bay and Greenstone	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including, could include the consideration of developing community-based violence prevention programs, including safe shelters and crisis support for victims; strengthening mental health, addictions, harm reduction programs, and family support services to address root causes.	■ Context: Potential for increase in violence, harassment, criminal activity, and / or human trafficking. ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Local ■ Duration: Continuous ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Possible ■ Uncertainty: Low	■ Significant	■ Moderate
Biophysical Determinants of Human Health - Air	■ **Negative** effects due to emissions to air and generation of dust. Leaks and spills of volatile substances can contaminate air.	■ Construction	■ Yes	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ Context: Effects to air can be carried by wind ■ Direction: Negative ■ Magnitude: High Magnitude ■ Geographic Extent: Local Study Area ■ Duration: Short-term ■ Frequency: Continuous ■ Reversibility: reversible ■ Likelihood: Possible ■ Uncertainty: High	■ Not Significant	■ Low

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Biophysical Determinants of Human Health - Air	■ **Negative** effects due to emissions to air and generation of dust. Leaks and spills of volatile substances can contaminate air.	■ Operation and Maintenance	■ Yes	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ Context: Effects to air can be carried by wind ■ Direction: Negative ■ Magnitude: High ■ Geographic Extent Construction Disturbance Area ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Irreversible ■ Likelihood: Certain ■ Uncertainty: High	■ Significant	■ Moderate
Biophysical Determinants of Human Health - Noise	■ **Negative** effects of unacceptable noise and vibration levels.	■ Construction	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ Context: Noise from blasting, quarrying, road construction, traffic and maintenance activities. ■ Direction: Negative ■ Magnitude: High ■ Geographic Extent: Construction Disturbance Area ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: Reversible ■ Likelihood: Certain ■ Uncertainty: Low.	■ Not significant	■ Moderate
Biophysical Determinants of Human Health - Noise	■ **Negative** effects of unacceptable noise and vibration levels.	■ Operation and Maintenance	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ Context: Noise from road use and pit and quarry operations for maintenance ■ Direction: Negative ■ Magnitude: High ■ Geographic Extent: Construction Disturbance Area ■ Duration: Long-term ■ Frequency: Infrequent ■ Reversibility: Irreversible ■ Likelihood: Certain ■ Uncertainty: High (Noise from Pit and Quarry operations exceed applicable noise limits. Predicted traffic noise levels are within acceptable levels).	■ Not significant	■ Moderate
Biophysical Determinants of Human Health - Sediment	■ **Negative** effects due to deposition of dust or runoff into water bodies could cause contamination of sediment; leaks and spills can contaminate sediment.	■ Construction ■ Operation and Maintenance	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ No adverse residual effect anticipated.	■ N/A	■ N/A
Biophysical Determinants of Human Health - Soils	■ **Negative** effects due to deposition of dust could cause contamination of soils. Elevated background concentrations of metals in aggregate source areas could result in elevated concentrations in metals in dust generated, leaks and spills can contaminate soils.	■ Construction	■ No	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use	■ No adverse residual effect anticipated (Air deposition rates will impact soil quality. Chemical concentrations in aggregate source for road (source of dust) not available from technical support document for soils).	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Biophysical Determinants of Human Health - Soils	■ **Negative** effects due to deposition of dust could cause contamination of soils. Elevated background concentrations of metals in aggregate source areas could result in elevated concentrations in metals in dust generated, leaks and spills can contaminate soils.	■ Operation and Maintenance	■ Yes	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use	■ Context: Effects to soils can occur subsequent to effects to air. ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extent: Construction Disturbance Area ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Irreversible ■ Likelihood: Probable ■ Uncertainty: High (Air deposition rates will impact soil quality. Chemical concentrations in aggregate source for road (source of dust) not available from technical support document for soils).	■ Significant	■ Moderate
Biophysical Determinants of Human Health – Land use	■ **Possible negative** effect due to increase in durations, extent, frequency and seasons spent engaged in land-use within the Local Study Area.	■ Construction	■ Yes	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ No adverse residual effect	■ N/A	■ N/A
Biophysical Determinants of Human Health – Land use	■ **Possible negative** effect of increase in durations, extent, frequency and seasons spent engaged in land-use within the Local Study Area.	■ Operation and Maintenance	■ Yes	■ The owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction or operation and maintenance of the Community Access Road, including concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use.	■ Context: Land use may be in areas where soil, surface water, air, sediment and groundwater effects occur. ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic Extend: Construction Disturbance Area ■ Duration: Long-term ■ Frequency: Continuous ■ Reversibility: Irreversible ■ Likelihood: Possible ■ Uncertainty: High (Duration and extent of overlap of project effects and land use is unknown).	■ Significant	■ Low
Biophysical Determinants of Human Health – Peatlands	■ Possible **positive** effect due to reduction in carbon dioxide and methane emissions from peatlands as road is developed.	■ Construction ■ Operations and Maintenance	■ Yes	■ None	■ No adverse effects	■ N/A	■ N/A
Biophysical Determinants of Human Health – Accidents and Malfunctions	■ Possible **negative** effect due to spill impacting soils, surface water, sediment and groundwater causing contamination	■ Construction	■ Yes	■ Marten Falls First Nation or the owner / operator(s), will prepare and implement a Spill Prevention and Emergency Response Plan that describes specific measures that would be implemented if a spill occurred ■ Spill and Leak protocols and response should include involvement and input form the biophysical human health team. This team should review all spill responses for consideration/ development of sampling plans and health impact assessment of potential for short- and long-term risk following spill events.	■ No adverse effect	■ N/A	■ N/A

Valued Component	Description of Effect (predicated in LSA by MFFN and/or Aroland)	Project Phase	Effect for RSA Communities (Yes/No)	Mitigation Measures	Summary of Negative Residual Effects Characterization	Significance (Not Significant / Significant)	Confidence (Low/Moderate/ High)
Biophysical Determinants of Human Health – Accidents and Malfunctions	■ Possible negative effect due to spill impacting soils, surface water, sediment and groundwater causing contamination	■ Operation and Maintenance	■ Yes	■ Marten Falls First Nation or the owner / operator(s), will prepare and implement a Spill Prevention and Emergency Response Plan that describes specific measures that would be implemented if a spill occurred ■ Spill and Leak protocols and response should include involvement and input form the biophysical human health team. This team should review all spill responses for consideration/ development of sampling plans and health impact assessment of potential for short- and long-term risk following spill events.	■ Context: Impacts form accidents, spills or malfunctions can affect quality of soil, surface water, groundwater, sediment. ■ Direction: Negative ■ Magnitude: Moderate ■ Geographic extent: Construction Disturbance Area ■ Duration: Short-term ■ Frequency: Infrequent ■ Reversibility: reversible ■ Likelihood: Probable ■ Uncertainty: High (Duration and extent of affects from spills or malfunctions is unknown).	■ Significant	■ Low

Table 7-20: List of Proposed Topics for Working Groups

The owner and/or operator will establish working groups with Marten Falls First Nation and Aroland First Nation to discuss community-proposed topics in relation to the construction and/or operation and maintenance of the Community Access Road. Please note, for some potential effects that may be experienced by Regional Study Area Indigenous communities, the working groups may include other interested Indigenous communities.

Proposed topics for the working groups, in relation to the identified Valued Component and potential effect, include the following:

Valued Component	Indicator	Project Phase	Proposed Topics for Working Groups
Sustainable Population Growth	■ Age Distribution within the community and change in on-reserve versus off-reserve status	■ Construction	■ Changes in local community population and demographic composition
Labour Market Dynamics	■ n/a	■ Construction	■ Removing employment barriers ■ Offering job readiness programs; and ■ Providing counseling and addiction support services to support community members
Community Access to Infrastructure and Services	■ Essential Infrastructure and Services	■ Construction	■ Avoiding pressure on local, essential services and infrastructure
Housing Adequacy and Suitability	■ Change in the Accessibility of Building Homes and Shipping Materials	■ Construction / Operations and Maintenance	■ Housing adequacy and demand ■ Converting construction camps to permanent housing is to address housing shortages in the community
Cultural Preservation and Change	■ Traditional Economy	■ Construction	■ Safety pull-out areas to promote safe access to harvesting locations along the road ■ Other issues related to traditional food harvesting ■ Note: working groups should include other interested indigenous communities who may be or intend to be engaged in traditional harvesting or cultural practices within the Local Study Area.
Community and Public Health	■ Mental Health and Well-being	■ Construction	■ Offering mental health supports, counselling and addiction support services
Community and Public Health	■ Mental Health and Well-being	■ Operation and Maintenance	■ A Safety and Wellness Plan that addresses project-related mental health and wellbeing concerns
Access to Clean Water	■ Quality of Drinking Water	■ Construction / ■ Operation and Maintenance	■ Concerns related to contamination of ground and surface water ■ Note: Working Groups should include other interested Indigenous communities who may be downstream from the LSA and want to be engaged on concerns related to ground and surface water contamination.
Traditional Foods	■ Availability of Traditional Foods	■ Construction	■ Identifying key harvesting areas to implement measures that can minimize construction disturbances to traditional food resources during harvesting seasons ■ Adjusting construction activities to avoid peak harvesting periods etc. ■ Note: working groups should include other interested indigenous communities who may be or intend to be engaged in traditional harvesting within the Local Study Area.
Traditional Foods	■ Quality of Traditional Foods	■ Operation and Maintenance	■ Pathways to contamination through traditional foods and opportunities to prevent contamination e.g. Signage related to washing dust off gathered foods etc. ■ Note: working groups should include other interested indigenous communities who may be or intend to be engaged in traditional harvesting within the Local Study Area.
Public Safety	■ Violence and Harassment	■ Construction	■ Financial literacy programs for workers and families to help manage income fluctuations and reduce financial stress, addressing economic disparities that could contribute to resentment and lateral violence ■ Measures to strengthen cultural programming and land-based activities to reinforce community cohesion and well-being, strengthening support networks and reducing feelings of isolation; and ■ Supports for unemployed community members by identifying employment barriers and offering job readiness programs to support community members facing unemployment.
Public Safety	■ Road-related Injuries	■ Operations	■ Advocating for funding to build a local fire station, recruit paramedics, and expand medical transport services ■ Develop emergency preparedness plans, first responder training programs, and ■ Informing in independent medical providers (e.g., dentists and physiotherapists) for potential for increased demand
Public Safety	■ Violence and Harassment	■ Operations	■ Consideration of developing community-based violence prevention programs, including safe shelters and crisis support for victims ■ Strengthening mental health, addictions, harm reduction programs, and family support services to address root causes. ■ Note: working groups should include other interested indigenous communities who may be concerned with violence and harassment in the Local Study Area.
Biophysical Determinants of Human Health	■ Air ■ Noise and Vibration ■ Sediment ■ Soils ■ Land use ■ Accidents and Malfunctions	■ Construction ■ Operations and Maintenance	■ Concerns related to the biophysical effects on human health during construction, such as air, noise and vibration, sediment, soil, ground and surface water, and land-use. ■ Note: working groups should include other interested Indigenous communities who may be concerned with potential biophysical effects on human health.

8. Cumulative Effects of the Project

The *Canadian Environmental Assessment Act, 2012* (Government of Canada, 2019) requires that each environmental assessment of a project take into account any cumulative environmental effects that are likely to result from the project in combination with the environmental effects of other physical activities that have been or will be carried out.

This section presents the assessment of potential cumulative effects completed as part of the Project. The effects of past and present activities on the Study Area and valued components identified for the Project were assessed and results are described in the following sections.

The cumulative effects assessment builds on the results of the effects assessment described in **Section 7** and will consider the incremental changes that are predicted to have a likely residual adverse effect on a valued component.

8.1 Cumulative Effects Methodology

8.1.1 Definitions

The Agency defines **cumulative effects** as 'changes to the environment, health, social and economic conditions, as a result of the Project's residual environmental, health, social and economic effects combined with the existence of other past, present and reasonably foreseeable physical activities, as well as within activities of the Project itself from multiple emissions and discharges (e.g., simultaneous operations) to understand synergistic or additive effects' (Impact Assessment Agency of Canada, 2020). Cumulative effects may result if:

- The implementation of the Project may cause direct residual adverse effects to the valued components, taking into account the application of technically and economically feasible mitigation measures; and
- The same valued component may be affected by other past, present and future physical activities.

A cumulative effect on an environmental, health, social or economic component may be important even if the Project's effects to this component by themselves are minor.

Temporal boundaries for the cumulative effects assessment as described in **Section 4.2,** correspond to the duration that the likely residual adverse effects of the Project are predicted to occur. The Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020) indicates the cumulative effects assessment should look at potential effects throughout the lifecycle of the Project, including decommissioning and abandonment; however, there are currently no plans to decommission the Project.

Therefore, **Section 8.2.2** is limited to identifying and assessing cumulative effects during the Project construction, and Operations and Maintenance phases.

Spatial boundaries, which are the study area(s) within which the geographic extent of cumulative effects will be studied, may vary by each valued component selected (e.g., caribou). Finalization of the boundaries were informed through consultation with Indigenous communities, agencies and interested persons. The spatial boundaries used to assess cumulative effect are described in **Section 8.2.2.**

The characteristics described in **Section 4.4** for the residual effects assessment have also been used for the cumulative effects assessment, a summary of these is described in **Table 8-1** below.

Table 8-1: Residual Effects Characteristics – Definitions

Effects Characteristic	Definition	Description
Context	■ Social context ■ Timing of effect in relation to sensitive activities	■ See Description in **Section 4.4.5**
Direction	■ Direction of change from existing conditions	■ Positive: net gain or positive effect. ■ Neutral: no change to existing condition. ■ Negative: net loss or adverse effect.
Magnitude	■ Magnitude is the expected change from existing conditions	■ Negligible, low, moderate, high. ■ See description in **Section 4.4.5**
Geographic Extent	■ The spatial area that the effect is expected to occur	■ Construction Disturbance Area: effect is confined within the direct physical disturbance of the Project. ■ Local: effect extends into the Local Study Area. ■ Regional: effect extends into the Regional Study Area. ■ Beyond Regional: effect extends beyond the Regional Study Area.
Duration	■ The period of time that the effect is expected to occur	■ Short-term: effect ends before the end of construction. ■ Medium-term: the effect occurs during construction and ends soon after operation begins and / or maintenance ends soon after the activity causing the effect ends. ■ Long-term: the effect occurs during construction and persists into operation and / or the effect is considered permanent, or the likelihood of reversibility is low or uncertain.
Frequency	■ How often the effect is expected to occur	■ Infrequent: The effect is expected to occur rarely. ■ Frequent: The effect is expected to occur intermittently. ■ Continuous: the effect is expected to occur continuously.
Reversibility	■ The ability to return to existing conditions	■ Reversible: the effect is not permanent. ■ Irreversible: the effect is permanent.
Likelihood	■ Probability that the effect will occur	■ Unlikely: the effect is not likely to occur. ■ Possible: the effect may occur, but is not likely. ■ Probable: the effect is likely to occur. ■ Certain: the effect will occur.
Uncertainty	■ The potential for observed results to deviate from predictions made	■ See description in **Section 4.4.5**
Direct / Indirect	■ Nature of the pathway through which the effect occurs.	■ Direct effects are typically immediate and spatially aligned with the activity. ■ Indirect effects may be delayed or spatially removed but are causally linked and predictable.

8.2 Cumulative Effects Scoping

8.2.1 Valued Components with Residual Effects

The cumulative effects assessment builds on the results on the residual effects assessment described in **Section 7** and provides the incremental changes that are predicted to have a likely residual adverse effect on a Valued Component. A cumulative effects assessment was not completed in the following cases:

- Where no residual effects were identified in **Section 7**;
- The magnitude of the residual effect was rated as negligible, and the probability of occurrence was unlikely or possible; or
- the residual effect was positive in direction.

The cumulative effect assessment is described in **Table 8-2** below.

Table 8-2: Valued Components and Residual Effects

Valued Component	Residual Effect	Phase
Community Access to Infrastructure and Services	Negative effect due to increased transportation to and from the community. During construction, there will be a temporary increase in reliance on winter roads and air transport, despite co-ordination efforts. Infrequent but higher-than-usual traffic volumes on winter roads are probable and could lead to traffic congestion issues, accelerated deterioration, potentially shortening operational periods or increasing maintenance needs locally. Once the project mobilization is completed, transportation demands on the winter road should be reduced. Long-term following the completion of construction of the road, the winter road will be decommissioned	Construction
Cultural Preservation and Change	Negative effect during construction due to disruption to traditional economy and cultural practices due to potential loss of traditional harvesting areas / disturbance in the local construction area. This could also reduce available land for traditional activities within the project footprint. While mitigation measures aim to minimize these impacts, some access restrictions during key harvesting periods are likely.	Construction
Community and Public Health	Negative effect during construction on mental health and well-being of shift workers due to long hours, tight deadlines, and physically demanding tasks, leading to stress and fatigue; potential for social disconnection and emotional strain from extended periods away from families; employment disparities; and sensory disturbances and restricted land access etc.	Construction
Community and Public Health	Negative effect on mental health and well-being during operation and maintenance phase due to loss of connectivity to the land, change in sense of place and loss of identity due to presence of the road. Effects may be localized, confined to the areas where construction will be occurring, long-term and continuous because it may persist as long as the road corridor exists.	Operations and Maintenance
Community and Public Health	Negative effect during the Operations and Maintenance phase due to potential increase in substance use due to easier access to drugs and alcohol. Increased substance use is not expected to affect the community uniformly but the potential effect is long-term because the opportunity to more easily access drugs and alcohol will persist as long as the road corridor exists.	Operations and Maintenance
Access to Clean Water	Potential negative effect during construction on quality of surface and / ground water	Construction
Access to Clean Water	Potential negative effect during operation and maintenance on quality of surface and / ground water as a result of dust deposition, road maintenance, accidents, spills etc.	Operations and Maintenance
Traditional Foods	Potential negative effect during construction of reduction in availability of traditional foods due disturbances to traditional food sources as a result of construction activities.	Construction
Traditional Foods	Potential negative effect during Operations and Maintenance of reduction in availability of traditional foods due to overharvesting and environmental strain from the road. These effects may be moderate in magnitude and long-term but are reversible and have a high uncertainty.	Operations and Maintenance
Traditional Foods	Potential negative effect during construction on the quality of traditional foods due to contamination. Quality of country foods may be affected by residual effects on air surface water, groundwater, soils, and sediment.	Construction
Traditional Foods	Potential negative effect during operation and maintenance on quality of traditional foods due to contamination. Quality of country foods may be affected by residual effects on air surface water, groundwater, soils, and sediment.	Operations and Maintenance
Public Safety	Negative effect during construction of increased traffic and road-related injuries. Even with mitigation measures, the increased traffic during construction could lead to an increased risk of accidents. This could include serious incidents such as trucks or heavy equipment breaking through the ice on the winter road. These negative effects are anticipated to be moderate and short-term, given the limited duration of the winter road use during construction phase.	Construction
Public Safety	Negative effect during construction of increased strain on emergency services. Despite emergency management mitigations and planning and the presence of on-site medical staff, certain injuries or health concerns may still require transport to community health facilities in Marten Falls First Nation. This could lead to short-term increases in demand for the local nursing station and medevac services. While mitigation measures will reduce workplace injuries, some serious cases may still require evacuation to regional hospitals, such as Thunder Bay. This may place some additional demand on local emergency response and co-ordination services.	Construction
Public Safety	Negative effect during construction of increased risk of violence and harassment. Even with mitigations in place, violence, harassment, and emotional strain may still occur within workcamps, within homes, and community.	Construction
Public Safety	Negative effect during operation and maintenance of increased in road-related injuries due to increase in road traffic.	Operations and Maintenance
Public Safety	Negative effect during Operations and Maintenance of increase in violence and harassment. Despite mitigations, there may be an increase in human trafficking, criminal activity and family and social conflicts, which may continue to arise as economic and social shifts occur locally.	Operations and Maintenance
Biophysical Determinants of Health (Air)	During constriction concentrations in air for nitrogen dioxide, Particulate matter less than 2.5 micrometers, Particulate matter less than 10 micrometers Total suspended particulate, sulphur dioxide, carbon monoxide, acrolein, benzo(a)pyrene and dust fall were modelled to be in excess of applicable standards. Depending on the magnitude of the effect, the location and the potential for exposures to humans at those locations, there may be a potential negative impact on human health.	Construction
Biophysical Determinants of Health (Air)	During operation and maintenance, concentrations in air for Particulate matter less than 2.5 micrometers, Particulate matter less than 10 micrometers Total suspended particulate, benzo(a)pyrene and dust fall were modelled to be in excess of applicable standards. Depending on the magnitude of the effect, the location and the potential for exposures to humans at those locations, there may be a potential negative impact on human health.	Operations and Maintenance
Biophysical Determinants of Health *(noise and vibration, sediment, soil, land use and accidents and malfunctions)*	Certain construction and Operations and Maintenance activities were noted in the Technical Studies to potentially have an impact on noise and vibration, sediment, soil, land use and / or accidents and malfunctions. Depending on the magnitude of the effect, the location and the potential for overlap with exposures to humans at those locations, there may be a potential negative impact on human health.	Constructions, Operations and Maintenance
Biophysical Determinants of Health *(noise and vibration, sediment, soil, land use and accidents and malfunctions)*	Air quality, noise and vibration, sediment, soil, land use and accidents and malfunctions were noted in the respective Technical Studies to potentially have an impact on human health during operation activities. Depending on the magnitude of the effect, the location and the potential for overlap with exposures to humans at those locations, there may be a potential negative impact on human health.	Operations

8.2.2 Spatial and Temporal Boundaries

Temporal Boundary

Temporal boundaries for the cumulative effects assessment correspond to the duration that the likely residual adverse effects of the Project are predicted to occur. There are currently no plans to decommission the Community Access Road as there is no expected / known end date for its need. Therefore, future suspension, decommissioning, and eventual abandonment was not considered in this report. It will be considered if and when a decommissioning or abandonment application is made for the Community Access Road.

The Project is planned to occur in two phases:

- **Construction Phase –** The time from start of construction, including site preparation activities, to the start of operation and maintenance of the Community Access Road. Decommissioning of construction works is included in the construction phase. The Cons Depending on the magnitude of the effect, the location and the potential for exposures to humans at those locations, there may be a potential negative impact on human health. The construction phase is anticipated to lake approximately three to ten years to complete; and
- **Operation and Maintenance Phase –** The operation and maintenance phase starts once construction activities are complete and lasts the lifetime of the Project. The operation and maintenance phase of the Project is considered to be permanent based on the expected timeline for when major refurbishment of road components is anticipated.

The temporal boundaries for the assessment recognize that construction and operation and maintenance phases present distinct challenges for each valued component. As such, the majority of valued components are evaluated separately for both phases to account for their unique impacts (**Table 8-3**). However, the reliance on store-bought food valued component is assessed only during the operations phase, as no measurable changes to this component are expected until the road becomes operational.

Spatial Boundary

The spatial boundary for the cumulative effects assessment is defined by the geographic extent where residual effects of the Project are expected to occur. This assessment focuses on the communities most directly affected, particularly within the Local Study Area, which includes Marten Falls First Nation and Aroland First Nation.

For the community well-being discipline, most impacts are concentrated within the Local Study Area. Certain valued components, particularly those related to increased access, extend beyond these communities. To fully capture potential effects, including negative externalities associated with enhanced connectivity, the assessment also considers nearby urban centres (**Table 8-3**). This approach supports a more comprehensive understanding of the Project's broader community well-being implications.

Table 8-3: Spatial and Temporal Boundaries

Valued Component	Spatial Boundary	Temporal Boundary	Included in Cumulative Effects?
Community Access to Infrastructure and Services	■ Local Study Area (Marten Falls First Nation; Aroland First Nation)	■ Construction. ■ Road construction brings unique challenges to community access to infrastructure and services.	■ Yes ■ Residual impacts related to the access to infrastructure and services are concentrated in the Local Study Area communities. The negative impacts are associated with the increased pressure on infrastructure within Marten Falls First Nation and Aroland First Nation during construction. Other projects in the area are not anticipated to impact this valued component.
Cultural Preservation and Change	■ Local Study Area (Marten Falls First Nation; Aroland First Nation)	■ Construction. ■ The construction of the road may impact cultural preservation and change.	■ Yes ■ Residual impacts related to cultural preservation and change are concentrated in the Local Study Area communities. The negative impacts are associated with decreased participation in traditional economy and cultural practices in the Local Study Area. Other projects in the area are not anticipated to impact this valued component.
Community and Public Health	■ Local Study Area (Marten Falls First Nation; Aroland First Nation)	■ Construction and operation and maintenance. ■ Road construction and road access during the operation and maintenance project phases both bring unique challenges to community and public health.	■ Yes ■ Residual impacts related to public health are associated with reduced mental health in the Local Study Area communities. Other projects in the area are not anticipated to impact this valued component.
Community and Public Health	■ Local Study Area (Marten Falls First Nation)	■ Operation and Maintenance. ■ Road construction and road access during the operation and maintenance project phases both bring unique challenges to community and public health.	■ No ■ Residual public health effects related to substance use are associated with increased access to drugs and alcohol resulting from the Project's new road connection. The community is currently remote and not connected to the regional road network; therefore, the change in accessibility is attributable solely to the Project. No other existing or reasonably foreseeable projects in the area would alter access conditions or contribute to changes in substance use patterns. As a result, cumulative effects on this indicator are not anticipated.
Traditional Foods	■ Local Study Area (Marten Falls First Nation; Aroland First Nation)	■ Construction and operation and maintenance. ■ The construction of the road, and road access during the operation and maintenance project phases, both bring unique challenges for the harvesting of traditional foods.	■ Yes ■ Residual impacts related to traditional foods are associated with the Local Study Area communities. Quality of Traditional Foods may be impacted by projects' impacts on water, soil and air. The negative impacts are related to possible decrease in availability of traditional foods due to construction and road operations. Other projects in the area are not anticipated to impact this valued component.
Valued Component – Public Safety	■ Local Study Area plus nearby city centres (Thunder Bay; Geraldton) ■ City centres are included as these areas may face or contribute to decreased safety during construction and following the completion of the road.	■ Construction and operation and maintenance. ■ The construction of the road, and road access during the operation and maintenance project phases both bring unique challenges for public safety.	■ Yes ■ Public safety, as it relates to increases in road use accidents, violence and harassment, and emergency services, may be more frequent as a consequence of additional projects in the area.
Valued Component - Access to Clean water	■ Local Study Area	■ Construction and operation and maintenance. ■ The construction of the road, and road access during the operation and maintenance project phases both bring unique challenges for access to clean water.	■ No ■ Residual effects related to access to clean water are related to Local Study Area communities. The negative impacts are related to increased pressure on cost and access to water. The Community Access Road is anticipated to reduce the reliance on seasonal and unpredictable transportation methods to support a more stable supply of water and to improve regular inspections and maintenance from more feasible access to the community.
Valued Component - Biophysical Factors Influencing Human Health	■ Local Study Area	■ Construction and operation and maintenance. ■ The construction of the road, and road access during the operation and maintenance project phases both bring unique challenges for impacts to biophysical determinants of human health.	■ Yes ■ Impact to quality of air, soils, sediment, as well as impacts from noise and vibrations and accidents and malfunctions may be increased through cumulative effects. Cumulative effects can increase this impact.

8.2.3 Physical Activities Inclusion List

Community Access to Infrastructure and Services Physical Activities:

Access to and from Community

- During construction, the increased reliance on winter roads and air transportation for the mobilization of equipment, supplies, and work force transportation may result in potentially negative effects of traffic congestion or scheduling challenges for community members.

Cultural Preservation and Change Physical Activities:

Traditional Economy

- During construction, the disruption of the land may impact vegetation and animal migration paths, potentially resulting in reduced participation in the Traditional Economy.

Access to Clean Water Physical Activities:

Access to Drinking and Recreational Water

- Water is used for drinking, bathing, cooking, swimming and other cultural and recreational activities. During construction, activities, particularly related to stream crossings, may impact the quality of surface water. Surface water can also be impacted by deposition of air contaminants. Other construction activities may lead to leaks or spills which may impact surface water and groundwater.
- During operations, deposited emissions form vehicles and dust generated can impact surface water through runoff.

Community and Public Health Physical Activities:

Mental Health and Well-being

- During construction, workers may experience stress, burnout, or emotional strain due to extended shifts and separation from family, and restricted land access could exacerbate stress, which can lead to social disconnection or emotional distress.
- During operations, disturbances to the land may create a diminished sense of connectivity to land and cultural identity.

Traditional Foods Physical Activities:

Availability of Traditional Foods

- Construction activities, including land clearing for the road corridor, work camps, and pits and quarries, may lead to disturbances that reduce the availability of traditional foods during key harvest seasons.

- During Operations and Maintenance phases, possible negative residual effects on availability traditional foods include a local decrease in availability of traditional food resources, due to disruption from the road itself or the result of increased harvesting due to increased access.

Quality of Traditional Foods

- During construction, activities will release contaminants to air which may then deposit onto surface water and soils. These contaminants may make their way into country foods affecting their quality.
- During operations, emissions from vehicles and dust generated by vehicle traffic will release contaminants to air which may then deposit onto surface water and soils. These contaminants may make their way into country foods affecting their quality.

Public Safety Physical Activities:

Road Use Accidents

- During construction, the presence of heavy machinery, work vehicles, and increased traffic along the project corridor raises the risk of accidents, potentially resulting in worker and public injuries.
- During operations, year-round road access may lead to a higher frequency of vehicle accidents, particularly as members of Marten Falls First Nation may face barriers to obtaining driver's licenses and vehicle insurance. This could increase risks for both community members and other road users.

Violence and Harassment

- During construction, extended periods of separation due to shift work may place strain on family relationships, potentially leading to increased domestic conflict and incidents of violence.
- During operations, the road may facilitate greater movement of people through the area, increasing the risk of human trafficking and exploitation of women, girls and boys along the project corridor.

Access to Emergency Services

- During construction, a higher risk of workplace injuries on project sites or road accidents may increase demand for emergency medical services.

Biophysical Determinates to Human Health

Biophysical Factors Influencing Human Health

- During construction, air quality, soils, sediments, and land use can be impacted by construction activities. Contaminants in air may deposit onto surface water and soils. Human contact with these impacted these impacted media through consumption, dermal contact or inhalation may impact human health.
- During construction, accidents and malfunctions or construction activities will release contaminants to air which may then deposit onto surface water and soils. These contaminants may make their way into country foods affecting their quality.
- During operations, emissions from vehicles and dust generated by vehicle traffic will release contaminants to air which may then deposit onto surface water and soils; accidents and malfunctions could result in spills or leaks of contaminants. These contaminants may make their way into country foods affecting their quality.

To determine the spatial boundaries of potential cumulative effects of the Project, related projects within the vicinity of the Project have been considered and are listed in **Table 8-4**. See **Figure 8-1** for a map of the eight projects that overlap with the Spatial Boundaries of the cumulative effects assessment.

Table 8-4: Project and Physical Activity Inclusion List

Project	Identified in TISG (yes / no)	Location	Status	Distance (km) and direction from Marten Falls First Nation Community Access Road Study Area	Developer / Company	Project Start Date	Project Duration	Project Completion Date	Assumed Temporal Overlap with Community Access Road Activities (yes / no)	Project Description	Map Feature Type	Map Buffer	Buffer Rationale	Valued Component Temporal Overlap with Project (yes / no)	Valued Component Spatial Overlap with Project (yes / no)	Included in Cumulative Effects Assessment (yes / no)
Northern Road Link	Yes	Between Marten Falls First Nation community Access Road and Webequie Supply Road, northwestern Ontario	Impact Assessment ongoing	0 (adjacent or overlapping)	■ Webequie First Nation ■ Marten Falls First Nation	October 28, 2020	Unknown	Unknown	Yes – construction and operation will overlap with Community Access Road construction (expected for Northern Road Link to begin construction during construction of northern portion of Community Access Road)	■ Marten Falls First Nation and Webequie First Nation are proposing to build, operate and maintain an all-season multi-use road and associated infrastructure between the community access road that has been proposed by Marten Falls First Nation and the supply road that has been proposed by Webequie First Nation. ■ Terms of Reference for the preparation of an Environment Assessment approved March 3, 2023.	Line	100 m	N/A	Yes	Yes	Yes
Anaconda and Painter Lake Road Upgrades	Yes	James Bay Lowlands	Unknown	0 (adjacent or overlapping)	■ In discussions: Ontario Ministry of Transportation and Aroland First Nation	Not Started	2-5 years	Unknown	Yes – operation expected to overlap with Community Access Road construction and operation	■ Upgrades to existing road will be required for heavy vehicles accessing the Community Access Road route during construction and operations. ■ Currently discussions on proponency and scope of work are underway. ■ Potential scope of work is expected to include roadway widening, culvert and bridge replacements/rehabilitations to accommodate higher weight vehicles, and road base improvements. ■ This project will be completed prior to the start of the construction of the Community Access Road and therefore the upgrade to these roads is not expected to overlap with the construction of the Community Access Road.	Line	100 m	N/A	Yes	Yes	Yes
Rapid Lynx Broadband	Yes	Matawa First Nation communities	Phase 1 Complete Phase 2 Ongoing	Phase 1 – 0 (adjacent or overlapping) Phase 2 – 57.69	■ Rapid Lynx	February 2020	Unknown	Unknown	Yes – operations of Phase 1 and operations and construction of Phase 2 expected to overlap with Community Access Road construction and operations	■ Approximately 810 kilometres of fibre optic cables, providing reliable high-speed internet service to 5 Matawa First Nation communities: Eabametoong, Marten Falls, Neskantaga, Nibinamik and Webequie First Nations with an interconnection at Aroland First Nation.	Line	100 m	N/A	Yes	Yes	Yes
Esnagami Road Bypass Upgrade	Yes	Aroland First Nation	Unknown	51.96	■ In discussions: Municipality of Greenstone, Ontario Ministry of Transportation and Aroland First Nation	Not Started	2-5 years	Unknown	Yes – construction expected to overlap with Community Access Road construction	■ Upgrades to existing road to use as a bypass route around Aroland First Nation settlement area by heavy vehicles accessing the Community Access Road route towards the Ring of Fire. ■ Currently discussions on proponency and scope of work are underway. ■ Potential scope of work is expected to include roadway widening, bridge and culvert rehabilitation / replacement, and road base improvements.	Line	100 m	N/A	Yes	Yes	Yes
Transload Facility	Yes	Aroland, Ontario	Ongoing	59.53	■ Wyloo	Unknown	Unknown	Unknown	Yes –construction and operations expected to overlap with Community Access Road construction and operations	■ Rail transload facility to Aroland First Nation.	Point	2.5 km	N/A	Yes	Yes	Yes
Webequie Supply Road	Yes	McFaulds Lake (eastern limit) Webequie First Nation (western limit)	Impact Assessment ongoing	98.57	■ Webequie First Nation	August 28, 2019	Unknown	Unknown	Yes – construction and operations will overlap with Community Access Road construction (expected to occur concurrently)	■ New Community Access Road approximately 107 km in length from Webequie First Nation to the mineral deposit near McFaulds Lake for mineral exploration and future mining development activities. ■ 17 km of the corridor is within Webequie First Nation Reserve Lands.	Line	100 m	Road might to connect to the Community Access Road.	Yes	Yes	Yes; Road may connect to the Community Access Road
Winter Road Realignment Project	No	Various	Ongoing	0	■ Ministry of Northern Economic Development and Growth	2025	Unknown	Unknown	Yes – construction and operations will overlap with CAR construction (expected to occur concurrently)	■ Funding to remote northern communities for projects involving installation of water crossing infrastructure, such as pre-engineered bridges and culverts, and repairs to existing structures. ■ Funding for approximately 3,200 kilometres of winter roads in Northern Ontario.	Line	100 m	N/A	Yes	Yes	Yes
Equinox Gold Greenstone Gold Mine	Yes	Geraldton, Ontario	Construction	112.81	■ Equinox Gold	October 2021	36 years	2044	Yes – operations expected to overlap with Community Access Road construction and operations	■ Construction, operation, decommissioning and abandonment of an open-pit gold mine and on-site metal mill located near Geraldton, Ontario. ■ Production estimated at 30,000 tonnes per day. ■ Amended Decision Statement issued February 10, 2021. ■ First gold pour is anticipated in early 2024.	Polygon	N/A	N/A	Yes	Yes	Yes

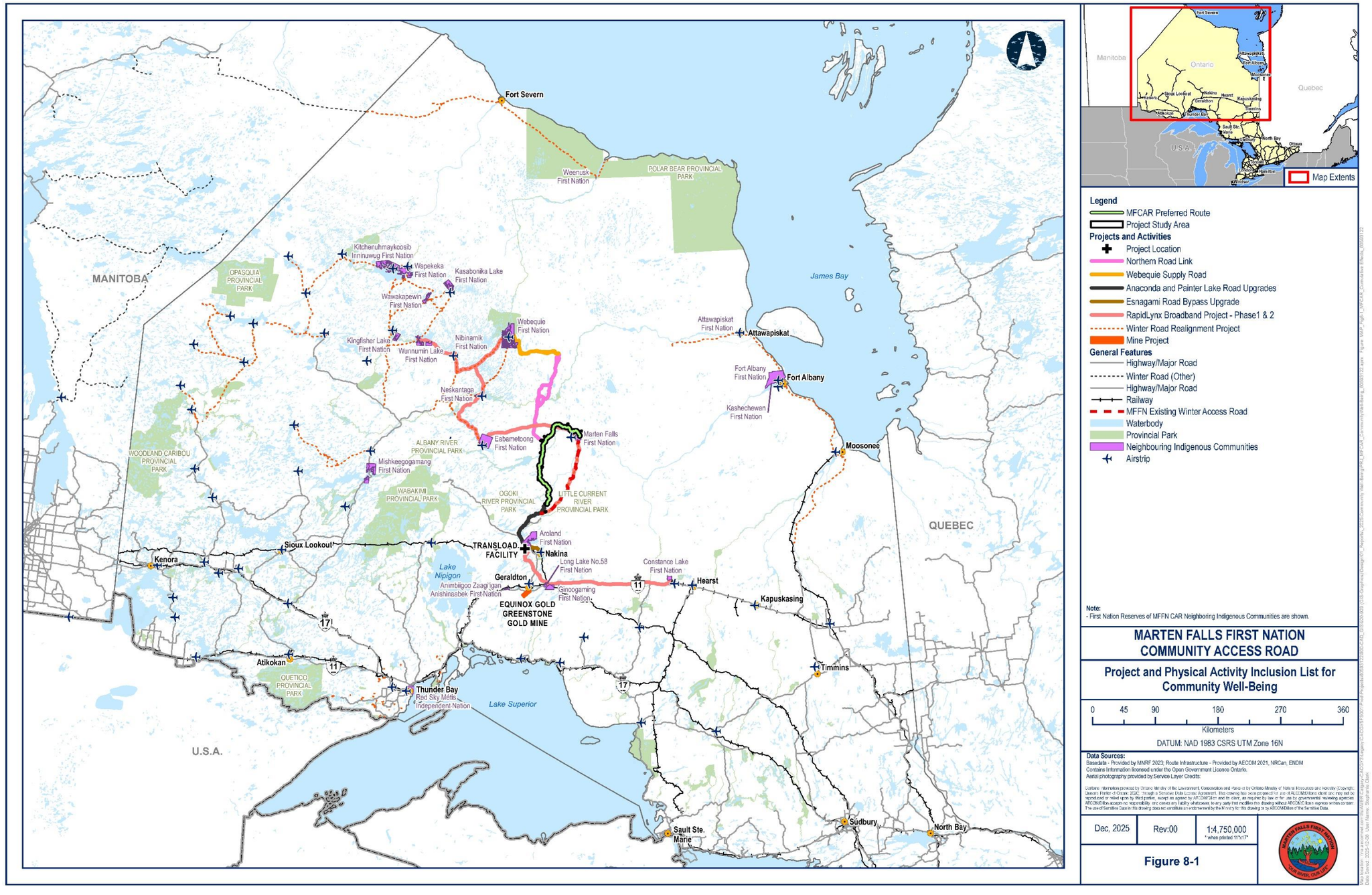
8.2.4 Summary of Outcome

Table 8-5: Summary of Outcome

Past, Existing and Future Physical Activities / Projects	Valued Component Carried Forward	Results of Scoping
Northern Road Link	Community Access to Infrastructure and Services, Cultural Preservation and Change, Community and Public Health, Access to Clean Water, Traditional Foods, Public Safety, Biophysical Factors Influencing Human Health	■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Community Access to Infrastructure and Services due to increased traffic around Aroland First Nation and on the winter access roads needed to transport equipment and material. . ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Community and Public Health due to the stress associated with construction work, long hours, and remote work camps. Both projects also have the potential to negatively impact the mental health and well-being of individuals living in the Local Study Area due to the loss of connectivity to the land. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to access to clean water. Construction and Operations and Maintenance activities can create air emissions and dust which affects air quality and has the potential to settle on surface water and soils. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally impacts to air, soil, sediment, surface water and groundwater can effect the quality of country foods. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on the winter road and other access roads. During the operation and maintenance phase of the project, it is anticipated that the overall number of road use accidents will increase due to the year-round nature of both roads. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ There is a potential for increased human trafficking and criminal activity along the Marten Falls First Nation Community Access Road, particularly impacting Indigenous women and girls. Similarly, the Northern Link Road may present comparable concerns. Given the scope and location of both projects, there is a possibility of cumulative residual effects that could contribute to these safety risks. ■ For biophysical human health the residual effects from both projects may overlap temporally during the construction and operation and maintenance Phases. Spatially, the residual effects from the Northern Road link project may overlap with the residual effects with the Marten Falls First Nation Community Access Road project within the Local Study Areas. This overlap could magnify the effects in certain areas.
Anaconda and Painter Lake Road Upgrades	Community Access to Infrastructure and Services, Cultural Preservation and Change, Community and Public Health, Access to Clean Water, Traditional Foods, Public Safety, Biophysical Factors Influencing Human Health	■ Both the Marten Falls First Nation Community Access Road and the Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to Community Access to Infrastructure and Services due to increased traffic around Aroland First Nation needed to transport equipment and material. ■ Both the Marten Falls First Nation Community Access Road and the Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to Community and Public Health due to the stress associated with construction work and long hours. Both projects also have the potential to negatively impact the mental health and well-being of individuals living in the Local Study Area due to the loss of connectivity to the land. ■ Both the Marten Falls First Nation Community Access Road and the Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to access to clean water. Construction and Operations and Maintenance activities can create air emissions and dust which affects air quality and has the potential to settle on surface water and soils. ■ Both the Marten Falls First Nation Community Access Road and Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally, impacts to air, soil, sediment, surface water and groundwater can affect the quality of traditional foods. ■ Both the Marten Falls First Nation Community Access Road and Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on the winter road and other access roads. During the operation and maintenance phase of the project, it is anticipated that the overall number of road use accidents will increase due to the year-round nature of both the Marten Fals Community Access Road. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ For biophysical human health the residual effects from both projects may overlap temporally during the construction and operation and maintenance Phases. Spatially, the residual effects from the Northern Road link project may overlap with the residual effects with the Marten Falls First Nation Community Access Road project within the Local Study Areas. This overlap could magnify the effects in certain areas.
Rapid Lynx Broadband	Cultural Preservation and Change, Community and Public Health, Traditional Foods, Public Safety, Biophysical Factors Influencing Human Health	■ Both the Marten Falls First Nation Community Access Road and the Rapid Lynx Broadband have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Anaconda and Painter Lake Road Upgrades have the potential for residual effects related to Community and Public Health due to the stress associated with construction work and long hours. Both projects also have the potential to negatively impact the mental health and well-being of individuals living in the Local Study Area due to the loss of connectivity to the land. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally, effects to air, soil, sediment, surface water and groundwater can affect the quality of country foods. ■ Both the Marten Falls First Nation Community Access Road and the Rapid Lynx Broadband project have the potential for residual effects related to public safety. Ongoing construction projects may create an increased strain on local health care and emergency service providers if accidents occur. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ For biophysical human health, Traditional foods and clean water, the residual effects from both projects may overlap temporally during the construction and operation and maintenance phases. Spatially, the residual effects from the Rapid Lynx Broadband project overlap with the residual effects within the Local Study Area near Marten Falls First Nation. This overlap could magnify the effects in certain areas.
Esnagami Road Bypass Upgrade	Community Access to Infrastructure and Services, Cultural Preservation and Change, Community and Public Health, Access to Clean Water, Traditional Foods, Public Safety,	■ Both the Marten Falls First Nation Community Access Road and the Esnagami Road Bypass Upgrade have the potential for residual effects related to Community Access to Infrastructure and Services due to increased traffic around Aroland First Nation needed to transport equipment and material. ■ Both the Marten Falls First Nation Community Access Road and the Esnagami Road Bypass Upgrade have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Esnagami Road Bypass Upgrade have the potential for residual effects related to Community and Public Health due to the stress associated with construction work and long hours. Both projects also have the potential to negatively impact the mental health and well-being of individuals living in the Local Study Area due to the loss of connectivity to the land.

Past, Existing and Future Physical Activities / Projects	Valued Component Carried Forward	Results of Scoping
	Biophysical Factors Influencing Human Health	■ Both the Marten Falls First Nation Community Access Road and the Esnagami Road Bypass Upgrade have the potential for residual effects related to access to clean water. Construction and Operations and Maintenance activities can create air emissions and dust which affects air quality and has the potential to settle on surface water and soils. ■ Both the Marten Falls First Nation Community Access Road and Esnagami Road Bypass Upgrade have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally, effects to air, soil, sediment, surface water and groundwater can affect the quality of country foods. ■ Both the Marten Falls First Nation Community Access Road and Esnagami Road Bypass Upgrade have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on the winter road and other access roads. During the operation and maintenance phase of the project, it is anticipated that the overall number of road use accidents will increase due to the year-round nature of both the Marten Fals Community Access Road. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ For biophysical human health the residual effects from both projects may overlap temporally during the construction and operation and maintenance Phases. Spatially, the residual effects from the Northern Road link project may overlap with the residual effects with the Marten Falls First Nation Community Access Road project within the Local Study Areas. This overlap could magnify the effects in certain areas.
Winter Road Realignment Project	Community Access to Infrastructure and Services, Cultural Preservation and Change, Community and Public Health, Access to Clean Water, Traditional Foods, Public Safety, Biophysical Factors Influencing Human Health	■ Both the Marten Falls First Nation Community Access Road and the Winter Road Realignment Project have the potential for residual effects related to Community Access to Infrastructure and Services due to increased traffic around Aroland First Nation and on the winter access roads needed to transport equipment and material. . ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to Community and Public Health due to the stress associated with construction work, long hours, and remote work camps. Both projects also have the potential to negatively impact the mental health and well-being of individuals living in the Local Study Area due to the loss of connectivity to the land. ■ Both the Marten Falls First Nation Community Access Road and the Winter Road Realignment Project have the potential for residual effects related to access to clean water. Construction and Operations and Maintenance activities can create air emissions and dust which affects air quality and has the potential to settle on surface water and soils. ■ Both the Marten Falls First Nation Community Access Road and Esnagami Road Bypass Upgrade have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally, effects to air, soil, sediment, surface water and groundwater can affect the quality of country foods. ■ Both the Marten Falls First Nation Community Access Road and the Northern Link Road have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on the winter road and other access roads. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ There is a potential for increased human trafficking and criminal activity along the Marten Falls First Nation Community Access Road, particularly impacting Indigenous women and girls. Similarly, the Northern Link Road may present comparable concerns. Given the scope and location of both projects, there is a possibility of cumulative residual effects that could contribute to these safety risks. ■ For biophysical human health the residual effects from both projects may overlap temporally during the construction and operation and maintenance Phases. Spatially, the residual effects from the Northern Road link project may overlap with the residual effects with the Marten Falls First Nation Community Access Road project within the Local Study Areas. This overlap could magnify the effects in certain areas.
Transload Facility	Community Access to Infrastructure and Services, Traditional Foods, Cultural Preservation and Change Public Safety	■ Both the Marten Falls First Nation Community Access Road and the Transload Facility have the potential for residual effects related to Community Access to Infrastructure and Services due to increased traffic around Aroland First Nation and on the winter access roads needed to transport equipment and material. ■ Both the Marten Falls First Nation Community Access Road and the Transload Facility have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Transload Facility project have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on the roads around Aroland First Nation. ■ Ongoing construction projects may create an increased strain on local health care and emergency service providers if accidents occur. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ The residual effects from both projects may overlap temporally during the construction and operation and maintenance phases. Spatially, the residual effects from the Transload Facility project may overlap with the residual effects from the Marten Falls First Nation Community Access Road project within the Local Study Area near Aroland First Nation.
Webequie Supply Road	Cultural Preservation and Change, Traditional Foods, Public Safety	■ Both the Marten Falls First Nation Community Access Road and the Webequie Supply Road project have the potential for residual effects related to public safety. During the construction phase of the project, there are ongoing safety concerns associated with the increased construction-related traffic on nearby roads. ■ Both the Marten Falls First Nation Community Access Road and the Webequie Supply Road have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Webequie Supply Road have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. Additionally, effects to air, soil, sediment, surface water and groundwater can affect the quality of country foods. ■ Ongoing construction projects may create an increased strain on local health care and emergency service providers if accidents occur. ■ If community members are employed during the construction phase, increased pressure from work and potential for harassment could contribute to an increase in violence in the community. ■ The residual effects from both projects may overlap temporally during the construction and operation and maintenance phases. Spatially, the residual effects from the Webequie Supply Road project may overlap with the residual effects from the Marten Falls First Nation Community Access Road project within the Local Study Area near Marten Falls First Nation and Aroland First Nation.
Equinox Gold Greenstone Gold Mine	Cultural Preservation and Change, Public Safety	■ Both the Marten Falls First Nation Community Access Road and the Transload Facility have the potential for residual effects related to Cultural Preservation and Change due to the potential to disrupt the land and therefore traditional economy and cultural practices. ■ Both the Marten Falls First Nation Community Access Road and the Equinox Gold Greenstone Gold Mine have the potential for residual effects related to Traditional Foods due to a potential reduction in the availability of traditional foods driven by the disruption of the land and animal migration paths. ■ Both the Marten Falls First Nation Community Access Road and the Greenstone Gold's Hardrock Mine project have the potential for residual effects related to public safety. It is expected that the mine will be operational during the construction and operation of the Community Access Road. During the operation phase of the project, there are ongoing safety concerns related to the increased traffic on nearby roads, while construction traffic for the Community Access Road is also underway. ■ Ongoing construction projects may create an increased strain on local health care and emergency service providers if accidents occur. ■ The residual effects from the operation of the Greenstone Gold's Hardrock mine and the construction and operation and maintenance phases of the Community Access Road project. Spatially, the residual effects from the Greenstone Gold's Hardrock Mine overlap with the residual effects from the Marten Falls First Nation Community Access Road project within the Local Study Area near Aroland First Nation.

Figure 8-1: Projects included in the Cumulative Effects Assessment



8.3 Cumulative Effects Assessment

The cumulative effects assessment evaluates the combined and overlapping impacts of multiple past, existing, and future projects and activities within the region. This assessment focuses on understanding how these projects, in aggregate, may affect various valued components such as public safety, and health. The assessment considers both the individual and collective effects of these projects over time and space, recognizing that their impacts may not be isolated, but rather interrelated and cumulative.

8.3.1 Valued Component: Community Access to Infrastructure and Services

8.3.1.1 Access to and from Community

8.3.1.1.1 Potential Cumulative Effects

The construction and operations of multiple road projects, including the Marten Falls First Nation Community Access Road, Northern Road Link, and others, will place increased strain on local transportation networks in the Local Study Area. Construction is expected to increase reliance on winter roads and air transportation for the mobilization of equipment, supplies, and work force transportation. This increase in use of existing transportation networks may result in potentially negative effects of traffic congestion or scheduling challenges for community members. There may be negative effects related to safety along existing routes, especially for winter roads, when heavy equipment or large shipments of materials may be brought into community.

8.3.1.1.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.1.1.3 Characterization of Cumulative Effects

It is expected that the negative impacts related to community access will be reduced, but the residual risk will remain elevated due to the sheer volume of traffic associated with multiple projects in the region. Increased traffic within the existing transportation network is **probable to occur**, given the nature of the project and the need to leverage the existing transportation networks to support the construction of the project and other projects that are reasonably foreseeable. Given the overall rate of traffic anticipated in the area, the effect is anticipated to be **negative, moderate, medium-term,** and **frequent.** The impacts will be **local** in nature**.** The effect is anticipated to be **reversible** as traffic from construction reduces. Regular monitoring of traffic patterns will be necessary to assess the effectiveness of these measures.

8.3.2 Valued Component: Cultural Preservation and Change

8.3.2.1 Impacts to Traditional Economy

8.3.2.1.1 Potential Cumulative Effects

The construction of multiple projects, including the Marten Falls First Nation Community Access Road, the Transload Facility in Aroland, the Northern Road Link, and others, could contribute to a disruption to the traditional economy and cultural practices in the Local Study Area due to potential loss of traditional harvesting areas / disturbance in the local construction area. This could also reduce available land for traditional activities within the project footprint.

These impacts may be compounded by other projects in the area, including the Northern Road Link, Anaconda and Painter Lake Road Upgrades, and others. These impacts may persist for Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake First Nation, Neskantaga First Nation, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming First Nation, and Long Lake #58 First Nation.

8.3.2.1.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.2.1.3 Characterization of Effects

Following the implementation of these mitigation measures, it is expected that the **negative** impacts related to the traditional economy will be reduced, but the residual risk will remain due to the disruption of the land during construction. These changes may temporarily alter animal migration paths, disturb vegetation, and could lead to overharvesting of traditional resources in the Local Study Area. The potential impacts to the traditional economy are **probable to occur**, given the construction disturbance area overlaps with areas used for traditional practices and given other projects that are reasonably foreseeable that will also disrupt the land and potentially animal migration paths. Given the disruption is related to construction activities, the effect is anticipated to be **moderate, short-term, local** and **infrequent.** Due to the complicated nature of animal migration paths, uncertainty is **high** but these changes may be **reversible.**

8.3.3 Valued Component: Community and Public Health

8.3.3.1 Mental Health and Well-being

8.3.3.1.1 Potential Cumulative Effects

The construction and operations of multiple projects, including the Marten Falls First Nation Community Access Road, the Northern Road Link, the Transload Facility in

Aroland, and others, may create overlapping pressures on mental health and well-being in the Local Study Area. During construction, workers may experience stress, burnout, or emotional strain due to extended shifts and separation from family, which can lead to social disconnection or emotional distress. For community members, increased sensory disturbances and restricted land access during construction could exacerbate stress for those already facing mental health challenges, while limited employment opportunities may create frustration or community tensions.

Operations may continue to influence mental health for some individuals, particularly through a diminished sense of connectivity to land and cultural identity. These effects are expected to remain localized to areas where the road corridor exists and may persist as long as the infrastructure remains, though they could be reversible through access to mental health supports and land-based activities. Uncertainty remains high, as feelings of ecological grief and cultural loss vary widely among individuals. When combined with other projects occurring concurrently or sequentially, these effects could compound stressors on workers and community members, extend periods of land disturbance, and amplify cultural and psychosocial challenges. Indigenous women and youth are particularly vulnerable to these effects, which can erode community trust, strain support services, and disrupt intergenerational relationship.

Indigenous communities with overlapping interests in the local study area, including Constance Lake First Nation, Neskantaga First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nations, face similar risks and potential negative effects to their mental health and well-being as those identified for Marten Falls First Nation and Aroland First Nation community members. Potential impacts include increased pressure from employment stress, community tension from employment disparities, and mental health and well-being impacts related to changes to the land.

8.3.3.1.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.3.1.3 Characterization of Effects

Following the implementation of these mitigation measures, it is expected that the **negative** impacts related to mental health and well-being will be reduced, but the residual risk will remain due to the increased pressure on workers during construction activities, and disruption of the land leading to a lost feeling of connectivity to land due to social and cultural sensitivities related to sense of place and identity. The potential impacts to mental health and well-being are **possible** to occur, given the pressure of construction work and the known disturbance to the land. The effect is anticipated to be **moderate** in magnitude**, long-term,** and **continuous**. However, it may be **reversible** given increased access to mental-health supports and community and land-based activities. Uncertainty is **high**,

because while feelings of ecological grief are relatively well-documented, the extent and intensity of this effect may vary individually.

8.3.4 Valued Component: Access to Clean Water

8.3.4.1 Quality of Water

8.3.4.1.1 Potential Cumulative Effects

Indigenous communities with overlapping interests in the local study area, including: Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation, face similar potential negative effects related to the quality and availability of clean water as those identified for Marten Falls First Nation and Aroland First Nation.

8.3.4.1.2 Mitigation and Enhancement Measures

To mitigate negative effects on drinking and recreational water:

- Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to contamination of ground and surface water.
- Surface water and groundwater will not be used as a drinking water source without appropriate treatment.
- Best practices for construction and operations will be used to minimize dust formation and to reduce the risks of accidents or malfunctions.

8.3.4.1.3 Characterization of Effects

There are possible negative residual cumulative effects on water quality related to access to clean water. Construction and Operations and Maintenance activities can create air emissions and dust which affects air quality and has the potential to settle on surface water and soils. Additionally, accidents and malfunctions could impact air, sediment, soils, surface water and groundwater directly. The impact is expected to be of moderate magnitude, local and long-term. The effect may be frequent, irreversible, with a high uncertainty.

8.3.5 Valued Component: Traditional Foods

8.3.5.1 Quality of Traditional Foods

8.3.5.1.1 Potential Cumulative Effects

There is a **possible negative** effect on the quality of traditional foods, due to contamination from construction activities, that may not be fully mitigated. This impact is expected to be of **moderate** magnitude, **local,** and **short-term**. The effect may be **infrequent, irreversible**, with a **high** uncertainty.

Indigenous communities with overlapping interests in the local study area, including: Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation may face similar potential negative effects related to the quality and availability of traditional foods as those identified for Marten Falls First Nation and Aroland First Nation.

8.3.5.1.2 Mitigation Measures

Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Attawapiskat, Kashechewan, and Fort Albany First Nations, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including concerns related to contamination of ground and surface water.

Best practices for construction and operations will be used to minimize dust formation and to reduce the risks of accidents or malfunctions.

8.3.5.1.3 Characterization of Effects

There is a possible negative effect on the quality of traditional foods, due to contamination from construction activities, that may not be fully mitigated. This impact is expected to be of moderate magnitude, local, and short-term. The effect may be infrequent, irreversible, with a high uncertainty.

8.3.5.2 Impacts to Availability of Traditional Foods

8.3.5.2.1 Potential Cumulative Effects

The construction and operations of multiple projects, including the Marten Falls First Nation Community Access Road, the Northern Road Link, the Transload Facility in Aroland, and others, will create overlapping pressures on traditional foods in the Local Study Area. Construction activities, including land clearing for the road corridor, work camps, and pits and quarries, may lead to disturbances that reduce the availability of traditional foods during key harvest seasons. During Operations and Maintenance phases, possible negative residual effects on availability traditional foods include a local decrease in availability of traditional food resources, due to disruption from the road itself or the result of increased harvesting due to increased access.

The potential cumulative effects have the potential to impact Indigenous communities with overlapping interests in the Local Study Area, including: Constance Lake First Nation, Fort Albany First Nation, Attawapiskat First Nation, Kasabonika Lake First Nation, Kitchenuhmaykoosib Inninuwug First Nation, Kingfisher Lake First Nation, Neskantaga First Nation, Nibinamik First Nation, Wapekeka First Nation, Wawakapewin First Nation, Webequie First Nation, Weenusk First Nation, Wunnumin Lake First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Ginoogaming First Nation, and Long Lake #58 First Nation.

8.3.5.2.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.5.2.3 Characterization of Effects

It is expected that the **negative** impacts related to traditional food availability will be reduced, but the residual risk will remain due to the construction activities and road corridor having the potential to disrupt vegetation and animal migration paths. The potential impacts to traditional foods are **possible** to occur, given the land and vegetation disturbances associated with reasonably foreseeable projects. The cumulative effect is anticipated to be **low** in magnitude, **medium-term**, and **local** in nature. The effect may be **infrequent** and **irreversible**, with **high** uncertainty, especially as it relates to the changes in animal migration and unpredictability of human behaviour**.**

8.3.6 Valued Component: Public Safety

The construction and operations of the Marten Falls First Nation Community Access Road, along with other regional infrastructure projects, will contribute to cumulative public safety concerns, particularly related to road use accidents, emergency service access, and social risks.

To address potential effects related to public safety, a mitigation measure has been identified that the owner / operator will establish a working groups with Marten Falls First Nation, Aroland First Nation, and the owner / operator to meet regularly and discuss issues such as driver's license accessibility, road safety training, and risks of increased violence.

8.3.6.1 Road-Related Injuries and Safety Standards

8.3.6.1.1 Potential Cumulative Effects

The construction and operation of the Marten Falls First Nation Community Access Road and other regional road projects will likely increase road use accidents. During construction, heavy traffic on winter and access roads may raise the risk of accidents despite traffic management plans. Once operational, the shift from a seasonally available winter road to a year-round route is expected to lead to more accidents due to higher traffic volumes. This increase in total number of accidents will also be experienced by Aroland as well as regional municipal communities of Thunder Bay and Greenstone.

8.3.6.1.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.6.1.3 Characterization of Cumulative Effects

Following the implementation of these mitigation measures, it is expected that the increase in road use accidents will be reduced, but the residual risk will remain elevated due to the sheer volume of traffic associated with multiple road projects in the region. Increased road accidents are predicted to be **probable to occur**, given the nature of the project, and the increased road access associated with other projects that are reasonably foreseeable. Given the overall rate of traffic anticipated in the area, the effect is anticipated to be **negative**, **moderate, continuous, long-term, local** in nature, and **infrequent**. Regular monitoring of accident rates and traffic patterns will be necessary to assess the effectiveness of these measures. The effects are **reversible** in nature and are anticipated to level-out following completion of local construction projects.

8.3.6.2 Access to Emergency Services

8.3.6.2.1 Potential Cumulative Effects

The construction and operations of multiple road projects, including the Marten Falls First Nation Community Access Road, Northern Road Link, and others, will place increased strain on local healthcare and emergency services. During the construction phase, increased traffic accidents and injuries could overwhelm local medical providers.

8.3.6.2.2 Mitigation Measures

No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.

8.3.6.2.3 Characterization of Cumulative Effects

Following the implementation of these mitigation measures, the strain on healthcare services will be somewhat alleviated, but it is anticipated that residual pressures are **possible** due to the ongoing construction and operational phases of multiple projects. Over time, as local healthcare adjusts to the demand, it is expected that the negative impact on emergency services and non-emergency healthcare will be lessened, though continued monitoring and resource allocation may be required to address rising demand. Given the effect on healthcare is tied to workplace injuries, and an increase in access to healthcare facilities supported by the road, is anticipated to be **negative**, but **low** in magnitude**, infrequent, short-term,** and **local.** The effects are **reversible** in nature once supply and demand adjusts with **low** uncertainty.

8.3.6.3 Violence and Harassment

8.3.6.3.1 Potential Cumulative Effects

The combined effects of multiple construction and operational activities (e.g., Marten Falls First Nation Community Access Road, Northern Road Link, Anaconda and Painter Lake Forestry Access Road Upgrades, Transload Facility, and others) could contribute to an increase in violence and criminal activity, particularly human trafficking, along these roads. The construction phase may contribute to these issues due to an influx of workers, long-term family separations, and increased stress, which can elevate the risk of domestic violence. Improved road accessibility may facilitate human trafficking, particularly affecting Indigenous women, girls, boys and gender-diverse individuals.

Indigenous communities with overlapping interests in the Local Study Area, including Constance Lake, Neskantaga, Animbiigoo Zaagi'igan Anishinaabek, Ginoogaming, and Long Lake #58 First Nations, face similar risks and potential negative effects related to crime, violence, and safety. These effects may also be experienced in regional municipal communities of Thunder Bay and Greenstone. Potential impacts include increase in violence and criminal activity, particularly human trafficking.

8.3.6.3.2 Mitigation Measures

As part of the cumulative effects assessment, the following additional mitigation measures are proposed:

- Owner / operator to develop a community-based reporting system that enables community members and employees to report concerns, including those related to violence, harassment, and crime, providing an option for anonymous reporting.

- Owner / operator to provide training and hand-off of all reporting mechanisms that are implemented by the owner / operator, so that the data remains in the hands of the community to support long-term response and prevention.

8.3.6.3.3 Characterization of Cumulative Effects

Despite the implementation of these mitigation measures, the potential for violence and human trafficking will likely persist, although reduced in severity, due to the continued development of multiple roads and associated infrastructure. Over time, the risk of human trafficking may decrease with stronger community support networks and law enforcement presence, though continuous monitoring and engagement will be necessary to support the effectiveness of these measures. Increased crime and violence are **possible** to occur, given the Community Access Road will facilitate increased access to new regions along with other projects that are reasonably foreseeable. Given the overall rate of traffic anticipated to move through the area, the effect is anticipated to be **negative**, but **moderate** in magnitude**, continuous, local** in nature, and **infrequent** but **long-term**. The effect is anticipated to be **irreversible** with **moderate** uncertainty.

8.3.7 Valued Component: Biophysical Factors Influencing Human Health

The Problem Formulation document included in **Attachment A** details the potential cumulative effects and the mitigation measures recommended by each of the Technical Studies (air, noise and vibration, sediments, soils, land use, peatlands, accidents and malfunctions) for the construction and the operation phases. A characterization of the cumulative effects is also included.

The predominant residual effect is particulate concentrations in air during operations which can also lead to deposition onto soil, sediment, and surface water. This would be additive in areas of spatial and temporal overlap. Temporal overlap is anticipated as the operations phase is considered continuous.

8.3.8 Summary of Cumulative Effects

This section provides a high-level summary of the proposed mitigations to address potential cumulative effects in the Local Study Area.

Table 8-6: Proposed Mitigation Measures for Cumulative Effects

Valued Component	Potential Impact	Proposed Mitigation Measure / Commitment	Proposed Follow-up Measure
Community Access to Infrastructure and Services	Access to and from Community	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	Regular monitoring of traffic patterns will be necessary to assess the effectiveness of these measures.
Cultural Preservation and Change	Traditional Economy	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Community and Public Health	Mental Health and Well-being	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Community and Public Health	Substance Use	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Access to Clean Water	Quality of Drinking Water	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Traditional Foods	Availability of Traditional Foods	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
	Quality of Traditional Foods	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Public Safety	Road Safety	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
	Violence and Harassment.	Owner / operator to develop a community-based reporting system that enables community members and employees to report concerns, including those related to violence, harassment, and crime, providing an option for anonymous reporting. Owner / operator to provide training and hand-off of all reporting mechanisms that are implemented by the owner / operator, so that the data remains in the hands of the community to support long-term response and prevention.	No additional follow-up measures.
	Access to Emergency Services.	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.
Biophysical Determinants, Air, Soil, Sediment, Land use, Accidents and Malfunctions	Potential negative effects on the quality of air, soil, sediment.	No additional mitigation or enhancement measures are proposed as part of the cumulative effects assessment.	No additional follow-up measures.

Table 8-7: Cumulative Effect Summary and Recommendations

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation and Maintenance
Community Access to Infrastructure and Services	■ Increased reliance on winter roads and air transportation for the mobilization of equipment, supplies, and work force transportation.	■ Construction	■ N/A	■ N/A
Cultural Preservation and Change	■ Loss of traditional harvesting areas reducing availability of traditional foods.	■ Construction	■ N/A	■ N/A
Community and Public Health	■ Change in mental health including workers who may experience stress, burnout, or emotional strain which can lead to social disconnection or emotional distress. ■ Changes to the land may lead to diminished sense of connectivity to land and cultural identity. ■ Change in substance use.	■ Construction and Operations	■ N/A	■ N/A
Access to Clean Water	■ Depending on spatial and temporal overlap, impacts to surface water and groundwater quality may be additive.	■ Construction and Operations	■ Implement mitigations as required by specific technical disciplines. ■ Communicate with other projects to limit spatial and temporal overlap. ■ Data sharing to bolster monitoring information.	■ During construction and operations, adhere to required mitigations to protect surface water and groundwater. Conduct monitoring as per technical disciplines studies. ■ review monitoring to evaluate for potential impacts to human health
Traditional Foods	■ Land disturbance and increased access leading to a reduced availability of traditional foods.	■ Construction and Operations	■ N/A	■ N/A
Public Safety	■ Change in frequency of road related accidents. ■ Change in violence and harassment.	■ Construction and Operations	■ N/A	■ Owner / operator to develop a community-based reporting system that enables community members and employees to report concerns, including those related to violence, harassment, and crime, providing an option for anonymous reporting. ■ Owner / operator to provide training and hand-off of all reporting mechanisms that are implemented by the owner / operator, so that the data remains in the hands of the community to support long-term response and prevention.
Biophysical Determinants Affecting Human Health	■ Depending on spatial and temporal overlap, impacts to surface water, sediment, soil and air quality may be additive. Noise levels may also be increased.	■ Construction and Operations	■ Implement mitigations as required by specific technical disciplines. ■ Communicate with other projects to limit spatial and temporal overlap. ■ Data sharing to bolster monitoring information.	■ During construction and operations, adhere to required mitigations to protect surface water, groundwater, soils, sediment, and air quality and minimize noise levels. Conduct monitoring as per technical disciplines studies. ■ review monitoring to evaluate for potential impacts to human health

9. Monitoring Programs and Future Commitments

A monitoring program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. Monitoring programs also include future commitments related to mitigating residual effects.

9.1 Pre-Construction Monitoring Program

Access to Clean Water – Water Quality

- For groundwater, a pre-construction geochemical testing and monitoring program to assess the potential for acid rock drainage from any soils or bedrock that will be exposed during Project construction. The groundwater quality samples should be analyzed for general water quality parameters at minimum (i.e., pH, temperature, conductivity, hardness, alkalinity, chloride, nitrate, nitrite, sulphate, phosphate, ammonia, total dissolved solids, dissolved organic carbon, calcium, copper, iron, magnesium, manganese, potassium, sodium, and zinc). Additional parameters of concern should also be sampled for where identified.

Biophysical Human Health

- During detailed design, develop and implement a geochemical testing and monitoring program to assess the potential for acid rock drainage from soils or bedrock that would be exposed during aggregate extraction Include assessment of the material proposed to be used for road construction for potential for metal leaching and metal composition. Fugitive dust from the Project will be made up of materials proposed to be used for road construction.
- Residual effects to surface water, groundwater, soils, and sediment, including deposition of dust onto surface water soils and sediment, were not fully evaluated in the individual technical studies, and modelling was not completed.

9.2 Construction Monitoring Program

Community and Public Health

- Owner / operator to implement a monitoring program and perform safety checks at work camps and entry points (e.g., airport) for alcohol and substances to prevent entry into the community.
- Owner / operator will develop a community-based reporting system that enables Indigenous community members and employees to anonymously report concerns,

including those relating to violence, harassment, and crime, providing an option for anonymous reporting.

- Owner / operator to provide training and hand-off of all reporting mechanisms that are implemented by the Operator, so that the data remains in the hands of the community to support long-term response and prevention.

Public Safety

- Owner / operator to develop an on-site safety and emergency preparedness program to include:
  - Implement on-site fire suppression systems, including sprinklers and fire extinguishers, to minimize reliance on local fire services.
  - Provide on-site medical care (paramedics, first aid stations, medics) to reduce pressure on local emergency response services.
  - Train and employ on-site security personnel to monitor safety compliance and enforce safety policies, reducing the strain on local police.
  - Work with the Ministry of Health and other appropriate government agencies to develop a co-ordinated emergency response plan with local responders for efficient handling of construction-related incidents requiring additional personnel.
  - Establish emergency response plans, including clear communication protocols between the construction teams and local emergency responders.

Access to Clean Water – Water Quality

- During construction, monitoring of surface water quantity and quality parameters (including but not limited to water taking and discharge rates, pH, total suspended solids, turbidity, temperature, dissolved oxygen, biochemical oxygen demand, and other contaminants of concerns as required). Monitoring of total suspended solids and / or turbidity instrumented measurements and / or visual observations), as well as visual inspections to confirm the presence or absence of oil or sheen.
- A construction groundwater monitoring program to continue the pre-construction monitoring through construction activities to identify and quantify any impacts to groundwater levels or quality resulting from construction activities. Groundwater quality should be sampled at the monitoring stations at least monthly for the same parameters as the pre-construction monitoring.

Biophysical Human Health

- During construction, a construction monitoring program is recommended as a mechanism to help mitigate and / or identify potential conditions that may lead to air quality impacts from construction related activities. An air monitoring station should be set up in the Marten Falls First Nation Community throughout the construction phase and into the operation phase. Air monitoring in the community should have

transparency in data to allow sensitive individuals to be aware of levels and remain inside during times of high particulate concentrations.

9.3 Operations Monitoring Program

Public Safety

- The road owner will need to engage with law enforcement to implement increased monitoring of traffic and reckless driving to reduce road safety incidents.

Access to Clean Water – Water Quality

- During operations, monitoring of water quality, sediment quality, and streamflow conditions at waterbodies that include greater sensitivity or implication to change from the standpoint of fish habitat, species at risk, channel stability, drainage pattern, or other environmental considerations. The specific monitoring locations will be determined during the permitting and design stages of the Project; however, it is expected that waterbodies of varying size (small, medium, large) would be captured, recognizing that this would allow the performance / effectiveness of mitigation and enhancement measures to be evaluated Monitoring of surface water quantity and quality parameters will include but not limited to water taking and discharge rates, pH, total suspended solids, turbidity, temperature, dissolved oxygen, biochemical oxygen demand, and other contaminants of concerns as required). Monitoring of total suspended solids and / or turbidity instrumented measurements and / or visual observations, as well as visual inspections to confirm the presence or absence of oil or sheen

Biophysical Human Health

- During operation, it is recommended that consideration of input gathered through other technical monitoring programs specific to potential air quality concerns (i.e., potential dust deposition on vegetation) is completed and evaluated for consideration of future mitigation or monitoring options. An air monitoring station should be set up in the Marten Falls First Nation Community throughout the construction phase and into the operation phase. Air monitoring in the community should have transparency in data to allow sensitive individuals to be aware of levels and remain inside during times of high particulate concentrations.

9.4 Future Commitments

All mitigation measures outlined in **Section 7** and **Section 8** will be addressed. Additional future commitments, and mitigations that need to be implemented before construction e.g. during a Detailed Design phase, are summarized in **Table 9-1**. The effectiveness of mitigation measures will be evaluated during construction and operations and will be modified as necessary through adaptive management.

Table 9-1: Summary of Future Commitments

Valued Component	Project Phase	Mitigation Measures	Reference
All Valued Components	Detailed Design; Construction; and Operations	■ To address potential effects anticipated during Construction and Operation, the owner / operator will establish several different working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the Community Access Road. In many cases, these Working Groups should be established in Detailed Design and then carry thru construction and, potentially, into the operations phase. ■ Proposed topics for the working groups are summarized in Table 7-25. ■ Note: In some instances, it is noted that the working groups should include other interested Indigenous communities or regional municipal communities given nature of predicted effects within the LSA.	Table 7-25
Sustainable Population Growth	Detailed Design	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to discuss community concerns and proposed topics, including those in relation to changes in population or social demographics. ■ Owner / operator to develop and implement Diversity, Equity, and Inclusion hiring policies to prioritize women and reduce gender disparities.	Section 7.1.1.2
Labour Market Dynamics / Economy	Detailed Design	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to discuss construction-related issues and unemployment by identifying and removing employment barriers, offering job readiness programs, and providing counseling and addiction support services to support community members. ■ Owner / operator to develop and implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs. ■ Develop a comprehensive inventory of the labour and business / procurement / contracting requirements for the project by identifying project requirements (i.e., labour needs, business / procurement needs and contracting needs); and categorizing requirements by time frame (i.e., short term, medium term, and long term). ■ Develop a comprehensive inventory of the Marten Fall First Nation and Aroland First Nation current labour and business / procurement / contracting capacities and capabilities to address the project's requirements by engaging Marten Falls and Aroland leaders and members virtually; collecting data (i.e., labour market information; and business and procurement data); analyzing and categorizing skills inventory, business capabilities and contracting experience. ■ Conduct a labour and business / procurement / contracting demand and supply gap analysis and develop initiatives to address the gaps. ■ Create a Local Content Plan to utilize a certain dollar value or share of operation and maintenance towards local businesses and contractors. ■ Owner / operator to create a Local Training Plan to complete a local skills assessment and utilize local labour force. ■ Owner / operator to provide information on available opportunities and training programs to help community members obtain necessary qualifications. ■ Owner / operator to offer ongoing job readiness programs and coordinate training timing to support workforce transition and career growth. ■ Owner / operator to develop and implement Diversity, Equity, and Inclusion hiring policy to prioritize women and reduce gender disparities.	Section 7.1.1.5 Section 7.1.1.8
Community Access to Infrastructure and Services: Access to and From Community	Detailed Design	■ Owner / operator will develop an Equipment Mobilization Plan with both Marten Falls First Nation and Aroland First Nation for the movement of equipment, personnel, supplies, and resources. Where possible, construction traffic should be separated from community traffic to improve safety and minimize disruptions. The mobilization plan should also include a clear communications strategy to keep the community informed of the mobilization schedule, ensuring residents are aware of periods of increased heavy equipment traffic on the winter road.	Section 7.1.1.11
Community Access to Infrastructure and Services: Impact on Infrastructure and Essential Services	Detailed Design	■ The owner / operator will establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics avoiding pressure on local, essential services and infrastructure. ■ The owner / operator will develop waste management policies to minimize waste production and support responsible disposal. Collaboration with the community will be prioritized to develop effective construction waste management and disposal strategies, incorporating local input. ■ The owner / operator will establish a secure fuel storage facility and provide a reliable fuel supply throughout the construction season. Fuel deliveries will be planned in advance and transported via the winter road, reducing reliance on costly air transport and preserving community fuel resources. All fuel storage sites will comply with safety and environmental regulations to prevent spills and contamination.	Section 7.1.1.11
Housing Adequacy and Suitability	Detailed Design	■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics associated with housing adequacy, converting construction camps to permanent housing, etc. ■ House workers in autonomous camps to limit demographic shifts and reduce pressure on community housing.	Section 7.1.1.14
Cultural Preservation and Change: Traditional Economy	Detailed Design	■ Prior to construction, owner / operator will develop Access Management Plans with Marten Falls First Nation and Aroland First Nation in relation to hunting, trapping and gathering activities. All activities must conform to licensing requirements and adhere to the rules and regulations under the Ministry of Natural Resources.	Section 7.1.1.17
Traditional Foods	Detailed Design	■ Owner / operator to work with communities and governments, as required, to support education and development of Indigenous Conservation Officer (Game Warden) program.	Section 7.1.1.26
Public Safety: Driver's Licence	Detailed Design	■ Explore opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, including partnerships with third-party remote licence providers.	Section 7.1.1.29
Public Safety: Road related Injury and Safety	Detailed Design	■ Develop Equipment Mobilization Plans with local First Nations for the movement of equipment, personnel, and supplies.	Section 7.1.1.29
Public Safety: Access to Emergency Services	Detailed Design	■ Develop, with the Ministry of Health, on-site safety and emergency preparedness programs to include fire suppression systems, medical care, security personnel, monitor safety compliance, emergency response plans and clear communication protocols between construction teams and emergency responders.	Section 7.1.1.29
Biophysical Determinants of Human Health	Detailed Design	■ Chemical analysis of quarry materials to be used in road construction should be completed during detailed design. These materials will ultimately make up the majority of the fugitive dust created during road construction and operations. Interpretation of this information can be used to source materials with the least potential impacts and to support that appropriate mitigations are implemented. ■ Residual effects to surface water, groundwater, soils, and sediment, including deposition of dust onto surface water soils and sediment, were not fully evaluated in the individual technical studies, and modelling was not completed.	Section 7.1.1.32

9.5 Future Permits and Approvals

To facilitate the construction of the Community Access Road, including construction activities and temporary infrastructure, permits and approvals from provincial, federal government and other jurisdictional agencies will need to be acquired.

There are no permits or approvals required applicable to the Project for Community Well-Being.

10. Summary and Recommendations

The potential effects summary and recommendations for the Community Well-being valued components is provided in **Table 10-1**. Additional details related to the biophysical determinants of human health are included in the Problem Formulation document located in **Attachment A**.

Table 10-1: Potential Effects Summary and Recommendations

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation
Sustainable Population Growth	■ Changes to age distribution and community population.	■ Construction and operation and maintenance	■ N/A	■ All construction workers will be housed in autonomous work camps to limit demographic shifts and limit disruptions to social structures and community dynamics. ■ Owner / operator to implement Diversity, Equity, and Inclusion hiring policy. ■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including those in relation to changes in population or social demographics.
Labour Market Dynamics	■ Potential barriers to community members from Marten Falls First Nation and Aroland First Nation accessing job market.	■ Construction	■ Project owner / operator will provide information on available opportunities to help Marten Falls First Nation and Aroland First Nation community members understand the opportunities and provide time to obtain the necessary qualifications. ■ Project owner / operator will create a Local Training Plan to complete a local skills assessment and utilize local labour force. ■ Project owner / operator will provide ongoing job readiness programs, continuously enhancing training opportunities to support community members in their transition into the workforce and long-term career growth. Timing of training and education will be co-ordinated in advance of hiring to reduce barriers to participation.	■ Owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to discuss construction-related issues and unemployment by identifying and removing employment barriers, offering job readiness programs, and providing counseling and addiction support services to support community members. ■ Project owner / operator will implement Community Readiness Strategies and Adaptive Management Plans to assess and respond to community needs through construction. ■ Owner / operator to implement Diversity, Equity, and Inclusion hiring policy, enhanced through training programs, job fairs, and outreach, to actively prioritize women in construction-related employment opportunities and reduce gender disparities in the work force. ■ Owner / operator to gradually integrate new workers into the workforce through shorter days and shift rotations. ■ All construction workers will be housed in autonomous work camps to limit disruptions to communities.
Labour Market Dynamics	■ Creation of direct, indirect, and induced jobs. ■ Increased labour income and Gross Domestic Product contributions.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Labour Market Dynamics	■ Supporting educational attainment.	■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Economy	■ Creation of new business opportunities for Indigenous businesses related to construction contracts and services, as well as in road operation and maintenance and transportation services.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Economy	■ Increased economic activity and output, with significant contributions to Gross Domestic Product, labour income, gross operating surplus, and tax revenues.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Economy	■ Increased productivity of individuals and businesses in the region.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Economy	■ Boost in the value of land that is surrounding the transportation infrastructure.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.
Economy	■ Improvement in diversifying the economy.	■ Construction ■ Operation and Maintenance	■ No mitigation measures proposed.	■ No mitigation measures proposed.

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation
Economy	■ Disruptions to certain businesses that are in the area close to where the road is being developed.	■ Construction	■ No mitigation measures proposed.	■ Project owner / operator will implement Community Readiness Strategies and Adaptive Management Plans to monitor and respond to community needs through construction. ■ Project owner / operator will create a Local Content Plan to utilize a certain dollar value or share towards local businesses and contractors. ■ Project owner / operator to consult with local businesses that would be potentially affected by work zone impacts and determine the optimal times and conditions for the construction to take place, such as during off-peak times.
Community Access to Infrastructure and Services	■ Disruptions due to increased transportation to and from the community.	■ Construction	■ Road contractor will develop an Equipment Mobilization Plan with both Marten Falls First Nation and Aroland First Nation for the movement of equipment, personnel, supplies, and resources. Where possible, construction traffic should be separated from community traffic to improve safety and minimize disruptions. The mobilization plan should also include a clear communications strategy to keep the community informed of the mobilization schedule, ensuring residents are aware of periods of increased heavy equipment traffic on the winter road.	■ The owner / operator, when possible, will transport employees on a charter flight.
Community Access to Infrastructure and Services	■ Increased demand on local infrastructure and essential services including roads, airports, water facilities, and more.	■ Construction	■ N/A	■ The owner / operator will establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics avoiding pressure on local, essential services and infrastructure. ■ All construction workers (including on- and off-reserve members) will be housed in autonomous work camps equipped with independent water, wastewater, and power systems. These systems need to be properly maintained to reduce reliance on community infrastructure and to prevent contamination risks. ■ The owner / operator will develop waste management policies to minimize waste production and support responsible disposal. Collaboration with the community will be prioritized to develop effective construction waste management and disposal strategies, incorporating local input. ■ The owner / operator will establish a secure fuel storage facility and provide a reliable fuel supply throughout the construction season. Fuel deliveries will be planned in advance and transported via the winter road, reducing reliance on costly air transport and preserving community fuel resources. All fuel storage sites will comply with safety and environmental regulations to prevent spills and contamination.
Housing Adequacy and Suitability	■ Changes to housing adequacy and suitability	■ Construction ■ Operation and Maintenance	■ N/A	■ All construction workers, including on- and off-reserve members, will be housed in autonomous work camps. This will help limit demographic shifts, reduce disruptions, and prevent additional pressure on community housing. ■ The owner / operator to establish working groups with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including topics associated with housing including monitoring housing demand and adjust to meet changes in housing needs.
Cultural Preservation and Change	■ Changes within the traditional economy and cultural practices	■ Construction	■ Prior to construction, owner / operator will develop Access Management Plans with Marten Falls First Nation and Aroland First Nation in relation to hunting, trapping and gathering activities. All activities must conform to licensing requirements and adhere to the rules and regulations under the Ministry of Natural Resources	■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation, and other interested Indigenous communities, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including where to appropriate locate safety pull out areas to promote safe access, and other traditional harvesting issues. ■ Provide flexible work schedules during key hunting, trapping, and gathering seasons to support continued access to traditional food resources.
Cultural Preservation and Change	■ Traditional language decline	■ Construction	■ N/A	■ Owner / operator to provide Training and Work Materials in Indigenous Languages. Offer onboarding materials, safety protocols, and job-related paperwork in Indigenous languages alongside English to provide language accessibility for all workers. ■ Owner / operator to implement multi-lingual worksite signage. Reduce language barriers at the worksite by using multilingual signage at work sites, including directional signs, safety notices, workplace policies, and equipment labels, to promote the use of Indigenous languages in the workplace. ■ Owner / operator to provide Cultural Sensitivity and Language Awareness Training. Educate non-Indigenous supervisors and workers on the importance of Indigenous languages in cultural identity, knowledge transmission, and community well-being. Encourage an inclusive workplace where traditional language use is supported and valued.

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation
				■ Owner / operator to implement a Zero-Tolerance Policy for Language Discrimination. Establish clear workplace policies ensuring that Indigenous workers are not discouraged from speaking their traditional language. Supervisors and project managers should actively reinforce language inclusivity and address any instances of discrimination or bias. ■ Owner / operator to introduce a cultural safety mechanism. Introduce a workplace mechanism, such as a cultural safety flag, allowing employees to pause work or request support if they feel uncomfortable due to language-related issues. Propose a Cultural Safety and Stop Work Protocol.
Community and Public Health	■ Changes to mental health and well-being.	■ Construction	■ N/A	■ Owner / operator to provide cultural safety training for all workers to promote a safe and inclusive work environment. ■ Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included. ■ Owner / operator to provide all employees training on violence and harassment in the workplace. ■ Owner / operator to provide mental health counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being. ■ Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations.
Community and Public Health	■ Increased risk of substance use.	■ Construction	■ N/A	■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, which could include topics in relation offering mental health supports, counselling and addiction support services. ■ All construction workers (including on- and off-reserve members) will be housed in autonomous work camps to limit demographic shifts and limit disruptions to social structures and community dynamics. ■ The owner / operator to develop and implement monitoring and enforcement, including regular security checks at work camps and entry points (e.g., airport) for alcohol and substances to prevent entry into the community. ■ Owner / operator to collaborate with the community (Marten Falls First Nation and Aroland First Nation) to provide mental health counseling, addictions counseling, mentorship, and peer support at work camps, with on-site Elders or cultural liaisons to promote emotional and cultural well-being. ■ Owner / operator to enforce a zero-tolerance policy for alcohol and substance use at work camps. ■ Owner / operator to implement a gradual work force integration for community members, introducing shorter workdays and shift rotations (e.g., starting with 2-3 days on with a day or two break instead of 10 consecutive days) to ease new workers into construction roles. ■ Owner / operator to provide cultural safety training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences, to promote a safe and inclusive work environment. ■ Owner / operator to hold training session on violence and harassment prevention. ■ Owner / operator to enforce a zero-tolerance policy for workplace discrimination so that Indigenous workers feel respected and included. ■ Owner / operator to provide cultural and recreational activities, when possible, in work camps.
Community and Public Health	■ Decrease in mental health and well-being due to loss of connectivity to the land, change in sense of place and identity due to presence of the road.	■ Operations and Maintenance	■ N/A	■ Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, the Road Owner / operator, and the Road Owner to develop a Safety and Wellness Plan that addresses project-related mental health and wellbeing concerns.
Community and Public Health	■ increase in substance use due to easier access to drugs and alcohol.	■ Operations and Maintenance	■ N/A	■ Owner / operator to form a Working Group with Marten Falls First Nation, Aroland First Nation, the Road Owner / operator, and the Road Owner to co-develop a Safety and Wellness Plan that addresses project-related substance use concerns.
Access to Clean Water	■ Changes in access and cost of clean water. ■ Changes in quality of drinking or recreational water due to construction or operations activities.	■ Construction and operation and maintenance	■ Technical study recommendations to protect surface water and groundwater.	■ During construction, implement temporary water storage tanks or other measures to accommodate peak water demands during construction, reducing reliance on flown-in water and helping to balance the construction and community needs. ■ During construction and operations adhere to required mitigations to protect surface water quality.

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation
Reliance on Store Bought Food	■ Change in reliance on store-bought food in the community.	■ Construction ■ Operation and maintenance	■ N/A	■ Owner / operator to coordinate bulk-orders of a diversity of fresh, high-quality foods to increase availability and selection of high-nutritional value foods during construction phase. ■ Owner to sponsor community-led educational efforts related to nutritional, healthy food choices.
Traditional Foods	■ Change in the availability of traditional foods.	■ Construction ■ Operation and maintenance	■ N/A	■ Owner / operator to provide flexibility in work schedules during important traditional food hunting and gathering periods. ■ The owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation, and other interested Indigenous communities, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including identifying key harvesting areas to implement measures that can minimize construction disturbances to traditional food resources during harvesting seasons, adjusting construction activities to avoid peak harvesting periods etc. ■ Owner to work with Ontario's Ministry of Natural Resources to encourage more frequent patrols of Conservation Officers along the Community Access Road to confirm hunters and fishermen are not exceeding their limits and that they have the proper tags and licenses. ■ Owner / operator to work with communities and governments, as required, to support education and development of Indigenous Conservation Officer (Game Warden) program. ■ Owner / operator to sponsor community-led harvesting initiatives in Marten Falls First Nation and Aroland First Nation.
Public Safety	■ Increased road related accidents lack of driver's licences, and increased strain on emergency services, .	■ Construction	■ Explore opportunities to increase total Driver Licence holders, alongside the Ministry of Transportation, including partnerships with third-party remote licence providers. ■ Develop Equipment Mobilization Plans with local First Nations for the movement of equipment, personnel, and supplies.	■ Implement driver safety training tailored to winter road conditions and remote community travel. ■ Develop, with the Ministry of Health, on-site safety and emergency preparedness programs to include fire suppression systems, medical care, security personnel, monitor safety compliance, emergency response plans and clear communication protocols between construction teams and emergency responders. ■ Comply with all relevant health and safety requirements, including but not limited to, preparation of a Health and Safety Policy.
Public Safety	■ Increased violence and harassment	■ Construction	■ N/A	■ Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including: - financial literacy programs for workers and families to help manage income fluctuations and reduce financial stress, addressing economic disparities that could contribute to resentment and lateral violence. - measures to strengthen cultural programming and land-based activities to reinforce community cohesion and well-being. Strengthening cultural identity and offering community-driven programs can provide positive coping mechanisms for workers and families experiencing stress due to shift work and can offer a protective factor against violence and social disruption by strengthening support networks and reducing isolation. - supports for unemployed community members by identifying employment barriers and offering job readiness programs to support community members facing unemployment. ■ House workers in autonomous work camps to limit unsupervised interactions with the community and prioritize gender-divided living quarters in the work camps. ■ Enforce zero-tolerance policies for harassment and violence. ■ Provide cultural safety and language awareness training for all workers, including supervisors and non-Indigenous employees, to complete training on Indigenous culture, traditions, and historical experiences to understand Indigenous cultural norms and appropriate community interactions to reduce instances of harassment or violence. ■ Comply with the Human Rights Code (Ontario, 2024b) to prevent workplace discrimination and uphold employee rights to reduce work force tensions. ■ Mental health counseling, mentorship, and peer support at work camps to reduce stress-related aggression. On-site Elders or cultural liaisons will offer emotional support and traditional guidance to workers. ■ Implement a gradual work force integration for community members, starting with shorter workdays and shift rotations. ■ Implement Diversity, Equity, and Inclusion hiring policy.

Valued Component	Environmental Concern and Potential Effect	Project Phase	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Construction / Operation
Public Safety	■ Increased in road-related injuries due to increase in road traffic.	■ Operations and Maintenance	■ N/A	■ The Owner / operator will establish a working group with Marten Falls First Nation and Aroland First Nation to meet regularly to discuss community-proposed topics in relation to the operation of the Community Access Road, including advocating for funding to build a local fire station, recruit paramedics, and expand medical transport services; develop emergency preparedness plans, first responder training programs, and informing in independent medical providers (e.g., dentists and physiotherapists) for potential for increased demand. ■ The owner to engage with law enforcement to implement increased monitoring; prepare for the opening of the road, allowing for an increased presence to monitor traffic, enforce speed limits, and deter impaired or reckless driving. ■ The owner to consider alternative methods to using salt on roadways to prevent attracting wildlife, minimizing the potential for vehicle-wildlife collisions. ■ The owner to consider the installation of road signage in both English and Indigenous languages indicated speed limits, sharp turns, wildlife crossings, and other hazards.
Public Safety	■ Increased in violence and harassment	■ Operations and Maintenance	■ N/A	■ The Owner / operator to establish working groups with Marten Falls First Nation, Aroland First Nation, and other interested Indigenous communities from the Regional Study Area, to meet regularly to discuss community-proposed topics in relation to the construction of the Community Access Road, including, could include the consideration of developing community-based violence prevention programs, including safe shelters and crisis support for victims; strengthening mental health, addictions, harm reduction programs, and family support services to address root causes.
Biophysical Determinants of Human Health	■ Change in the quality of soils, sediment, and air ■ Change in noise levels ■ Potential for accidents and malfunctions	■ Construction and Operations and Maintenance	■ Chemical analysis of quarry materials to be used in road construction should be completed during detailed design. These material will ultimately make up the majority of the fugitive dust created during road construction and operations. Interpretation of this information can be used to source materials with the least potential impacts and appropriate mitigations are implemented. ■ Residual effects to surface water, groundwater, soils, and sediment, including deposition of dust onto surface water soils and sediment, were not fully evaluated in the individual technical studies, and modelling was not completed.	■ N/A

11. References

211 Ontario. (2024). *Marten Falls First Nation Medical Transportation Program.* Retrieved from 211 Ontario: https://211ontario.ca/service/65300586/marten-falls-first-nation-medical-transportation-program/

211 Ontario North. (2022). *Greenstone Economic Development Corporation.* Retrieved from 211 Ontario North: https://211north.ca/record/65310602/

211 Ontario North. (2024a). *Aroland First Nation Economic Development.* Retrieved from 211 Ontario North: https://211north.ca/record/65304569/

211 Ontario North. (2024b). *Marten Falls First Nation Economic Development.* Retrieved from 211 Ontario North: https://211north.ca/record/65300603/

211 Ontario North. (2024c). *Marten Falls First Nation Home and Community Care.* Retrieved from 211 Ontario North: https://211north.ca/record/65300590/

Achneepineskum, B. (2023). *Column: Leading our own prosperity: What are we doing in our territory?* Retrieved from Northern Ontario Business: https://www.northernontariobusiness.com/regional-news/far-north-ring-of-fire/column-leading-our-own-prosperity-what-are-we-doing-in-our-territory-7613218

Achneepineskum, B. (2024). *RE: State of Emergency in Marten Falls First Nation.* Retrieved January 30, 2025, from Marten Falls: https://martenfalls.com/wp-content/uploads/2024/12/patty_letter.pdf

AECOM. (2022a). *Work Plan – Economic Environment. https://www.iaac-aeic.gc.ca/050/documents/p80184/146162E.pdf.*

AECOM. (2022b). *Socio-Community Work Plan. https://www.iaac-aeic.gc.ca/050/documents/p80184/146203E.pdf.*

AECOM. (2022c). *Human Health and Community Safety Work Plan. https://www.iaac-aeic.gc.ca/050/documents/p80184/146192E.pdf.*

AECOM. (2025). Story Beads Program. Personal Correspondence.

AECOM Canada ULC. (2020). *Proposed Terms of Reference Marten Falls Community Access Road – Environmental Assessment.* Markham, Ontario. Retrieved from https://www.martenfallsaccessroad.ca/wp-content/

Agoke Development Corporation. (n.d.). *Agoke Development Corporation.* Retrieved from Agoke Development Corporation: https://www.agokedevcorp.ca/

Albrecht, G. (2005). 'Solastalgia' a new concept in health and identity. . *PAN: Philosophy, Activisim, Nature (3)*, 41-55.

Anishinabek Education System. (2024). *Aroland First Nation.* Retrieved from Anishinabek Education System Wellness Portal: https://aeswellnessportal.ca/Services/Display/140223/Band_Office

Ariss, R., & Cutfeet, J. (2011). Kitchenuhmaykoosib Inninuwug First Nation: Mining, Consultation, Reconciliation and Law. *Indigenous Law Journal (10)1*, 1-37.

Aroland First Nation. (2022). *Aroland First Nation.* Retrieved from Aroland First Nation: https://www.arolandfirstnation.ca/

Assembly of First Nations. (2021). *Ending Violence Against Women.* Retrieved from It's Our Time Education Toolkit: https://education.afn.ca/afntoolkit/web-modules/plain-talk-18-ending-violence-against-women/ending-violence-against-women/

Assembly of First Nations. (2024). *Murdered & Missing Indigenous Women & Girls.* Retrieved from Assembly of First Nations: https://afn.ca/rights-justice/murdered-missing-indigenous-women-girls/

Attawapiskat First Nation & Neegan Naynowan Stantec LP. (2015). Attawapiskat First Nation Community Based Land Use Plan Terms of Reference .

Baillie, E. (2023). *This Summer's Best Festival is Not Where You Think.* Retrieved from Destination Northern Ontario: https://northernontario.travel/northeastern-ontario/stars-and-thunder-timmins-major-music-festival

Baragar, S. (2025, July). *SDG 6, Infectious Diseases, and Climate Change*. Retrieved from NCCID: https://nccid.ca/wp-content/uploads/sites/2/2025/07/SDG-6-Infectious-Diseases-and-Climate-Change_Final_2025.pdf

Bein, S. (2024). *Globe Climate: Reconciliation and critical minerals in the Ring of Fire.* Retrieved from The Globe and Mail: https://www.theglobeandmail.com/canada/article-globe-climate-reconciliation-and-critical-minerals-in-the-ring-of-fire/

Beringia community planning. (2015, June 29). *Ginoogaming First Nation Social Impact Assessment .* Retrieved from Impact Assessement Agency of Canada: https://www.iaac-aeic.gc.ca/050/documents/p80068/119998E.pdf

Beringia community planning. (2025, June 29). *Ginoogaming First Nation Social Impact Assessment.* Retrieved from IAAC: https://www.iaac-aeic.gc.ca/050/documents/p80068/119998E.pdf#:~:text=Groundwater%20samples%20showed%20some%20metals%2C%20iron%2C%20arsenic%2C,in%2031%25%2C%208%25%20and%2069%25%20of%20the

Bir, S. (2023). *Are federal subsidies really solving food insecurity in the Canadian north?* Retrieved from TorontoMet Today: https://www.torontomu.ca/news-events/news/2023/10/are-federal-subsidies-really-solving-food-insecurity-in-canadian-north/

Campbell, A. (2024). *Marten Falls First Nation celebrates opening of community store.* Retrieved from Northern Ontario Business: https://www.northernontariobusiness.com/industry-news/aboriginal-businesses/marten-falls-first-nation-celebrates-opening-of-community-store-8075096

Canada Crime Report. (2023). *Crime Severity Index in Canada by City 2023.* Retrieved from Canada Crime Report: https://canadacrimereport.com/crime-severity-index

Canadian institutes of Health Research. (2022, August 19). *Gender-Based Analysis Plus.* Retrieved from Government of Canada: https://cihr-irsc.gc.ca/e/50968.html

Casey, E. S. (1996). How to Get from Space to Place in a Fairly Short Stretch of Time. In S. Feld, & K. (. Basso, *Senses of Place* (pp. 13-52). School of American Research Press.

Retrieved from http://escasey.com/Article/How_to_Get_from_Space_to_Place_in_a_Fair.pdf

CBC News. (2006). *Slow Boil.* Retrieved from CBC News: https://www.cbc.ca/slowboil/pdfs/on/Aroland.pdf

CBC News. (2022, March 24). *'Why is there no uproar?' Marten Falls First Nation chief criticizes slow response on teacher housing.* Retrieved from CBC News: https://www.cbc.ca/news/canada/thunder-bay/marten-falls-education-update-1.6394699

CBC News. (2023). *Northwest winter road season 'successful' despite climate challenges, some First Nations say.* Retrieved January 29, 2025, from CBC News Thunder Bay: https://www.cbc.ca/news/canada/thunder-bay/northwestern-ontario-winter-road-recap-1.6804386

CFNO. (2024). *Ongonigaming Pow wow.* Retrieved from CFNO FM: https://www.cfno.fm/events/event/ongonigaming-pow-wow/

Chiefs of Ontario. (n.d.). *Traditional Knowledge*. Retrieved from Chiefs of Ontario: http://www.chiefs-of-ontario.org/priorities/environment/traditional-knowledge/.

Choose Kenora. (2025). *Events.* Retrieved from Choose Kenora: https://www.choosekenora.ca/about-kenora/events/

Cision. (2021). *Marten Falls First Nation Joins Class Action Litigation on Drinking Water Advisory and calls on the Government of Canada for Critical Housing and Infrastructure Appropriations.* Retrieved from Marten Falls First Nation: https://www.newswire.ca/news-releases/marten-falls-first-nation-joins-class-action-litigation-on-drinking-water-advisory-and-calls-on-the-government-of-canada-for-critical-housing-and-infrastructure-appropriations-838850322.html?utm_source=chatgpt.com

City of Kenora. (2025a). *City of Kenora Construction.* Retrieved from City of Kenora: https://www.kenora.ca/en/build-invest/resources/Documents/Sector%20Profiles/January%202025%20-%20Construction%20Sector%20Profile.pdf

City of Kenora. (2025b). *Construction Sector.* Retrieved from City of Kenora: https://www.kenora.ca/en/build-invest/Construction_Sector.aspx

City of Kenora. (2025c). *Treatment Facilities.* Retrieved from City of Kenora: https://www.kenora.ca/en/living-here/treatment-facilities.aspx#Plant-components_1

City of Thunder Bay. (2025a). *Drinking Water.* Retrieved from City of Thunder Bay: https://www.thunderbay.ca/en/city-services/drinking-water.aspx

City of Thunder Bay. (2025b). *Events.* Retrieved from City of Thunder Bay: https://www.thunderbay.ca/en/recreation/events.aspx

City of Thunder Bay. (2025b). *Family Day Powwow.* Retrieved from City of Thunder Bay: https://calendar.thunderbay.ca/default/Detail/2025-02-17-1000-Family-Day-Powwow

City of Thunder Bay. (2025c). *Maamawe Summer Festival.* Retrieved from City of Thunder Bay: https://www.thunderbay.ca/en/city-hall/maamawe-summer-festival.aspx

City of Thunder Bay. (2025d). *Post-Secondary Education.* Retrieved from City of Thunder Bay: https://www.thunderbay.ca/en/city-hall/careers-post-secondary-education.aspx

CMHC. (2022, July 19). *National Occupancy Standard.* Retrieved from CMHC: https://www.cmhc-schl.gc.ca/professionals/industry-innovation-and-leadership/industry-expertise/affordable-housing/provincial-territorial-agreements/investment-in-affordable-housing/national-occupancy-standard

Cochrane Municipal Airport. (2025). *Rich History of the Cochrane Airport.* Retrieved from Cochrane Municipal Airport: https://cycn.ca/about/

Cochrane Winter Carnival. (2022). *Cochrane Winter Carnival.* Retrieved from Cochrane Winter Carnival: https://www.cochranewintercarnival.com/

Confederation College. (2025). *Confederation College.* Retrieved from Confederation College: https://www.confederationcollege.ca/

Constance Lake First Nation & Ontario Ministry of Natural Resources . (2025, July). *Constance Lake First Nation Community Based Land Use Plan*. Retrieved from Ontario.ca: https://ero.ontario.ca/notice/012-2229

Constance Lake First Nation. (2019). Retrieved from https://constancelakefn.ca/our-history/

Constance Lake First Nation. (2025, July). *Community Based Land Use Plan.* Retrieved from Environmental Registry of Ontario: https://ero.ontario.ca/public/2025-08/CLFN_Draft%20Plan_Accessible_Clean_2025-07.pdf

Constance Lake First Nation. (n.d.). *Our Territory*. Retrieved from Constance Lake First Nation: https://constancelake.ca/our-territory/

Cummins, D. B. (1992, May). *Attawapiskat Cree land tenure and use, 1901-1989*. Retrieved from MacSphere: http://hdl.handle.net/11375/8611

Daigle, M. (2005). Awuwanainithukik: Living an Authentic Omushkegowuk Cree Way of Life: A Discussion on the Regeneration and Transmission of Nistam Eniniwak Existences. *Unpublished Master's Thesis*. University of Victoria.

Davidson, T. (2025). *Police issue Community Safety Warning in Marten Falls.* Retrieved from CKDR: https://www.ckdr.net/2025/01/10/103795/

Department of Justice Canada. (2017, July). *Missing and Murdered Indigenous Women and Girls.* Retrieved from JustFacts: https://www.justice.gc.ca/eng/rp-

Dillon Consulting Limited. (2021). *Aboriginal and Treaty Rights and Interests Study Plan.*

Dillon Consulting Limited. (2024). *Marten Falls Community Access Road: Aboriginal and / or Treaty Rights and Interests Draft Existing Conditions & Effects Assessment Report.*

Dillon Consulting Limited. (2024). *Marten Falls Community Access Road: Aboriginal and / or Treaty Rights and Interests Draft Existing Conditions Report.*

District School Board Ontario North East. (n.d.). *District School Board Ontario North East.* Retrieved from District School Board Ontario North East: https://www.dsb1.ca/

Dunick, L. (2024, April 04). *Ford promises to connect five First Nations to power grid.* Retrieved from TB News Watch: https://www.tbnewswatch.com/local-news/ford-promises-to-connect-five-first-nations-to-power-grid-8554362

Eabametoong First Nation. (2016). *Kakinaa kaagoon gaabiimatiiziimakak nabikang kayah akiikang oomaabigoo Eabametoong – Eabametoong First Nation Biodiversity Atlas.*

Eabametoong First Nation. (2016). *Kakinaa kaagoon gaabiimatiiziimakak nabikang kayah akiikang oomaabigoo Eabametoong (Eabametoong First Nation's Biodiversity Atlas).*

Eabametoong First Nation. (2018, February 7). *Eabametoong First Nation Forced to Head to Court to Protect Homelands from Mining in Ontario*. Retrieved from Mining Watch Canada: https://miningwatch.ca/news/2018/2/7/eabametoong-first-nation-forced-head-court-protect-homelands-mining-ontario

Eabametoong First Nation. (2018, February 7). *Eabametoong First Nation Forced to Head to Court to Protect Homelands from Mining in Ontario.* Retrieved from Mining Watch Canada: https://miningwatch.ca/news/2018/2/7/eabametoong-first-nation-forced-head-court-protect-homelands-mining-ontario

First Nations Drinking Water Settlement. (2024). *Impacted First Nations.* Retrieved from First Nations Drinking Water Settlement: https://firstnationsdrinkingwater.ca/impacted-first-nations/

Four Rivers. (2022). *Constance Lake Caribou Four Rivers Environmental Monitoring Update.* Retrieved from Four Rivers: https://fourrivers.group/constance-lake-caribou-four-rivers-environmental-monitoring-update/

FryWay 11. (2024). *Longlac Summer Fest 2024.* Retrieved from FryWay 11: https://fryway11.ca/event/longlac-summerfest-2024/

Garvin, T. (2001). *A Guide to Conducting a Traditional Knowledge and Land Use Study.* Northern Forestry Centre.

Garvin, T., & Northern Forestry Centre (Canada). (2001). *A Guide to Conducting a Traditional Knowledge and Land Use Study.* Northern Forestry Centre.

Geraldton District Hospital. (2025). *Geraldton District Hospital.* Retrieved from Geraldton District Hospital: http://www.geraldtondh.com/

Gibson, G., & Klinck, J. (2005). Canada's Resilient North: The Impact of Mining on Aboriginal. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health, 3(1)*, 115-140.

Gibson, G; K. Yung, Chisholm, L; Quinn, H, Lake Babine Nation, & Nak'azdli Whut'en. (2017). *Indigenous Communities and Industrial Camps: Promoting healthy communities in settings of industrial change.* Victoria, B.C.: The Firelight Group.

Government of Canada. (2019, August 28). *Impact Assessment Act (S.C. 2019, c. 28, s. 1)*. Retrieved from Justice Laws Website: https://laws.justice.gc.ca/eng/acts/I-2.75/index.html

Government of Canada. (2023). *Support for hunting, harvesting and community-led food programs.* Retrieved from Nutrition North Canada: https://www.nutritionnorthcanada.gc.ca/eng/1586274027728/1586274048849

Government of Canada. (2024a). *Aroland First Nation to build its first Elders lodge (ᑭᒋᐦᐊᓇᐯᒡ).* Retrieved from Housing, Infrastructure and Communities Canada: https://www.canada.ca/en/housing-infrastructure-communities/news/2024/03/aroland-first-nation-to-build-its-first-elders-lodge.html

Government of Canada. (2024b). *First Nation Detail: Martin Falls.* Retrieved from Crown-Indigenous Relations and Northern Affairs Canada: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=186&lang=eng

Government of Canada. (2024c). *Long-term drinking water advisories affecting water systems South of 60 not financially supported by the Government of Canada.* Retrieved from Indigenous Services Canada: https://www.sac-isc.gc.ca/eng/1516134315897/1533663683531#ont

Government of Canada. (2024d). *Prosperity and Growth Strategy for Northern Ontario.* Retrieved from Federal Economic Development Agency for Northern Ontario: https://fednor.canada.ca/en/about-us/prosperity-and-growth-strategy-northern-ontario

Government of Canada. (2025a). *Active long-term drinking water advisories: Marten Falls.* Retrieved January 30, 2025, from Indigenous Services Canada: https://www.sac-isc.gc.ca/eng/1614628038367/1614628089629

Government of Canada. (2025b). *Regional Assessment in the Ring of Fire Area.* Retrieved from Impact Assessment Agency of Canada: https://iaac-aeic.gc.ca/050/evaluations/proj/80468

Government of Canada. (2025c). *Registered Population of Aroland.* Retrieved from Indigenous Peoples and Communities: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=242&lang=eng

Government of Canada. (2025d). *Registered Population of Marten Falls.* Retrieved from Indigenous Peoples and Communities: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=186&lang=eng

Grant Thornton. (2019). *Financial Statements Marten Falls First Nation*. Retrieved from https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/DisplayBinaryData.aspx?BAND_NUMBER_FF=186&FY=2018-2019&DOC=Audited%20consolidated%20financial%20statements&lang=eng

Greenstone. (2024). *Greenstone Waste Management Environmental Assessment.* Retrieved from Greenstone: https://www.greenstone.ca/en/shared-content/greenstone-waste-management-environmental-assessment.aspx#PROJECT-UPDATES

Hale, A. S. (2024, October 9). *Helicopters from Ring of Fire road construction disturb hunting: Neskantaga*. Retrieved from The Trillium: https://www.thetrillium.ca/news/indigenous-rural-and-northern-affairs/helicopters-from-ring-of-fire-road-construction-disturb-hunting-9637951

Hanes, T. (2023). *Timing is everything: Constructing Ontario's ice roads.* Retrieved from Daily Commercial News: https://canada.constructconnect.com/dcn/news/infrastructure/2023/02/timing-is-everything-constructing-ontarios-ice-roads

Health Quality Ontario. (2025). *System Performance.* Retrieved from Health Quality Ontario: https://www.hqontario.ca/System-Performance/Time-Spent-in-Emergency-Departments?utm_source=Ontario.ca&utm_medium=Referral&utm_campaign=WT%20Referral

Hessey, K. (2023). *Treasure, conflict, and survival in Canada's peatlands.* Retrieved from Global News: https://globalnews.ca/news/9524388/peatlands-climate-canada-ring-of-fire/

hme Enterprises. (2019). *SLFNHA Food Security Environmental Scan*. Retrieved from SLFNHA: https://www.slfnha.com/wp-content/uploads/2023/03/FoodSecurityEnvironmentalScan-2019.pdf

hme Enterprises. (2019). *SLFNHA Food Security Environmental Scan* . Retrieved from SLFNHA.com: https://www.slfnha.com/wp-content/uploads/2023/03/FoodSecurityEnvironmentalScan-2019.pdf

Human Rights Watch. (2016, June 07). *Make it Safe: Canada's Obligation to End the First Nations Water Crisis.* Retrieved from Human Rights Watch: https://www.hrw.org/report/2016/06/07/make-it-safe/canadas-obligation-end-first-nations-water-crisis

Hydro One. (2019). *For the Possibilities of Tomorrow 2019 Sustainability Report.* Retrieved from Hydro One: https://www.hydroone.com/Sustainability/Documents/CSR_2019/HydroOne_CSR_2019.pdf

IISD. (2012). *Canada Issues Position on Right to Safe Drinking Water and Basic Sanitation in Rio+20 Outcome.* Retrieved from https://sdg.iisd.org/news/canada-issues-position-on-right-to-safe-drinking-water-and-basic-sanitation-in-rio20-outcome/

Impact Assessment Agency of Canada. (2020, February 24). *Marten Falls Community Access Road Project Tailored Impact Statement Guidelines.* Retrieved from https://iaac-aeic.gc.ca/050/documents/p80184/133937E.pdf

Impact Assessment Agency of Canada. (2021, July). *Glossary of Terms*. Retrieved from Canada.ca: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/glossary-of-terms.html

Impact Assessment Agency of Canada. (2021, September 17). *Guidance: Gender-Based Analysis Plus in Impact Assessment.* Retrieved from Government of Canada: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html

Impact Assessment Agency of Canada. (2025, August 8). *Health effects and the determinants of health framework.* Retrieved from Analyzing Health, Social and Economic Effects under the Impact Assessment Act: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/analyzing-health-social-economic-effects-impact-assessment-act.html#toc015

Independent Electricity System Operator. (2012). *Technical Report for the Connection of Remote First Nation Communities in Northwest Ontario.* Retrieved from Northwest Ontario First Nation Transmission Planning Committee.

Indigenous and Northern Affairs Canada. (2016, June 21). *Government of Canada, Province of Ontario and Constance Lake First Nation Partner to Deliver Safe Drinking Water*. Retrieved from Canada.ca: https://www.canada.ca/en/indigenous-northern-affairs/news/2016/06/government-of-canada-province-of-ontario-and-constance-lake-first-nation-partner-to-deliver-safe-drinking-water.html

Indigenous Fire Service Directory. (2024, April). *Fire Departement List*. Retrieved from Indigenous Fire Service Directory: https://www.indigenousfireservicedirectory.com/dept-list

Indigenous Services Canada. (2024, August 23). *Neskantaga First Nation.* Retrieved from Active long-term drinking water advisories: https://sac-isc.gc.ca/eng/1614887856664/1614887885919

Indigenous Services Canada. (2025, November 26). *Short-term drinking water advisories*. Retrieved from Drinking Water advisories in First Nations: https://www.sac-isc.gc.ca/eng/1562856509704/1562856530304#ont

Indigenous Watchdog. (2023). *How reconciliation is tied up in the Ring of Fire.* Retrieved from Indigenous Watchdog: https://www.indigenouswatchdog.org/update/how-reconciliation-is-tied-up-in-the-ring-of-fire/

Infrastructure Canada. (2017, October 10). *Better water, wastewater and stormwater infrastructure for First Nations across Ontario.* Retrieved from Newswire: https://www.newswire.ca/news-releases/better-water-wastewater-and-stormwater-infrastructure-for-first-nations-across-ontario-650260403.html

InterGroup. (2012). *Keeyask Transmission Project Socio-Economic Technical Report.* doi:https://www.gov.mb.ca/sd/eal/registries/5614keeyask_transmission/technical_reports/socio_tech_report.pdf

Jacasum, J. P. (2007). *Matawa First Nations Community and Life Experiences Volume 2 (North).* Timmins: Ojibway and Cree Cultural Centre.

Jacasum, J. P. (2007). *Matawa First Nations Community and Life Experiences Volume 2 (North).* Timmins: Ojibway and Cree Cultural Centre.

Karam, M. (2016). *Trafficking in persons in Canada.* Statistics Canada: Canadian Centre for Justice Statistics. 85-002-X. Retrieved from Statistics Canada: Canadian Centre for Justice Statistics.

Keewatin-Patricia District School Board. (2025). *Keewatin-Patricia District School Board.* Retrieved from Keewatin-Patricia District School Board: https://www.kpdsb.ca/#/

Kenora Catholic District School Board. (2025). *Kenora Catholic District School Board.* Retrieved from Kenora Catholic District School Board: https://www.kcdsb.on.ca/

Ketcheson, I., & Rawn, T. (2022, February 25). *Submission to the joint review panel marathon palladium mine project.* Retrieved from IAAC: https://iaac-aeic.gc.ca/050/documents/p54755/143017E.pdf

Kiikenomaga Kikenjigewen Employment & Training Services. (2023). *Kiikenomaga Kikenjigewen Employment & Training Services.* Retrieved from Kiikenomaga Kikenjigewen Employment & Training Services: https://www.kkets.ca/programs

Kiikenomaga Kikenjigewen Employment and Training. (2017). *Addressing Disparity in Employment Rates for Indigenous People in Remote Communities.* Retrieved from North Superior Workforce Planning Board: https://www.nswpb.ca/wp-content/uploads/2020/10/Final-Report-Addressing-the-Disparity.pdf

Kim, P. J. (2019, July 25). Social Determinants of Health Inequities in Indigenous Canadians through a Life Course Approach to Colonialism and the Residential School Systems.

Health Equity(3.1), 378-381. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6657289/

Kitching, K.; Firelight Research Inc. with Fort Albany First Nation. (2024). *Fort Albany First Nation Indigenous Knowledge and Use Study Specific to the Proposed Marten Falls Community Access Road.*

Kumar, M. B., Furgal, C., Hutchinson, P., Roseborough, W., & Kootoo-Chiarello, S. (2019, April 16). *Harvesting activities among First Nations people living off reserve, Métis and Inuit: Time trends, barriers and associated factors.* Retrieved from Statistic Canada: https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2019001-eng.htm

Labine, J. (2012, June 08). *Cost of Water.* Retrieved from TB News Watch: https://www.tbnewswatch.com/local-news/cost-of-water-391375

Lake of the Woods District Hospital. (n.d.). *Lake of the Woods District Hospital.* Retrieved from Lake of the Woods District Hospital: http://www.lwdh.on.ca/

Lakehead District School Board. (2025). *Lakehead District School Board.* Retrieved from Lakehead District School Board: https://www.lakeheadschools.ca/

Lakehead University. (2025). *Lakehead University.* Retrieved from Lakehead University: https://www.lakeheadu.ca/

Law, S. (2023). *Would you pay $40 for a bag of flour? Some remote First Nations in northern Ontario have no choice.* CBC News.

Law, S. (2024, December 17). *Ottawa resumes funding for bottled water in First Nation under state of emergency.* Retrieved from CBC News: https://www.cbc.ca/news/canada/thunder-bay/marten-falls-first-nation-state-of-emergency-1.7413218#:~:text=The%20plan%20was%20for%20the,own%20cost%2C%22%20he%20said

LeBlanc, J. W. (2014). Natural Resource Management and Indigenous Food Systems in Northern Ontario.

Lemon, J. (2023). *This year's kayak challenge promises to be greater than ever.* Retrieved from Destination Northern Ontario: https://northernontario.travel/northeastern-ontario/timmins-great-canadian-kayak-challenge

Levkoe, C., McLaughlin, J., Strutt, C., & Ng, V. (2019). *Understanding Our Food Systems: Phase II Final Report. A report for the Thunder Bay District Health Unit and the Ontario Ministry of Health and Long-Term Care.* Thunder Bay.

Li, N. (2023). *Grocery retailers are benefiting from food subsidies in Northern Canada.* Retrieved from Canadian Manufacturing: https://www.canadianmanufacturing.com/features/grocery-retailers-are-benefiting-from-food-subsidies-in-northern-canada/

Long, J. S., Preston, R. J., Srigley, K., & Sutherland, L. (2017, October 3). Sharing the Land at Moose Factory in 1763. *Ontario History*, 167-292. Retrieved from https://www.erudit.org/en/journals/onhistory/2017-v109-n2-onhistory03213/1041286ar/

Lopez-Garrido, G. (2025). *Bandura's Self-Efficacy Theory Of Motivation In Psychology.* Retrieved from Simply Psychology: https://www.simplypsychology.org/self-efficacy.html

Lowen, P., & MacPherson, M. (2015, December 1). *Constance Lake students earn credits while learning trapping from Elders.* Retrieved from Wawatay News: https://wawataynews.ca/studies/constance-lake-students-earn-credits-while-learning-trapping-elders

Marten Falls First Nation. (2020). *Draft Community Based Land Use Plan.*

Marten Falls First Nation. (2023a, October). *Existing Conditions Fact Sheet: Cultural Heritage.* Retrieved from Marten Falls First Nation Access Road: https://www.martenfallsaccessroad.ca/wp-content/uploads/2023/10/Existing-Conditions_CulturalHeritage.pdf

Marten Falls First Nation. (2023b, October). *Existing Conditions Fact Sheet: Economics.* Retrieved from Marten Falls First Nation Access Road: https://www.martenfallsaccessroad.ca/wp-content/uploads/2023/10/Existing-Conditions_Economic.pdf

Marten Falls First Nation. (2023c). *Existing Conditions Fact Sheet: Socio-Community.* Retrieved from Marten Falls First Nation Access Road: https://www.martenfallsaccessroad.ca/wp-content/uploads/2023/10/Existing-Conditions_SocioCommunity.pdf

Marten Falls First Nation. (n.d.). *Marten Falls First Nation.* Retrieved from Marten Falls First Nation: https://martenfalls.com/

Matawa First Nations. (2015). *Aroland, Eabametoong and Marten Falls move forward with Agreement for the Ogoki Forest.* Retrieved from Matawa First Nations: https://www.matawa.on.ca/aroland-eabametoong-and-marten-falls-move-forward-with-agreement-for-the-ogoki-forest/?utm_source

Matawa First Nations. (2025, January 31). *NESKANTAGA FIRST NATION MARKS 30 YEARS UNDER CANADA'S LONGEST BOIL WATER ADVISORY.* Retrieved from Matawa First Nations: https://www.matawa.on.ca/neskantaga-first-nation-marks-30-years-under-canadas-longest-boil-water-advisory/

Matawa First Nations. (n.d.). *Ecomonic Development.* Retrieved from Matawa First Nations: https://www.matawa.on.ca/services/economic-development/

Maynes, C. (2022, May 17). *Lack of Consent Drives Indigenous Opposition to Ontario's Ring of Fire Mining Plan*. Retrieved from The Energy Mix: https://www.theenergymix.com/lack-of-consent-drives-indigenous-opposition-to-ontarios-ring-of-fire-mining-plan/#:~:text=Concerns%20about%20the%20development%20of,video%20shared%20with%20the%20webinar

McGee, N. (2023, December 31). *How reconciliation is tied up in the Ring of Fire.* Retrieved from The Globe and Mail: https://www.theglobeandmail.com/canada/article-ontario-ring-of-fire-marten-falls-first-nation/

McGee, N. (2024, December 20). *Ontario First Nation declares state of emergency after wastewater system failure.* Retrieved January 29, 2025, from The Globe and Mail: https://www.theglobeandmail.com/canada/article-marten-falls-first-nation-state-of-emergency/#:~:text=a%20nearby%20river.-

,A%20pump%20at%20Marten%20Falls%20First%20Nation's%20wastewater%20lift%20system,state%20of%20emergency%20on%20Monday

Mcmanus, P., Albrecht, G., & Graham, R. (2014). Psychoterratic geographies of the Upper Hunter region, Australia. *Geoforum*, 58-65.

MICs Group of Health Services. (2025a). *About MICs.* Retrieved from MICs Group of Health Services: https://www.micsgroup.com/about-mics/

MICs Group of Health Services. (2025b). *MICs Group of Health Services.* Retrieved from MICs Group of Health Services: https://www.micsgroup.com/

Mining Life. (2021). *Marten Falls First Nation (Ogoki Post) Transportation.* Retrieved January 29, 2025, from https://mininglifeonline.net/company-article/transportation/18100

Mining Life. (2022, December 15). *Marten Falls First Nation and The Northern Road Link - A better life for our youth.* Retrieved from Mining Life Online: https://mininglifeonline.net/news/article/marten-falls-first-nation-and-northern-road-link-better-life-our-youth

Mining.com. (2019). *Noront and Aroland First Nation to work together on nickel mine in Ontario.* Retrieved from Mining.com: https://www.mining.com/noront-aroland-first-nation-work-together-nickel-mine-ontario/

Minkin, D. P. (2008, September 25). *Cultural Preservation and Self-Determination Through Land Use Planning: A Framework for the Fort Albany First Nation.* Retrieved from Queen's University: https://qspace.library.queensu.ca/items/7e732ebf-e2c8-4a66-a656-b5bc95b73abc

Minodahmun Development LP. (2020). *Our Partnership.* Retrieved from Minodahmun Development LP: https://minodahmun.ca/

Mishkeegogamang First Nation. (2010). *Our Stories - Stories of the Past, How We Lived*. Retrieved from Mishkeegogamang Ojibway Nation: https://mishkeegogamang.ca/about/stories/

Mishkeegogamang First Nation. (2010a). *Our Stories - Stories of the Past, How We Lived*. Retrieved from Mishkeegogamang Ojibway Nation: https://mishkeegogamang.ca/about/stories/

Mishkeegogamang First Nation. (2010b). *Natural Resources*. Retrieved from Mishkeegogamang Ojibway Nation: https://mishkeegogamang.ca/natural-resources/

Mishkeegogamang First Nation. (2010c). *History*. Retrieved from Mishkeegogamang Ojibway Nation: https://mishkeegogamang.ca/about/history/

MNP LLP. (2024). *Aroland First Nation Consolidated Financial Statements*. Retrieved from https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/DisplayBinaryData.aspx?BAND_NUMBER_FF=242&FY=2023-2024&DOC=Audited%20consolidated%20financial%20statements&lang=eng

Mueller, L. (2023). *From Trauma to Tension: Indigenous Lateral Violence.* Retrieved from Matriarch Media: https://www.matriarchmedia.ca/post/unveiling-the-complex-dynamics-of-indigenous-lateral-violence

Municipality of Greenstone. (2021a). *Airports.* Retrieved from Municipality of Greenstone: https://www.greenstone.ca/en/business-and-development/airports.aspx

Municipality of Greenstone. (2021b). *Water and Wastewater Treatment.* Retrieved from Municipality of Greenstone: https://www.greenstone.ca/en/living-here/water-and-wastewater-treatment.aspx?

Municipality of Greenstone. (2025). *Calendar.* Retrieved from Municipality of Greenstone: https://calendar.greenstone.ca/default/

Nakina Bass Derby. (2025). *Nakina LIVE RELEASE Bass Derby 2025 dates - August 1st, 2nd & 3rd, 2025!!* Retrieved from Nakina Bass Derby: http://www.nakinabassderby.ca/

Nation, M. F. (n.d.). Draft Community Based Land Use Plan. *2020*.

National Collaborating Centre for Indigenous Health. (2019). *Access to Health Service as a Social Determinant of First Nations, Inuit, and Metis Health.* Retrieved from https://www.nccih.ca/docs/determinants/FS-AccessHealthServicesSDOH-2019-EN.pdf

National Council of Indigenous Midwives. (2020). *End Forced Birth Evacuations.* Retrieved from Indigenous Midwifery: https://indigenousmidwifery.ca/end-forced-birth-evacuations/#1705288987469-2b23bfd9-924e

National Inquiry into Missing and Murdered Indigenous Women and Girls. (2019). *Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls.* Retrieved from National Inquiry into Missing and Murdered Indigenous Women and Girls: https://www.mmiwg-ffada.ca/final-report/

Native Ministries International. (2022). *Aroland First Nation*. Retrieved from Native Ministries International: https://data.nativemi.org/tribal-directory/Details/aroland-first-nation-1588165

Native Women's Association of Canada. (n.d.). *Systemic Inequities and Interjurisdictional Issues in Human Trafficking and MMIWG2S+.* Retrieved from Native Women's Associaiton of Canada: https://nwac.ca/assets-documents/Issues_in_Human_trafficking_and_MMIWG2S.pdf

Nature United. (2022, June 27). *Conserving Caribou*. Retrieved from Innovating for Climate Change: https://www.natureunited.ca/what-we-do/our-priorities/innovating-for-climate-change/conserving-caribou/#:~:text=A%20Cultural%20Hallmark,that%20comes%20through%20the%20community

Neegan Burnside. (2011, January). *National Assessment of First Nations Water and Wastewater Systems.* Retrieved from Department of Indian Affairs and Northern Development: https://publications.gc.ca/collections/collection_2016/aanc-inac/R6-1-5-2011-eng.pdf

Nerberg, S. (2025, June 4). *Inside the ambitious Indigenous-led plan to protect northwestern Ontario's "Breathing Lands"*. Retrieved from Canadian Geographic: https://canadiangeographic.ca/articles/inside-the-ambitious-indigenous-led-plan-to-protect-northwestern-ontarios-breathing-lands/

Neskantaga First Nation. (2022). *Stand with Neskantaga*. Retrieved from Neskantaga First Nation: https://neskantaga.com/

Nextbridge Infrastructure. (2018). *Section 17. Indigenous Current Use of Lands and Resources for Traditional Purposes.* Retrieved from East-West Tie Transmission Project Amended Environmental Assessment: http://www.nextbridge.ca/~/media/Microsites/Nextbridge/Documents/EWT_Amend_EA_September2018/EWT_Amend_EA_Section_17_Indigenous-Land-Resource-Use_September2018. pdf?la=en

Nipigon District Memorial Hospital. (2025). *Nipigon District Memorial Hospital.* Retrieved from Nipigon District Memorial Hospital: http://www.ndmh.ca/

Nishnawbe Aski Nation. (2024, November 22). *Federal Commitment Will Help Improve Vital Winter Road Network to Remote Communities.* Retrieved from Nishnawbe Aski Nation: https://www.nan.ca/news/winter-road-network/

Nishnawbe Aski Police Service. (2018). *A New N.A.P.S 2017- 2018 Annual Report.* Retrieved from Nishnawbe Aski Police Service Corporate Reports: https://static1.squarespace.com/static/5ad76b50aa49a1ab2b781ad8/t/5c0acfb24fa51a51a012f01e/1544212427108/NAPS_Annual_Report_2017_2018_Compressed.pdf

Nishnawbe Aski Police Service. (2024). *Annual Report 2023-2024.* Retrieved from Nishnawbe Aski Police Service Corporate Reports: https://static1.squarespace.com/static/5ad76b50aa49a1ab2b781ad8/t/6745f07cae9e047eab000209/1732636802211/NAPS+Annual+Report+2023+2024.pdf

Nishnawbe Aski Police Service. (n.d.a). *Central Region Office.* Retrieved from Detachments: https://www.naps.ca/central-region

Nishnawbe Aski Police Service. (n.d.b). *NAN Police Services Agreement.* Retrieved from History: https://www.naps.ca/history

North of Superior Healthcare Group. (2025). *North of Superior Healthcare Group.* Retrieved from North of Superior Healthcare Group: https://www.nosh.ca/

North Star Air. (2025). *North Star Air Flight Selection.* Retrieved January 30, 2025, from https://booknsa.skyres.ca/FlightSelection.html?origin=35&destination=96&depart=02%2F22%2F2025&returning=02%2F26%2F2025&adults=1&promoCode=

North Superior Workforce Planning Board. (n.d.). *Marten Falls & Webequie Workforce Development Strategy – Project Purpose*. Retrieved from Ontario Labour Market Partnerships: https://www.nswpb.ca/resources/ontario-labour-market-partnerships/

Northeastern Catholic District School Board. (n.d.). *Northeastern Catholic District School Board.* Retrieved from Northeastern Catholic District School Board: https://www.ncdsb.on.ca/

Northern College. (n.d.). *Timmins Campus.* Retrieved from Northern College: https://www.northerncollege.ca/campuses/timmins/

Northern Ontario Business. (2020). *Indigenous company pitches province for forest management licence.* Retrieved from Northern Ontario Business: https://www.northernontariobusiness.com/industry-news/forestry/indigenous-company-pitches-province-for-forest-management-licence-2734223

NorthWesthealthline. (2024a). *Aroland First Nation.* Retrieved from NorthWesthealthline: https://northwesthealthline.ca/displayservice.aspx?id=140223

NorthWesthealthline. (2024b). *Aroland First Nation Family Well Being Program.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayservice.aspx?id=182701&utm_source

NorthWesthealthline. (2024c). *Aroland First Nation Health Centre.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayservice.aspx?id=141377&utm_source=chatgpt.com

NorthWesthealthline. (2024d). *Aroland First Nation Healthy Babies Healthy Children.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayService.aspx?id=148715

NorthWesthealthline. (2024e). *Aroland First Nation Home Care Program.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayService.aspx?id=219586

NorthWesthealthline. (2024f). *Aroland First Nation Medical Transportation Program.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayService.aspx?id=141380

NorthWesthealthline. (2024g). *Aroland First Nation National Native Alcohol and Drug Abuse Program.* Retrieved from NorthWesthealthline: https://www.northwesthealthline.ca/displayservice.aspx?id=146070&utm_source

NorthWesthealthline. (2024h). *Tikinagan Child and Family Services.* Retrieved from NorthWesthealthline: https://northwesthealthline.ca/displayservice.aspx?id=198489

NorthWinds Environmental Services. (2023). 2023 Northern Roads Summit. Retrieved from https://www.nan.ca/app/uploads/2024/11/Northern-Roads-Summit-Summary-NAN.pdf

NorthWinds Environmental Servies. (2023). 2023 Northern Roads Summit. Retrieved from https://www.nan.ca/app/uploads/2024/11/Northern-Roads-Summit-Summary-NAN.pdf

Ontario. (2015). *Northern Ontario Winter Roads.* Retrieved from Publications Ontario: https://www.publications.gov.on.ca/northern-ontario-winter-roads

Ontario. (2022). *Marten Falls Community Based Land Use Plan Terms of Reference.* Retrieved from Ontario: https://www.ontario.ca/page/marten-falls-community-based-land-use-plan-terms-reference

Ontario. (2024a). *2024 Ontario Hunting Regulations Summary.* Retrieved from Hunting: https://www.ontario.ca/files/2024-03/mnrf-2024-hunting-regulations-summary-en-2024-03-26_0.pdf

Ontario. (2024b). *Human Rights Code, R.S.O. 1990, c. H.19.* Retrieved from Ontario: https://www.ontario.ca/laws/statute/90h19

Ontario. (2024c). *Map: Well Records.* Retrieved from Ontario: https://www.ontario.ca/page/map-well-records?

Ontario. (2024d). *Tourism Regions.* Retrieved from Ministry of Tourism, Culture and Gaming and Ministry of Sport: https://www.ontario.ca/document/tourism-regions

Ontario. (2024e). *Traffic Volume Data.* Ministry of Transportation.

Ontario. (2024f, March 5). *First Nations and Ontario One Step Closer to Building All-Season Roads in the Ring of Fire*. Retrieved from Newsroom: https://news.ontario.ca/en/release/1004265/first-nations-and-ontario-one-step-closer-to-building-all-season-roads-in-the-ring-of-fire

Ontario. (2025). *Ontario Business Registry.* Retrieved from Search the OBR: https://www.appmybizaccount.gov.on.ca/onbis/businessnames/viewInstance/view.pub?id=185e6c856f92f2744af3ee5b87a9ed2fa0c70e34899e6ed98c5cfddfeb7fc57b&_timestamp=456280088627391

Ontario. (n.d.a). *Guide to the Occupational Health and Safety Act.* Retrieved from Ontario: https://www.ontario.ca/document/print/book/85598

Ontario. (n.d.b). *Marten Falls First Nation.* Retrieved from Ontario Victim Services: https://ovss.findhelp.ca/record-detail/65300580/site/

Ontario Newsroom. (2025, January 28). *Ontario and Aroland First Nation Sign Historic Agreement Connecting Roads to the Ring of Fire.* Retrieved from Ontario Newsroom: https://news.ontario.ca/en/release/1005666/ontario-and-aroland-first-nation-sign-historic-agreement-connecting-roads-to-the-ring-of-fire

Ontario Parks. (2022). *Pipestone River Provincial Park Management Plan*. Retrieved from Ontario.ca: https://www.ontario.ca/page/pipestone-river-provincial-park-management-plan

Ontario Ring of Fire. (2025). *Neskantaga First Nation*. Retrieved from OROF.ca: https://www.orof.ca/first-nations-issues/neskantaga-first-nation/

Penn-Co. (2025). *Marten Fall Water Treatment Plant.* Retrieved from Penn-Co: https://www.penn-co.com/projects/marten-falls-water-treatment-plant/

Perreault, N. (2024, December 17). *Marten Falls Declares State of Emergency Over Contaminated Water Supply.* Retrieved from Net News Ledger: https://www.netnewsledger.com/2024/12/17/marten-falls-declares-state-of-emergency-over-contaminated-water-supply/

Public Health Ontario. (2023a). *Alcohol Use Snapshot.* Retrieved from Public Health Ontario: https://www.publichealthontario.ca/en/Data-and-Analysis/Substance-Use/Alcohol-Use

Public Health Ontario. (2023b). *Smoking Snapshot.* Retrieved from Public Health Ontario: https://www.publichealthontario.ca/en/Data-and-Analysis/Substance-Use/Smoking-Status

Public Health Ontario. (2024). *Chronic Disease Incidence and Prevalence Snapshot.* Retrieved from Public Health Ontario: https://www.publichealthontario.ca/en/Data-and-Analysis/Chronic-Disease/Chronic-Disease-Incidence-Prevalence

Rabski-McColl, A. (2022, October 13). *Trail cameras gathering insight into threatened woodland caribou.* Retrieved from https://www.timminstoday.com/local-news/trail-cameras-gathering-insight-into-threatened-woodland-caribou-5949199

Radio Station World. (2025). *Thunder Bay District Radio Stations: Lake Nipigon Area.* Retrieved from Radio Station World: https://radiostationworld.com/locations/canada/ontario/thunder_bay_district/radio_stations/

Railway Association of Canada. (2025). *Canadian Rail Atlas.* Retrieved from Railway Association of Canada: https://rac.jmaponline.net/canadianrailatlas/

Randazzo, M. (2018). *Land-Based Food Initiatives in Two Rural and Remote Indigenous Communities.* University of Ottawa.

Real Canadian Superstore. (2025). *Grocery.* Retrieved from Real Canadian Superstore: https://www.realcanadiansuperstore.ca/en/search?redirect=true&search-bar=flour%2010%20kg

Red Lake Margaret Cochenour Memorial Hospital. (2024). *Red Lake Margaret Cochenour Memorial Hospital.* Retrieved from Red Lake Margaret Cochenour Memorial Hospital: https://www.redlakehospital.ca/

Rinne, G. (2021, September 16). *Water treatment plant shutdown causes state of emergency in Marten Falls First Nation.* Retrieved from Timmins Today: https://www.timminstoday.com/local-news/water-treatment-plant-shutdown-causes-state-of-emergency-in-marten-falls-first-nation-2-photos-4338629

Robidoux, M., Winnepetonga, D., Santosa, S., & Haman, F. (2021). Assessing the Contribution of Traditional Foods to Food Security for Wapekeka First Nation of Canada. *Applied Physiology, Nutrition, and Metabolism 46(10)*, 1170-1178.

Rogers Communications. (2025). *Coverage map of the Rogers 5G network.* Retrieved from Rogers Communications: https://www.rogers.com/mobility/network-coverage-map

Ross, I. (2025, January 28). *Aroland First Nation signs on with province on Ring of Fire road.* Retrieved from Northern Ontario Business: https://www.northernontariobusiness.com/regional-news/far-north-ring-of-fire/aroland-first-nation-signs-on-with-province-on-ring-of-fire-road-10144991

Roudometkina , A., & Wakeford, K. (2018). *Trafficking of Indigenous Women and Girls in Canada.* Retrieved from Native Women's Associaition in Canada: https://www.ourcommons.ca/Content/Committee/421/JUST/Brief/BR10002955/br-external/NativeWomensAssociationOfCanada-e.pdf

Rutherford, K. (2024, October 9). *Part of Fort Albany First Nation under boil-water advisory, state of emergency*. Retrieved from CBC: https://www.cbc.ca/news/canada/sudbury/emergency-boil-water-treatment-infrastructure-failure-1.7347412

Salerno, T., Tam, J., & Page, J. (2021, May 7). *Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment*. Retrieved from Impact Assessment Agency of Canada: https://www.canada.ca/content/dam/iaac-acei/documents/research/indigenous-mental-wellness-and-ia-en.pdf

Semeniuk, I. (2022, October 9). *The quest to protect Hudson Bay's unique coastline, one of Canada's last, best wild places*. Retrieved from The Globe and Mail: https://www.theglobeandmail.com/canada/article-hudson-bay-coastline-mushkegowuk/#:~:text=A%20herd%20of%20caribou%20near%20the%20mouth%20of%20the%20Winisk%20River%20on%20the&text=Sam%20Hunter%2C%20a%20member%20of%20the%20Weenusk%20First%20Nation%20who%20li

Seven Generations Education Institute. (2025). *Seven Generations Education Institute.* Retrieved from Seven Generations Education Institute: https://www.7generations.org/

Shared Value Solutions Ltd. (2024). *Aroland First Nation.* Retrieved from Shared Value Solutions: https://sharedvaluesolutions.com/afsar-sturgeon-conservation-project-aroland-first-nation/

Smellie, S. (2024). *Northern stores 'absolutely not' hiking food costs when federal funding arrives, says CEO.* Retrieved from CBC News: https://www.cbc.ca/news/canada/newfoundland-labrador/north-west-co-food-prices-reject-1.7407201

Smith, J. (2011, October 25). *Return to tradition*. Retrieved from TBnewswatch.com: https://www.tbnewswatch.com/local-news/return-to-tradition-389095

Smith, J. (2015, February 14). *Ottawa sends $2M in bottled water to First Nation.* Retrieved from Toronto Star: https://www.thestar.com/news/canada/ottawa-sends-2m-in-bottled-water-to-first-nation/article_c22ce27a-22e1-5586-ab0b-f7f6bf749c02.html

Smooth Rock Hospital. (2021). *Smooth Rock Hospital.* Retrieved from Smooth Rock Hospital: https://www.srfhosp.ca/

SNC Lavalin. (2016). *GEDC Economic Development Study.* Retrieved from Greenstone Economic Development Corporation: http://www.gedc.ca/upload/documents/20160202_630931_rpt_final_gedc-economic-002.pdf

SNC Lavalin. (2018). *Greenstone Business Capacity.* Retrieved from Greenstone Economic Development Corporation: http://www.gedc.ca/upload/documents/reports-page/greenstone-economic-development-corporat.pdf

SNnewsWatch. (2022). *Fatal single vehicle collision north of Nakina.* Retrieved from SNnewsWatch: https://www.snnewswatch.com/local-news/fatal-single-vehicle-collision-north-of-nakina-5611514

Starlink. (2025). *High-Speed Internet Around the World.* Retrieved from Starlink: https://www.starlink.com/

Statistics Canada. (2011a). *Census Profile: Aroland 83, IRI.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558076&Geo2=PR&Code2=01&Data=Count&SearchText=aroland&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011b). *Census Profile: Cochrane, DIS.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3556&Geo2=PR&Code2=01&Data=Count&SearchText=cochrane&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011c). *Census Profile: Greenstone, MU.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558075&Geo2=PR&Code2=01&Data=Count&SearchText=Greenstone&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011d). *Census Profile: Kenora, DIS.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-

pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3560&Geo2=PR&Code2=01&Data=Count&SearchText=kenora&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011e). *Census Profile: Marten Falls 65, IRI.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3560052&Geo2=PR&Code2=01&Data=Count&SearchText=marten%20falls&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011f). *Census Profile: Ontario.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=35&Geo2=PR&Code2=01&Data=Count&SearchText=ontario&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011g). *Census Profile: Thunder Bay, Census Metropolitan Area.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMA&Code1=595&Geo2=PR&Code2=01&Data=Count&SearchText=thunder%20bay&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011g). *Census Profile: Thunder Bay, DIS.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3558&Geo2=PR&Code2=01&Data=Count&SearchText=thunder%20bay&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Statistics Canada. (2011h). *NHS Profile: Aroland 83, IRI.* Retrieved from National Household Survey (NHS) Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558076&Data=Count&SearchText=aroland&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011i). *NHS Profile: Cochrane, DIS.* Retrieved from National Household Survey (NHS) Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3556&Data=Count&SearchText=cochrane&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011j). *NHS Profile: Greenstone, MU.* Retrieved from National Household Survey (NHS) Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558075&Data=Count&SearchText=Greenstone&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011k). *NHS Profile: Kenora, DIS.* Retrieved from National Household Survey Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3560&Data=Count&SearchText=kenora&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011l). *NHS Profile: Marten Falls 65, IRI.* Retrieved from National Household Survey Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-

pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3560052&Data=Count&SearchText=marten%20falls&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011m). *NHS Profile: Ontario.* Retrieved from National Household Survey (NHS) Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=35&Data=Count&SearchText=Ontario&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2011n). *NHS Profile: Thunder Bay, DIS.* Retrieved from National Household Survey (NHS) Profile: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3558&Data=Count&SearchText=thunder%20bay&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1

Statistics Canada. (2016a). *Census Profile: Aroland 83, IRI.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558076&Geo2=CD&Code2=3558&SearchText=aroland&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016b). *Census Profile: Cochrane, DIS.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3556&Geo2=PR&Code2=01&SearchText=cochrane&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016c). *Census Profile: Greenstone, MU.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3558075&Geo2=PR&Code2=01&SearchText=Greenstone&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016d). *Census Profile: Kenora, District.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3560&Geo2=PR&Code2=35&SearchText=kenora&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016e). *Census Profile: Marten Falls 65, Indian reserve.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3560052&Geo2=CD&Code2=3560&SearchText=marten%20falls&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016f). *Census Profile: Ontario.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=35&Geo2=PR&Code2=01&SearchText=ontario&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016g). *Census Profile: Thunder Bay, Census Metropolitan Area.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMACA&Code1=595&Geo2=PR&Code2=35

&SearchText=thunder%20bay&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2016g). *Census Profile: Thunder Bay, DIS.* Retrieved from Census Profile, 2016 Census: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CD&Code1=3558&Geo2=PR&Code2=35&SearchText=thunder%20bay&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Statistics Canada. (2021a). *Census Profile: Aroland, Indian Settlement.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=aroland&GENDERlist=1,2,3&STATISTIClist=1,4&DGUIDlist=2021A00053558076&HEADERlist=0

Statistics Canada. (2021b). *Census Profile: Cochrane, DIS.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=cochrane&GENDERlist=1,2,3&STATISTIClist=1,4&DGUIDlist=2021A00033556&HEADERlist=0

Statistics Canada. (2021c). *Census Profile: Greenstone, MU.* Retrieved from Census Profile: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=greenstone&GENDERlist=1,2,3&STATISTIClist=1,4&DGUIDlist=2021A00053558075&HEADERlist=0

Statistics Canada. (2021d). *Census Profile: Kenora, District.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=kenora&DGUIDlist=2021A00033560&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

Statistics Canada. (2021e). *Census Profile: Marten Falls 65 Indian Reserve.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=marten%20falls&DGUIDlist=2021A00053560052&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

Statistics Canada. (2021f). *Census Profile: Ontario.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=ontario&DGUIDlist=2021A000235&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

Statistics Canada. (2021g). *Census Profile: Thunder Bay, Census metropolitan area.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=thunder%20bay&DGUIDlist=2021S0503595&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

Statistics Canada. (2021g). *Census Profile: Thunder Bay, District.* Retrieved from Census Profile, 2021 Census of Population: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=thunder%20bay&DGUIDlist=2021A00033558&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

Statistics Canada. (2023). *Housing Indicators, 2021 Census.* Retrieved from Data Visualization, 2021 Census: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/dv-vd/housing-logement/index-en.cfm

Statistics Canada. (a). *Surveys and statistical programs – Documentation: 15-602-X.* Retrieved from Supply and Use Tables: https://www150.statcan.gc.ca/n1/en/catalogue/15-602-X

Statistics Canada. (b). *Table 11-10-0190-01.* Retrieved from Market income, government transfers, total income, income tax and after-tax income by economic family type: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110019001

Statistics Canada. (c). *Table 14-10-0023-01.* Retrieved from Labour force characteristics by industry, annual (x 1,000): https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410002301

Statistics Canada. (d). *Table 14-10-0222-01.* Retrieved from Employment, average hourly and weekly earnings (including overtime), and average weekly hours for the industrial aggregate excluding unclassified businesses, monthly, seasonally adjusted: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410022201

Statistics Canada. (e). *Table 14-10-0287-01.* Retrieved from Labour force characteristics, monthly, seasonally adjusted and trend-cycle: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410028701

Statistics Canada. (f). *Table: 18-10-0005-01.* Retrieved from Consumer Price Index, annual average, not seasonally adjusted: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501

Statistics Canada. (g). *Table: 34-10-0126-01.* Retrieved from Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, annual: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410012601

Statistics Canada. (h). *Table 36-10-0103-01.* Retrieved from Gross domestic product, income-based, quarterly (x 1,000,000): https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610010301

Statistics Canada. (i). *Table: 36-10-0104-01.* Retrieved from Gross domestic product, expenditure-based, Canada, quarterly: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610010401

Statistics Canada. (j). *Table: 36-10-0222-01.* Retrieved from Gross domestic product, expenditure-based, provincial and territorial, annual (x 1,000,000): https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610022201

Statistics Canada. (k). *Table: 36-10-0450-01.* Retrieved from Revenue, expenditure and budgetary balance - General governments, provincial and territorial economic accounts (x 1,000,000): https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610045001

Statistics Canada. (l). *Table 36-10-0595-01.* Retrieved from Input-output multipliers, provincial and territorial, detail level: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610059501

Stimpson, M. (2024, April 05). *First Nations to get $15M from Housing Accelerator Fund.* Retrieved from NWO Newswatch: https://www.nwonewswatch.com/local-news/first-nations-to-get-15m-from-housing-accelerator-fund-8558782?

Stolz, W., Levkoe, C. Z., & Nelson, C. (2017). *Blueberry Foraging as a Social Economy in Northern Ontario: A Case Study of Aroland First Nation, Arthur Shupe Wild Foods, Nipigon Blueberry Blast Festival, and the Algoma Highlands Wild Blueberry Farm and Winery.* Retrieved from Centre for Sustainable Food Systems: http://nourishingontario.ca/wp-content/uploads/2017/10/Foraging-Case-Study-FINAL1.pdf

Superior-Greenstone District School Board. (2025). *Superior-Greenstone District School Board.* Retrieved from Superior-Greenstone District School Board: https://www.sgdsb.on.ca/

Taylor, S. (2022, April 13). *Federal department questioned quality of 2021 Indigenous census data: documents.* Retrieved from CBC News: https://www.cbc.ca/news/canada/north/indigenous-gaps-census-1.6419156

Tbaytel. (2025). *Tbaytel's network.* Retrieved from Tbaytel: https://www.tbaytel.net/Shop/Mobility/Network

TBnewsWatch. (2018). *Nakina loses Northern Store.* Retrieved from TBnewsWatch: https://www.tbnewswatch.com/local-news/nakina-loses-northern-store-832250

TBnewsWatch. (2024). *Monthly income spent on food increased 15 per cent in 2023.* Retrieved from TBnewsWatch: https://www.tbnewswatch.com/local-news/monthly-income-spent-on-food-increased-15-per-cent-in-2023-8490873?

Teach for Canada. (2022). *Welcome to Marten Falls First Nation / Ogoki Post.* Retrieved from Teach for Canada: https://teachforcanada.ca/en/wp-content/uploads/2017/09/Marten-Falls-2022-Web.pdf?utm_source

Teach for Canada. (2024). *Welcome to Marten Falls First Nation / Ogoki Post.* Retrieved January 30, 2025, from Teach for Canada: https://teachforcanada.ca/en/wp-content/uploads/2017/09/Marten-Falls-2024.pdf

Thompson, H. (2018). *Beyond Subsistence: Understanding Local Food Procurement Efforts in the Wapekeka First Nation in Northern Ontario.* University of Ottawa.

Thompson, H., Mason, C., & Robidoux, M. (2018). Hoop House Gardening in the Wapekeka First Nation as an Extension of Land-Based Food Practices. *Arctic 71(4)*, 407-421.

Thunder Bay Airport. (n.d.). *Thunder Bay Airport.* Retrieved from Thunder Bay Airport: https://www.tbairport.on.ca/

Thunder Bay Catholic District School Board. (n.d.). *Thunder Bay Catholic District School Board.* Retrieved from Thunder Bay Catholic District School Board: https://tbcschools.ca/

Thunder Bay Community Economic Development Commission. (n.d.). *Welcome to Thunder Bay, Ontario.* Retrieved from Thunder Bay Community Economic Development Commission: https://gotothunderbay.ca/

Thunder Bay District Health Unit. (2025). *Thunder Bay District Health Unit.* Retrieved from Thunder Bay District Health Unit: https://www.tbdhu.com/

Thunder Bay Regional Health Sciences Centre. (2025). *Thunder Bay Regional Health Sciences Centre.* Retrieved from Thunder Bay Regional Health Sciences Centre: https://tbrhsc.net/

Times Star. (n.d.). *Greenstone's Paper.* Retrieved from Times Star: https://www.thetimesstar.ca/the-paper/

Timpson, J., & O'Gorman, K. (2011). *Suicide Crisis Postvention to Marten Falls First Nation & Nishnawe Aski Nation.* Retrieved from https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fapihtawikosisan.com%2Fwp-content%2Fuploads%2F2012%2F02%2FMarten-Falls-Ogoki-Report-to-Community.doc&wdOrigin=BROWSELINK

Town of Cochrane. (2025a). *Calendar of Events.* Retrieved from Town of Cochrane: https://cochraneontario.com/visiting/events/

Town of Cochrane. (2025b). *Water & Wastewater.* Retrieved from Town of Cochrane: https://cochraneontario.com/services/water-wastewater/

Town of Hearst. (2024). *Water and Sewer.* Retrieved from Town of Hearst: https://www.hearst.ca/en/town-hall/departments/public-works-and-engineering/water-and-sewer/

Tung, E., Cagney, K., Hawkley, L., & Peek, M. (2019). Social Isolation, Loneliness, and Violence Exposure in Urban Adults. *Health Affairs (Project Hope), 38*(10), 1670-1678. doi:https://doi.org/10.1377/hlthaff.2019.00563

Turner, L. (2022, September 12). *Life on the line*. Retrieved from CBC News: https://www.cbc.ca/newsinteractives/features/a-divisive-road-to-ring-of-fire-ontario

Understanding Our Food Systems. (2024). *Aroland First Nation.* Retrieved from Understanding Our Food Systems: https://www.understandingourfoodsystems.com/community/afn

United Nations General Assembly. (2010). *Resolution adopted by the General Assembly on 28 July 2010.* Retrieved from https://docs.un.org/en/A/RES/64/292

Water Today. (2024, September 26). *First Nation Short-term Drinking Water Advisories.* Retrieved from Water Today: https://watertoday.ca/viewarticle.asp?article=456

Wawatay Communications Society. (2024). *About Us.* Retrieved from Wawatay News: https://www.wawataynews.ca/about-us

Wdowin, J. (2024). *Measuring and estimating shadow prices.* Retrieved from Economic Statistics Centre of Excellence: https://www.escoe.ac.uk/measuring-and-estimating-shadow-prices/

Webequie Firsts Nation. (n.d.). *Toursim*. Retrieved from Webequie Firsts Nation: http://www.webequie.ca/article/tourism-146.asp

Wendimu, M., Desmarais, A., & Martens, T. (2018). Access and Affordability of “Healthy” Foods in Northern Manitoba? The Need for Indigenous Food Sovereignty. *Canadian Food Studies, 5*(2), 44-72. Retrieved from Canadian Food Studies.

Windsor, J. E., & McVey, J. A. (2005). Annihilation of both place and sense of place: The experience of the Cheslatta T'en Canadian First nation within the context of large-scale environmental projects. *The Geographical Journal (171)*, 146-165.

Women and Gender Equality Canada. (2022, June). *Gender-based Analysis Plus.* Retrieved from Government of Canada: https://women-gender-equality.canada.ca/en/gender-based-analysis-plus/what-gender-based-analysis-plus.html

Working Forest. (2018). *Agoke Lumber Signs Joint Venture to Re-start Nakina Sawmill.* Retrieved from The Working Forest: https://workingforest.com/agoke-lumber-signs-joint-venture-re-start-nakina-sawmill/

Zemanek, M., Helbronner, V., & Ren, H. (2021, January 26). *Energy storage development: opportunities for remote Indigenous communities.* Retrieved from Torys: https://www.torys.com/en/our-latest-thinking/publications/2021/01/energy-storage-development

Attachment A

Final Problem Formulation for Human Health Risk Assessment

MARTEN FALLS FIRST NATION
COMMUNITY ACCESS ROAD

Attachment A - Problem Formulation for Human Health Risk Assessment

February 2026

Disclaimer: AECOM Canada ULC

The attached Report (the "Report") has been prepared by AECOM Canada ULC ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

The Client required that the work be completed on an accelerated schedule. As a result, all activities were carried out within a compressed timeframe. AECOM expressly disclaims responsibility for any omissions, inaccuracies, or impacts that arise from the shortened schedule.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time. AECOM further advises that the accelerated schedule limited the time available for data review, analysis, and internal quality assurance. Accordingly, the Information may contain a degree of uncertainty than would typically be expected for work of this nature performed under a standard schedule. AECOM makes no representations pertaining to the completeness of information made available for review considering the accelerated schedule required by the Client and other third parties.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2024-12-21
© 2009-2024 AECOM Canada ULC All Rights Reserved.

Authors

Report Prepared By:

Lesley Reid, M.Eng., P.Eng. (BC).
Senior Environmental Engineer and Risk Assessment Specialist

Report Reviewed By:

Mary Ellen Starodub, M.Sc.; QPRA (ON and SK)
Risk Assessment Lead

Report Approved By:

Elaine Lee-Ho, M.Sc., P.Biol., P.Ag.
Associate Vice President Department Manager
Ecology and Permitting

Executive Summary

Marten Falls First Nation is a remote community in northern Ontario, approximately 430 km from Thunder Bay, Ontario, located at the junction of the Albany and Ogoki rivers. Marten Falls First Nation is proposing a multi-purpose Community Access Road (the Project) that will connect the community to the Ontario provincial highway network.

The Community Access Road will serve community access and industrial supply needs for both the community (e.g., fuel, construction supplies, water treatment supplies) and industrial proponents (e.g., mining, forestry), thereby minimizing infrastructure corridors in the Far North. Therefore, the project will be for a multi-purpose road built to meet industrial use specifications.

This report presents the problem formulation for human health risk assessment for the human health discipline and is being prepared in support of the community well-being report. While completing the problem formulation for human health risk assessment, information provided by Indigenous Knowledge holders, Indigenous community members, regulators and public stakeholders was used. A problem formulation looks at the biophysical effects of the project on human health. A problem formulation is the first step in a human health risk assessment and is used to make evidence-based decisions using the available information. These decisions often include determining the level of potential health effects and for identifying appropriate mitigation measures and monitoring plans. A human health risk assessment is typically conducted when it is anticipated that individuals may be exposed to elevated concentrations of chemicals or other disturbances in the environment associated with a proposed project through one or more exposure pathways.

Since the problem formulation relies on data from many different technical disciplines the spatial boundaries of the problem formulation reflect the spatial boundaries from each of the source disciplines. The temporal boundaries include the construction phase and the operation and maintenance phase.

An evaluation of the technical support documents for surface water, physiography, terrain and soils, acoustics and vibration, atmospheric environment, groundwater, fish and fish habitat, wildlife, birds, ungulates, vegetation, and land and resource use, was completed to determine the existing conditions, potential effects, mitigations, residual effects, and potential cumulative effects as they relate to human health. Human receptors including residents, workers, cultural and recreational land users were identified, and an evaluation of potential exposure pathways was completed.

To assess the project's effects on biophysical determinants to human health the following steps were conducted:

- The data collected as part of the technical data reports for surface water (including sediment), physiography, terrain and soils, atmospheric environment, and groundwater was screened against applicable standards and / or criteria protective of human health. Any parameters that exceed applicable standards were identified and locations and extent were determined.
- A traditional / country foods sampling program to determine the existing condition contaminant concentrations in frequently consumed country foods was incorporated into the Project in Community meeting #6 held in May 2025. A report summarizing of the results will be provided to the Marten Falls and Aroland Communities for their use.
- In conjunction with the Indigenous Knowledge Reports, Aboriginal Rights and Treaty Interest Reports and the Land and Resource Use Technical Study Document, land use within the areas predicted to be directly effected by the project activities was completed for both indigenous uses and land use by others.

Findings

Surface Water samples were collected a part of the surface water technical study and as part of the development of this problem formulation. Surface water samples collected in Marten Falls in May 2025 contained total coliform and Escherichia coli levels above Ontario drinking water quality standards and Guidelines for Canadian drinking water quality but below guidelines for Canadian recreational water quality.

Surface water samples exceeded the aesthetic objectives for iron, manganese and pH. No exceedances of applied drinking water standards or guidelines for metals, Polycyclic Aromatic Hydrocarbons and volatile organic compounds and inorganics were identified.

It is recommended, based on surface water sampling findings, water from the Albany River should not be used as drinking water without treatment.

Peatlands within the Local Study Area are existing sources of carbon dioxide and methane. Construction activities will remove portions of the wetland, reducing the amount of carbon dioxide and methane released by natural processes.

Soil samples were collected as part of the physiography, terrain and soils technical study. Soil samples exceeded Arsenic and Vanadium human health-based standards/guidelines in multiple locations. Two Cobalt, five Chromium and one Nickel sample exceedances were identified.

The arsenic and vanadium soil contact human health-based standards are less than the generic arsenic and vanadium standards due to the presence of background arsenic and vanadium concentrations in soil which are above the human health-based standard (O.Reg 153 Table 2). Background concentrations of arsenic in soil in Ontario are 11 µg/g (O.Reg. 153 Table 1). Only one sample with a concentration of 30 µg/g has arsenic concentrations in excess of this background concentration. Ninety-nine samples exceed the human health-based standard. Background concentrations of vanadium in Ontario are 86 µg/g (O.Reg. 153 Table 1). Only one sample with a concentration of 93 µg/g has vanadium concentration in excess of this background concentration. Twenty-one samples exceed the human health-based standard.

Two cobalt samples minimally exceed the standard of 22 µg/g with a maximum concentration of 27 µg/g. One sample minimally exceeds the nickel standard of 200 µg/g with a maximum concentration of 210 µg/g. Five samples exceed the Chromium standard of 220 µg/g with a maximum concentration of 410 µg/g.

Some of the sampled soil material may be used as road construction materials. Dust containing these parameters may be generated during construction and operations and maintenance activities. It is recommended that additional evaluation of Arsenic, Chromium and Vanadium, concentrations in road construction materials be completed during quarry geotechnical evaluations.

Sediment samples were collected as part of the surface water technical study document. Sediment samples exceeded the Arsenic and Vanadium human health-based standards / guidelines for soils in multiple locations. There are no exceedances of background soil concentrations.

Sediment samples were compared to human health-based criteria and standards for soils as no human health-based standards for sediment exposure are available. Arsenic human health-based standards are less than the generic arsenic standard due to the presence of background arsenic concentrations in soil which are above the human health-based standard. Arsenic concentrations exceeded the standard of 0.95 µg/g at 30 locations with a maximum concentration of 5.8 µg/g. The background Arsenic concentration from is 11 µg/g (OReg. 153 Table 1). Vanadium concentrations exceeded the standard of 39 µg/g at two locations with a maximum concentration of 55 µg/g. The background concentration of Vanadium from is 86 µg/g (O.Reg. 153 Table 1).

Soil Leachate samples were taken from soil samples collected as part of the physiography, terrain and soils technical study. Soil leachate sample concentrations exceed applicable drinking water standards / guidelines for aluminum, arsenic, cobalt, lead and vanadium.

Although not directly comparable, leachate was screened against drinking water standards / guidelines.

Twelve of the arsenic exceedances were in Geochem samples.

Leachate can enter surface water and groundwater. It is recommended that surface and groundwater not be used as drinking water without treatment.

Groundwater samples were taken as part of the groundwater technical study. Groundwater is not currently being used nor is it proposed to be used as a drinking water source during construction or operations and maintenance activities.

- Groundwater samples were screened against applicable drinking water standards / guidelines It is recommended, based on groundwater sampling findings, groundwater should not be used as drinking water without treatment.

Air quality was measured to determine baseline air concentration levels before project development and also modelled to determine air concentration levels attributable to the project and the project plus baseline during both the construction and the operations and maintenance phases.

Baseline

For baseline measured data, short durations exceedances of 24 hour criteria for Particulate Matter less than 2.5 microns, Particulate Matter less than 10 microns and Total Suspended Particulate were measured. Acrolein exceeded the 1 hour and the 24 hour criteria and Benzo(a)pyrene exceeded the 24 hour and annual criteria.

Baseline measured air data collected was screened against applicable guidelines.

Construction Phase

Modeling during construction activities was completed for a North / South section of the road way and a separate East / West section of the road adjacent to the Marten Falls community. This modelling combined nearby activities to a singular time, thereby creating a worst case scenario model expected to generate the maximum concentrations but not representative of the entire length of the roadway.

For construction phase modelled data, there are exceedances of criteria for 24 hours and less for NO2, PM2.5, PM10, TSP, SO2, CO, diesel particulate, Acrolein and Benzo(a)pyrene. TSP exceedances are based on visibility concerns rather than human health concerns. There are exceedances of annual criterial for TSP, Benzo(a)pyrene and dust deposition. The TSP and dust deposition criteria are based on visibility and soiling respectively.

The Benzo(a)pyrene exceedances are due to elevated baseline Benzo(a)pyrene.

Modeling during operations and maintenance activities was complete for the same North / South and East / West segments of the road. Operations models were for vehicle travel and will apply along the whole road right of way. For operations phase modeling, there are exceedances of short-term criteria (24 hr) for PM2.5, PM10, and TSP and of annual criteria for PM2.5, TSP, benzo(a)pyrene, and dust deposition. Dust deposition also exceeds the 30 day criteria. Dust will be created from materials used as road base. Chemical makeup of the proposed quarry materials will be assessed during geotechnical assessments. Metals concentrations in dust may effect soil, groundwater and sediment quality in areas of dust deposition.

A review of Ontario D-6 Compatibility between Industrial Facilities was not completed.

Operations Phase

Thirty day and annual dust deposition exceeded criteria almost 700 m on either side of the north south segment road and almost 30 m on either side of the east west segment during the operations phase and extends along the whole length of the of the road.

A mitigations assessment during the operations phase for PM2.5, PM10 and TSP was also completed assuming an 80% control efficiency. Even with mitigations, concentrations including background exceeded the criteria for annual PM2.5, 24 hour PM10 and 24 hour and annual totals suspended particulate. No distance were calculated for the PM2.5 and PM10 exceedances. The distance effected by total suspended particulate considering background concentrations extended over 2.5 kilometers from each side of the road along its full the length.

Diesel Emissions were assessed by assuming the combustion models for NOx, SO2, PM and others would encompass diesel produced emissions of these substances as well. Diesel particulate was assessed on the assumption that the diesel particulate values would equate to the modelled PM2.5 values and that background diesel particulate would equate to eight percent of background PM2.5 values.

Receptors

Land use in the vicinity of the Marten Falls Community Access Road includes a combination of traditional activities, such as hunting, fishing, and trapping, as well as recreational pursuits. These uses reflect the cultural and economic importance of the land to Marten Falls First Nation and other stakeholders. However, specific details about the location and intensity of these activities cannot be provided, as much of this information is based on confidential Indigenous Knowledge. For this reason, the assessment relies on general patterns and assumptions drawn from the Land and Resource Use Report rather than precise site-specific data.

Permanent land uses in the area include remote outfitter camps, which typically operate between mid May and late October. There are six remote tourism outfitter operations identified within closer proximity to the proposed route.

Six remote tourism outfitter camps were identified closest to the Project location, within 5 km of the Construction Disturbance Area:

- Esser Lake (Twin Lake Outfitters): 4.3 km
- Painter Lake (Leuenberger Air Service): 0.5 km
- Percy Lake (Leuenberger Air Service; Nakina North Outfitters): 4.8 km
- Painter Lake (Leuenberger Air Service): 4 km
- Caviar Lake (Leuenberger Air Service): 0.9 km
- Leuenberger's Teabeau Site: 4.4 km

These outfitter camps are all located within the area expected to be impacted by exceedances in air quality and Leuenberger Air Service at Painter Lake is expected to be impacted by Particulate Matter (e.g., PM2.5, PM10, diesel particulate) exceedances.

For more information on Remote Tourism Outfitters, see *Land and Resource Use Technical Support Document [Appendix U]*.

Mitigations

1. Blasting protocols should be developed to reduce NO2, SO2 etc. during blasting activities
2. Dust mitigation methods should be employed during construction and operations and maintenance
3. Limits should be place on the burning of brush during construction
4. Groundwater and Surface water should not be used without appropriate treatment for drinking or potable water purposes.
5. Future air, surface water and soils monitoring programs should be reviewed for potential impacts on Human Health.
6. During construction, conduct sampling of proposed quarry material for metals concentrations and potential for metals leachate. These materials will be used as road base and become the fugitive dust during construction and operations activities and will also settle or deposit on vegetation, soils, sediment and surface water, potentially impacting these media.

Table of Contents

1. Introduction 1
1.1 Project Overview 3
1.2 Qualifications of Individuals 3

2. Project Description 4
2.1 Project Components 4
2.1.1 Roads 4
2.1.2 Bridges and Culverts 5
2.1.3 Pits and Quarries 5
2.1.4 Temporary Infrastructure for Construction 5

3. Information Shared by Indigenous Peoples and Other Interested Persons Which Informed This Report 7
3.1 Indigenous Knowledge 7
3.2 Indigenous Engagement 10
3.3 Tailored Impact Statement Guidelines Requirements Mitigation and Enhancement Measures 11

4. Biophysical Valued Components 13

5. Problem Formulation 15
5.1 Purpose of Problem Formulation 15
5.2 Scope of Problem Formulation 17
5.3 Identification of Study Boundaries 18
5.3.1 Spatial Boundaries 18
5.3.2 Temporal Boundaries 18
5.4 Identification of Contaminants of Potential Concern 19
5.4.1 Water 19
5.4.2 Peatlands 42
5.4.3 Physiography, Terrain, and Soils 42
5.4.4 Acoustics and Vibration 52
5.4.5 Atmospheric Environment 56
5.4.6 Traditional Foods 72
5.5 Identification of Human Receptors 88
5.5.1 Residents 90

5.5.2 Workers 93
5.5.3 Cultural and Recreational Use 95
5.5.4 Gender Based Analysis Plus 101
5.6 Identification of Exposure Pathways 104
5.7 Conceptual Site Model 106
6. Monitoring Programs 108
7. Data Gap 110
8. Uncertainty 112
9. Conclusions and Recommendation 114
10. References 116

List of Figures

Figure 1-1: Preferred Route 2
Figure 5-1: Problem Formulation 15
Figure 5-2: Exposure Pathways 16
Figure 5-3: Water Sampling Locations 21
Figure 5-4: Groundwater Sample Locations 33
Figure 5-5: Physical Activities Inclusions in the Aquatics Regional Study Area 38
Figure 5-6: Physical Activities Inclusions in the Groundwater and Geochemistry Regional Study Area 39
Figure 5-7: Soil Sampling Locations 47
Figure 5-8: Soil Sensitivity to Acidification 48
Figure 5-9: Location of Long-Term and Short-Term Baseline Noise Measurements 53
Figure 5-10: Construction Area Model 60
Figure 5-11: Community Area Model 61
Figure 5-12: Heat Map – Harvest Areas 75
Figure 5-13: Air Quality Sensitive Receptor Locations 89
Figure 5-14: Location of Neighbouring Indigenous Communities 91
Figure 5-15: Heat Map – Habitation Areas 92
Figure 5-16: Mineral Exploration Projects in the Regional Study Area 94
Figure 5-17: Heat Map – All Cultural Heritage Categories 96
Figure 5-18: Heat Map – Cultural, Spiritual and Sacred Areas 97
Figure 5-19: Provincial Parks, Recreation and Tourism Study Areas 99
Figure 5-20: Historical Indigenous Routes 102

Figure 5-21: Traplines Map 103
Figure 5-22: Potential Human Exposure Pathways 104
Figure 5-23: Conceptual Site Model 107

List of Tables

Table 1-1: Qualifications of Individuals 3
Table 3-1: Indigenous Knowledge 9
Table 3-2: Indigenous Engagement 10
Table 3-3: Tailored Impact Statement Guidelines Requirements 11
Table 4-1: Valued Components 14
Table 5-1: Study Boundaries 18
Table 5-2: Surface Water Exceedances 22
Table 5-3: Maximum Concentrations of Chemicals as Compared to the Applicable Human Health-based Criteria 23
Table 5-4: Potential Effects, Mitigations and Residual Effects 25
Table 5-5: Groundwater Exceedances 34
Table 5-6: Potential Effects and Mitigations 35
Table 5-7: Water Cumulative Effects 40
Table 5-8: Maximum Concentrations of Chemicals in Soils that Exceed the Applicable Human Health-based Standards 44
Table 5-9: Soil Leachate Exceedances of Potable Water Standards 46
Table 5-10: Potential Effects and Mitigations for Soils 49
Table 5-11: Cumulative Effects 51
Table 5-12: Acoustics and Vibrations Existing Conditions 52
Table 5-13: Noise 54
Table 5-14: Potential Effects and Mitigations for Acoustics and Vibration 55
Table 5-15: Air Quality Standards and Exceedances 57
Table 5-16: Construction Phase – North South Segment 62
Table 5-17: Construction Phase – East West Segment (Community) 63
Table 5-18: Operations Phase – North South Segment 64
Table 5-19: Operations Phase – East West Segment (Community) 65
Table 5-20: Operations Phase – with 80% dust Mitigation 67
Table 5-21: Potential Effects and Mitigations (Air Quality) 68
Table 5-22: Significant Air Impacts 71
Table 5-23: Additional Projects to be Considered under the Cumulative Effect Scenario 72
Table 5-24: Potential Contamination Mechanisms of Country Foods 73
Table 5-25: Number of Samples Collected for Each Category of Traditional Foods 76
Table 5-26: Concentration Range of Substances Analyzed in Traditional Foods Relative to Reference Ranges in Literature 78

Table 5-27: Concentrations of Substances of Potential Concern in Fish 80
Table 5-28: Concentrations of Substances of Potential Concern in Blueberries 82
Table 5-29: Concentrations of Substances of Potential Concern in Canada Goose 85
Table 5-30: Concentrations of Substances of Potential Concern in Moose 87
Table 5-31: Exposure Pathways-Residents, Recreational Users, Workers..... 105
Table 6-1: Monitoring Commitments 108
Table 9-1: Human Health Potential Exposure Pathways..... 115

1. Introduction

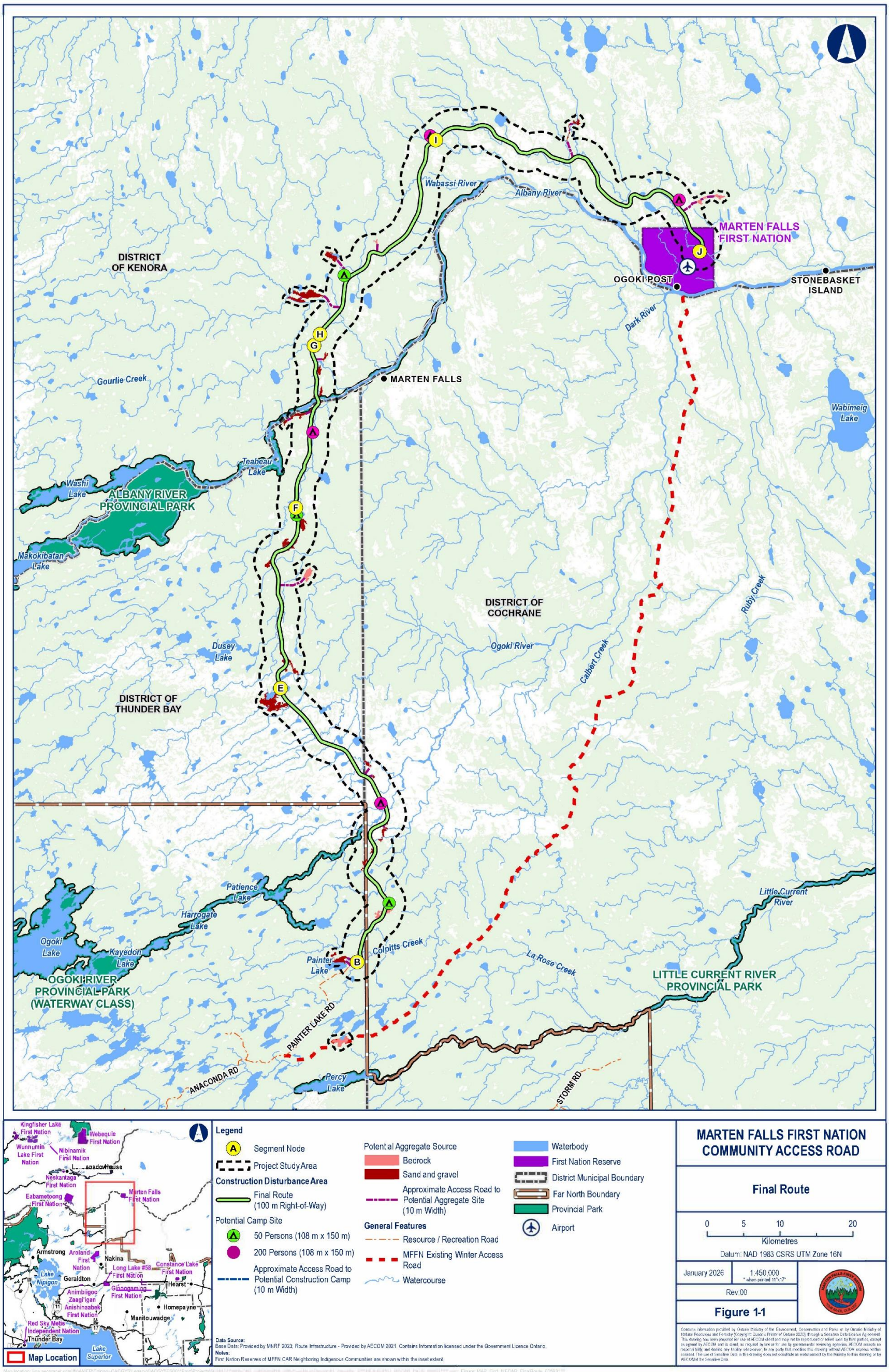
This report presents the problem formulation for human health risk assessment for the human health discipline and is being prepared in support of the community well-being report.

Marten Falls First Nation is a remote First Nation community in northern Ontario, approximately 430 km away from Thunder Bay, Ontario, located at the junction of the Albany and Ogoki rivers. Marten Falls First Nation is proposing a multi-purpose all-season Community Access Road (the Project) that will connect the community to the Ontario provincial highway network. The Project includes the construction and operation of the Community Access Road with the following key characteristics:

- Approximately 184 km (See Section 6 for further details on the selection of the Preferred Route) of two-lane gravel all-season road on a new right-of-way;
- Approximately 100 m wide right-of-way cleared to a width of 60 m; and
- Proposed designated speed limit of 80 km per hour.

Marten Falls First Nation is currently accessible year-round by air transportation out of Thunder Bay, Ontario and Nakina, Ontario, and by a winter access road constructed on an annual basis, if winter conditions permit. Since the 1990s, Marten Falls First Nation has received provincial funding to maintain the 140 km of winter road to the community. **Figure 1-1** shows the preferred project route.

Figure 1-1: Preferred Route



1.1 Project Overview

The Project consists of a Community Access Road from Painter Lake Road located approximately 57 km north of Nakina, Ontario to the Community of Marten Falls First Nation. The Community Access Road will serve community access and industrial supply needs for both the community (e.g., fuel, construction supplies, water treatment supplies) and industrial proponents (e.g., mining, forestry), thereby minimizing infrastructure corridors in the Far North. Therefore, the project will be for a multi-purpose road built to meet industrial use specifications.

In April 2018, Marten Falls First Nation signed an agreement with the Ministry of the Environment, Conservation and Parks to prepare an environmental assessment under the *Ontario Environmental Assessment Act*, 1990 for the design, construction and operation / maintenance of the project. A study under the *Ontario Environmental Assessment Act* was formally initiated by Marten Falls First Nation in March 2019 when the Notice of Commencement for a Terms of Reference for the project was published.

1.2 Qualifications of Individuals

A list of names and qualifications of the authors and technical reviewers of this Report is presented in **Table 1-1**.

Table 1-1: Qualifications of Individuals

Name	Title / Role	Years of Experience	Qualifications
Nadia Baker	Environmental Assessment and Permitting Specialist / Lead Verifier	24	B.Sc.H., P.Biol. R.P.Bio.
Mary Ellen Starodub	National Risk Assessment Lead / Senior Review of Physical Determinants of Health	28+	M.Sc.; QP_{RA} ON and SK
Lesley Reid	Senior Environmental Engineer and Risk Assessment Specialist / Problem Formulation Lead	30	M.Eng., P.Eng.(BC), CSAP (BC)
Crista Gladstone	Senior Social Scientist / Community Well-Being and Socio-Community Lead	15	B.A., MNRM
Victoria Anderson	Socio-Economic Specialist / Research and Review	2	B.A., B.Sc.
Carla Church	Ecologist / Research and Review	14	B.Sc. (HONS), M.Sc. (Candidate)
Tatianna Brierley	Social Impact Specialist / Research and Review	5+	B.E.S (HONS), M.E.S.

2. Project Description

The project will be executed in three main phases:

- Planning and design, which includes the preparation of the Environmental Assessment / Impact Statement Report, obtaining regulatory approvals and detailed engineering design;
- Construction, which is anticipated to last between three and 10 years; and
- Operation and maintenance, for a permanent road.

2.1 Project Components

2.1.1 Roads

The Project consists of an approximately 184 km all-season road within a 100 m wide right-of-way, 60 m of which will be cleared of vegetation. Additional temporary clearing occurring in certain locations to accommodate construction activities, access, borrow areas, aggregate source areas, quarry sites, and temporary infrastructure such as staging areas, camps and debris and / or timber stockpiles will be required. It has a roadway approximately 11 m in width to accommodate a two-lane gravel road with culverts and two-lane bridges at water crossing locations. Traffic levels for the project have been estimated at 700 vehicles per day for the north-south section and 100 vehicles a day for the east-west section of the Marten Falls First Nation Community Access Road. These volumes are reflective of the anticipated peak traffic in 2046.

The predominant building materials will be, blasted rockfill and composite excavation material capped with granular surface material. The majority of blasted rockfill will be obtained from rock outcrops within and / or adjacent to the right-of-way. Building materials will be primarily obtained through the pits and quarries developed specifically to support construction of the project.

Early investigations on permafrost have shown the project is located within a sporadic discontinuous permafrost zone, with known locations documented and monitored. Excavation within identified permafrost areas will be avoided, whenever possible, as cutting into surface vegetation can disturb the permafrost regime resulting in thaw and unstable ground. As a precaution, the design will primarily use fill to minimize any permafrost degradation and will follow the recommendations outlined in a Permafrost Management Plan. At the time of drafting no areas of known permafrost have been found within the Construction Disturbance Area.

2.1.2 Bridges and Culverts

Bridges will be required over the various waterways to provide grade separation with sizes ranging from single span to multi-span bridges to carry two lanes of traffic with appropriate shoulder widths. The foundation supports for the bridge abutments are expected to consist of driven steel piles, drilled concrete piles or concrete spread footings.

Equalization culverts will be installed at locations where it is determined that spring-melt or storm runoff needs to pass from one side of the project to the other to prevent flooding and / or erosion. The purpose of equalization culverts is to maintain the existing surface water drainage patterns in the area. Culverts will be put in place as construction progresses along the project.

2.1.3 Pits and Quarries

Quarries, borrow areas and aggregate source areas will be developed to provide crushed rock and granular materials for the construction of the project and temporary access roads. Most of the rock required for construction is expected to come from quarry sites adjacent to the project. Temporary access roads will be established to connect the various project components as required and will be limited in length to the extent feasible.

All materials will be subject to a geotechnical verification process to evaluate if they possess the desired physical properties for use in construction. The development and operation of all pits and quarries will be subject to the aggregate permitting process under the Aggregate Resources Act (Aggregate Resources of Ontario: Site Plan (2020) Standards and Technical Reports and Information (2023)). Permitted pits and quarries will follow the progressive and final rehabilitation requirements outlined in the approved site plans under the Act.

Only material that has been cleared through a geochemical verification process will be utilized for the road surface to avoid acid rock drainage or metal leaching. Monitoring of runoff will be conducted from an erosion and sediment control perspective; further details about this specific type of monitoring will be available in the Erosion and Sediment Control Plan.

2.1.4 Temporary Infrastructure for Construction

Temporary access roads may be required to access the right-of-way during construction. The purpose of the temporary access roads is to facilitate emergency access, equipment and personnel access, and to provide access to and from quarries, borrow sites and aggregate source areas. The temporary access roads will be cleared, but not grubbed, to approximately 10 m wide to accommodate equipment movement.

Upon completion of construction, sand and gravel pits, including temporary access roads leading to the pits will be rehabilitated (progressive and final rehabilitation) and surrendered in accordance with the Aggregate Resources Act.

Temporary construction camps, staging areas and stockpile areas are anticipated to be established at various locations along the right-of-way and / or near other project components. These components are proposed to support crews, store equipment, vehicles, materials and supplies.

3. Information Shared by Indigenous Peoples and Other Interested Persons Which Informed This Report

While completing the problem formulation for human health risk assessment, information provided by Indigenous knowledge holders, Indigenous community members, regulators and public stakeholders was used. This information and how it informed the development of this report are described below. This section does not detail all the information, comments or questions received related to the project and is limited to only the information which informed this report. For a full description of all consultation and engagement related to the Community Access Road refer to the *Record of Consultation and Engagement for the Environmental Assessment / Impact* Statement Report. Information related to the Indigenous Knowledge Program can be found in the *Marten Falls Community Access Road: Aboriginal and / or Treaty Rights and Interests Draft Existing Conditions Report* (Dillon Consulting Limited, 2024b).

3.1 Indigenous Knowledge

Indigenous Knowledge refers to Indigenous systems of knowledge as well as cultural practices related to the production of knowledge based on traditional belief systems, relationships to the environment, and community practices. It is the accumulated and living knowledge built upon the historic experiences of Peoples living on the land and adapting to social, economic, environmental, spiritual and political change (Chiefs of Ontario, 2025). It includes knowledge about the natural environment (e.g., locations of caribou seasonal use and calving areas), the relationships between environmental changes and species or ecosystems, and how potential effects to the environment can be avoided or reduced.

Indigenous Land and Resource Use refers to specific areas and resources used for traditional purposes when Indigenous peoples learn and practice their Indigenous Knowledge (Garvin & Northern Forestry Centre (Canada), 2001). This includes the areas and sites used for hunting, trapping, fishing, and gathering and the resources harvested, as well as cultural sites, features and practices—sometimes referred to as Traditional Land Use. Importantly, Indigenous Land and Resource Use also encompasses modern activities that integrate socio-cultural, environmental, and economic dimensions.

In 2019, the Marten Falls First Nation Community Access Road Project Team launched a program to collect Indigenous Knowledge. The Indigenous Knowledge Program is a critical component of the information base upon which the assessments will rely. The information generated through the Indigenous Knowledge Program has been woven with scientific approaches, and both knowledge systems will be given equal consideration in forming the

foundation for existing conditions, predicting potential project effects, and determining appropriate mitigation and monitoring methods.

The Indigenous Knowledge Program occurs in two concurrent phases:

1. Collecting existing Indigenous Knowledge and information on Indigenous land and resource use to help inform the early stages of the assessments; and
2. Completing project-specific Indigenous Knowledge and Lands & Resource Use studies.

The protection and confidentiality of Indigenous Knowledge and information on Indigenous land and resource use is of the utmost importance to the Project Team. To honour and respect this important information, Indigenous Knowledge Sharing Agreements were established with interested communities prior to the use of community information. The Sharing Agreement outlines how confidential and sensitive information will be woven into the project's environmental / impact and design processes.

All Indigenous communities and groups identified by the Ministry of the Environment, Conservation and Parks and the Impact Assessment Agency of Canada (the Agency) through the Indigenous Engagement and Partnership Plan have had the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the project, and / or complete project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program included opportunities for Indigenous communities and groups to meet with the Proponent to discuss the program, ask questions, and share concerns and interests.

Significant effort was made to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resources was used and cultural values considered in reporting, and how potential effects to Aboriginal and Treaty Rights and Interests were assessed. Measures to support this included but were not limited to: engaging Indigenous communities to request information on Indigenous Knowledge and Indigenous land and resource use and cultural values; to inform existing conditions, providing Indigenous communities with draft sections of the Environmental Assessment / Impact Statement Report; to show how Indigenous Knowledge and information on Indigenous land, resource use, and cultural values has been integrated, and to confirm that Indigenous Knowledge and related information has been presented appropriately. The proponent aimed to complete collaborative working sessions with Indigenous communities to inform the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights were

assessed is provided in the *Aboriginal and Treaty Rights and Interests Study Plan* (Dillon Consulting Limited, 2021).

Information provided by Indigenous knowledge holders, recognized as such by their Indigenous Community, has been, obtained through literature review and shared directly by Indigenous nations in support of this project through face-to-face meetings or receipt of Indigenous knowledge reports. The Indigenous Knowledge information, some of which is confidential, that has been used to inform this reporting is described in **Table 3-1**.

Table 3-1: Indigenous Knowledge

Valued Component	Indigenous Community	Details	Section Reference
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Aroland First Nation	• Information from Natural Resource Management and Indigenous Food Systems in Northern Ontario (LeBlanc 2014) was used to inform the list of traditional foods and traditional uses of the land for this project. Information was also included about contamination and spraying concerns to various plant species.	• Sections 5.4.6 and 5.4.5
• **Biophysical Determinants to Human Health**	• Marten Falls First Nation	• Information from the Draft Community Based Land Use Plan (Marten Falls First Nation, 2020) was used to provide information on the contemporary land use locations, such as trapping, tanning hides, and crafting.	• Section 5.5 & 5.5.3
• **Biophysical Determinants to Human Health**	• Marten Falls First Nation	• Information received during the Community Access Road field monitoring programs informed the project about the existing biophysical conditions.	• Sections 5.4 & 5.4.5
• **Consumption of Traditional Foods**	• Aroland First Nation	• The Understanding Traditional Food Behaviour and Food Security in Rural First Nation Communities: Implications for Food Policy report was used to understand which traditional foods are consumed.	• Section 5.4.6
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Marten Falls First Nation	• Information obtained from the Marten Falls First Nation Community Access Road Indigenous Knowledge Program was used to describe the locations for cultural activities as well as trapping, hunting, fishing, and other harvesting. Information collected also provided insight into concerns from the Community about the potential effects of the Community Access Road on harvesting practices and on the potential of pollution from the project.	• Sections 5.4.6 and 5.5
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Aroland First Nation	• Information obtained from the Marten Falls First Nation Community Access Road Indigenous Knowledge program was used to describe the locations for cultural activities as well as trapping, hunting, fishing, and other harvesting. Information from this program also provided insight into concerns from the Community about the potential effects of the Community Access Road on harvesting practices and on the potential of pollution from the project.	• Sections 5.4.6 and 5.5

Valued Component	Indigenous Community	Details	Section Reference
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Aroland First Nation	• The Aroland First Nation has noted the caribou as a species of concern. Outfitters operate seasonally (early June–late October), aligning offerings with available game and fish; workers are present during these periods and overlap with local traditional use.	• Section 5.5.3.3
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Marten Falls First Nation	• Species identified for harvest within the Local Study Area include walleye, whitefish, trout, pike, and sturgeon. Fishing typically peaks in the Spring and Fall but is harvested year-round.	• Section 5.5.3.4

3.2 Indigenous Engagement

In addition to the Indigenous Knowledge provided by Indigenous Knowledge Holders, information was collected from Indigenous Community members with interests in the Project. The information that has been used to inform this report is described in **Table 3-2**.

Table 3-2: Indigenous Engagement

Valued Component	Details	Section Reference
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• A community member noted the presence of traplines between Dusey Lake and Marten Falls First Nation. (PIC #4 December 2022)	• Sections 5.4.6 and 5.5
• **Consumption of Traditional Foods** • **Access to Clean Water** • **Biophysical Determinants to Human Health**	• Dust, vibration and contamination generated by road traffic that could negatively impact water crossings, and overnight cabin and camp sites. Increased traffic that would create noise and scare animals. Impacts to species that are present adjacent to existing roads that would be used as part of the Community Access Road Route (e.g., Anaconda and Painter Lake Roads) accidents that could contaminate waterways and the environment including spills. Accidents and spills into waterways during construction and road operation. Concerns related to the community's ability to access and use areas they rely on to hunt, fish trap and gather plants. Roads might make it easier for people to access harvesting areas, including at bridges and water crossings. Concerns regarding the community's ability to maintain their traditional way of life, including hunting, fishing, trapping, gathering, and staying out on the land due to environmental impacts. Concerns related to the ability of community members to access and use harvesting areas and areas of significance. Concerns related to impacts to vegetation including plants along the road and the gathering of food and medicinal plants (Andrew Peach Letter, Sept. 2024)	• Sections 5.4 and 5.5

Valued Component	Details	Section Reference
• **Biophysical Determinants to Human Health**	• The area north of the airport is widely used by the community, including children. It was also noted that the location is used as a cemetery and ceremonial areas. Concern was raised the project may interfere with outings, ability to gather firewood and socialize. (PIC #3, June 2022)	• Section 5.5
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Two locations were located close to hunting and fishing areas, outfitters camps and potential land use areas of Aroland First Nation. One location is in an area of a trapper from the community. (Groundwater teleconference)	• Section 5.5
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Hope the medicine of the land will not be touched and destroyed. Trapline near the study area and concern about the land, animals and lake / river. (Feedback forms, July 2024 meeting)	• Sections 5.4 and 5.5
• **Consumption of Traditional Foods** • **Access to Clean Water** • **Biophysical Determinants to Human Health**	• Concern about the land and water being polluted by the mine and polluted by ground transportation. A trapline was located by Teabeau Lake. (In person Community Meeting October 2024)	• Sections 5.4 and 5.5
• **Consumption of Traditional Foods** • **Biophysical Determinants to Human Health**	• Indigenous community members in the Local Study Area emphasized ongoing cultural use north of the airport, including locations used by children, cemetery areas, and ceremonial spaces, with concerns that project activities could interfere with outings, firewood gathering, and socializing (PIC #3, June 2022)	• Section 5.5.3.1

3.3 Tailored Impact Statement Guidelines Requirements Mitigation and Enhancement Measures

The Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020) Section 20 requirements for community well-being are provided in **Table 3-3**. The applicability of these requirements has been evaluated and will be adapted to the needs of the site, environment and project activities.

Table 3-3: Tailored Impact Statement Guidelines Requirements

Valued Component	Details	Section Reference
• **Consumption of Traditional Foods**	• Provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in current and future availability of country foods • Describe and quantify the health risk from exposure to COPCs via consumption of country foods and differential risk for vulnerable subgroups	• Section 5.4.6
• **Access to Clean Water – Drinking Water**	• Provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in current and future availability of water for drinking • Identify predicted effects of the project on the quality and quantity of ground or surface water used for domestic uses based on the most stringent guideline values	• Section 5.4.1

Valued Component	Details	Section Reference
• **Access to Clean Water – Recreational Water**	• Provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in current and future availability of water for recreational and cultural purposes	• Section 5.4.1
• **Biophysical Determinants to Human Health – Air Quality**	• Provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in air quality	• Section 5.4.5
• **Biophysical Determinants to Human Health - Noise and Vibration**	• Provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in noise exposure and effects of vibration	• Section 5.4.4
• **Biophysical Determinants to Human Health - Land use**	• Provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels. At minimum, provide a map showing approximate locations of permanent residences, temporary land uses (e.g., cabins and traditional sites) and known locations of sensitive human receptors (e.g., schools, hospitals, community centres, retirement complexes or assisted care homes)	• Section 5.5 and Figure **5-11**

4. Biophysical Valued Components

The biophysical component of human health pulls information from a broad assortment of valued components from many disciplines of the project. The Impact Assessment Agency of Canada describes **valued components** as the environmental, health, social, economic, or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and area of concern or value to the public, Indigenous peoples, federal authorities and interested parties (Government of Canada, 2024b).

Indicators represent the resource, feature, or issue related to the valued component that, if changed, may demonstrate a positive or negative effect on the environment, indicators and therefore on the valued component. The effect may be characterized or assessed quantitatively or qualitatively.

The valued components evaluated as part of the biophysical human health assessment are presented in **Table 4-1**. These valued components have been rolled up into the community well-being report.

Table 4-1: Valued Components

Valued Component	Indicators	Sub-Indicator	Rationale for Selection	Measures of Change
Traditional Foods	Quality of traditional foods	Change in quality of traditional foods within the study area.	Potential for contamination of country foods due to construction and operation activities.	Compare concentrations of contamination in country foods from an existing conditions assessment to concentrations predicted through modelling and / or measured during monitoring.
Access to Clean Water	Quality of drinking water	Change in the quality of drinking water.	Potential for contamination of drinking water sources due to construction and operation activities.	Compare concentrations of contamination in drinking water from an existing conditions assessment to concentrations predicted through modelling and / or measured during monitoring.
			Potential for improved maintenance and operation of the water treatment facility to allow for improved municipal water quality through easier access to licenced trained technicians, parts and equipment, and laboratory analysis.	
	Quality of recreational water	Change in the quality of water used for recreational purposes (swimming, boating and other water activities).	Potential for contamination of recreational water sources due to construction and operation activities.	Compare concentrations of contamination in water used recreationally from an existing conditions assessment to concentrations predicted through modelling and / or measured during monitoring.
Biophysical Determinants to Human Health (in addition to drinking water and recreational water use)	Air quality	Separation distance and orientation of location (upwind, downwind or crosswind) from project sites to human receptors including sensitive receptors in residential, school, daycare, hospital and community centre environments.	Project sites proximity to receptors determines level of air quality effects.	Based on mapped distance to receptors from road, interpret modelling conducted for the potential for inhalation exposure and nuisance dust / dust contact due to project construction and operation and maintenance activities. Compare to existing conditions and / or concentrations measured during monitoring.
		Number and type of vehicles used during construction phase (heavy vehicles vs light vehicles and fuel type, bulk fuel storage).	Construction equipment and activities will alter air quality.	Compare existing versus predicted air concentrations due to project emissions during construction and / or concentrations measured during monitoring.
		Change in number and type of vehicles per day, per hour, per season, per year, during operation.	Increased traffic will alter local air quality.	Compare existing versus predicted air quality concentrations based on actual number of vehicles per day, per hour, per season, per year using the road and / or concentrations measured during monitoring.
		Change in the quality of air near active construction and operations and maintenance sites.	Construction and operations could result in pollution of local air quality, through other construction including clearing, burning, blasting. Operations and maintenance activities due to vehicle emissions.	Compare existing versus predicted air concentrations due to other project construction and operations and maintenance activities and / or concentrations measured during monitoring.
Biophysical Determinants to Human Health (in addition to drinking water and recreational water use) (cont'd)	Noise and vibration	Separation distance from project sites to human receptors including sensitive receptors in residential, school, daycare, hospital and community centre environments.	Road and construction noise and vibration levels could impact use of personal and community spaces. Project site proximity to receptors will determine noise and vibration levels.	Based on mapped distance to receptors from road, interpret modelling conducted for the potential for noise and vibration due to project construction and operation and maintenance activities. Compare to existing conditions and / or concentrations measured during monitoring if complaints.
		Change in number and type of vehicles used during construction phase.	Construction activities could result in temporary noise and vibration disturbances.	Compare existing versus predicted and / or monitored noise and vibration levels during construction if complaints.
		Use of other construction equipment including jackhammers and drills and construction activities including blasting.	Construction activities could result in temporary noise and vibration disturbances.	Compare existing versus predicted and / or monitored noise and vibration levels during construction if complaints.
		Change in number and type of vehicles per day, per hour, per season, per year, during operation.	Higher traffic levels could contribute to increased noise and vibration levels.	Compare existing versus predicted and / or monitored noise and vibration levels during operation phase if complaints.
	Soil quality	Change in the quality of soil near project sites.	Construction and operations activities could result in contamination to soils through deposition of dust.	Compare existing versus predicted and / or monitored concentrations of project effects to soil in locations where soil impacts are expected based on dust deposition models.
Biophysical Determinants to Human Health (in addition to drinking water and recreational water use) (cont'd)	Sediment quality	Change in the quality of sediment near project sites.	Construction and operations activities could result in contamination to sediment through surface water runoff carrying solids, particulates and / or debris and through deposition of dust.	Compare existing versus predicted and / or monitored concentrations of project effects to sediment in locations where sediment impacts are expected based on dust deposition models.
	Land use	Access to lands adjacent to the project site could increase time spent pursuing traditional or recreational activities.	Use of the land for traditional and recreational activities could increase direct contact with soils and sediment, increase exposure to impacted outdoor air, increase consumption of traditional foods, increase direct contact with recreational water and alter sources of drinking water.	Compare existing versus predicted use of lands and recreational water bodies. Qualitative assessment to understand the population engaged in traditional and / or recreational activities.
	Accidents and malfunctions	Releases of contaminants during an accident or malfunction.	Potential for contamination of soils, sediments, air, drinking water, and recreational water after an accident or malfunction.	Compare existing versus predicted concentrations of project emissions in soil, sediment, air, drinking water and recreational water.

5. Problem Formulation

5.1 Purpose of Problem Formulation

The Tailored Impact Statement Guidelines for the project requires the Proponent to conduct a problem formulation exercise / preliminary model predictions to determine whether a human health risk assessment is required.

A Problem Formulation looks at the biophysical effects of the Project on human health (**Figure 5-1**). A problem formulation is traditionally the first step in a human health risk assessment and is useful in making evidence-based decisions using the available information. The findings of a problem formulation can help determine the level of potential health effects and identify appropriate mitigation measures and monitoring plans. A human health risk assessment is typically conducted when it is anticipated that individuals may be exposed to elevated concentrations of chemicals or other disturbances in the environment associated with a proposed project through one or more exposure pathways. The purpose of a human health risk assessment is to provide an estimate of the potential risks to human health from all project phases and to respond to government and public concerns related to those projected effects.

Figure 5-1: Problem Formulation

A well constructed human health risk assessment can provide increased defensibility for the conclusions of an assessment and help verify if identified concerns related to human health are justifiable. A human health risk assessment can be used to provide a quantitative estimate of the likelihood of potential risk in an exposed population, to highlight the need for mitigative measures where there may be elevated exposures, and to guide the development of follow-up monitoring plans, remediation, and / or risk management approaches to reduce unacceptable risks.

A quantitative human health risk assessment is required when measured or modelled contaminant of concern concentrations in one or more environmental media (soil, groundwater, surface water, air, country foods) exceed screening criteria, indicating potential exposure pathways and adverse health outcomes for a proposed project. If there are no operable exposure pathways to receptors, qualitatively there is no risk; a qualitative

screening approach may be sufficient to determine whether mitigation of risk involving remedial action and or risk management of the effected biophysical factor and operable exposure pathway is necessary (Government of Canada, 2024c).

For a potential risk to occur there must be some exposure by the human receptors effected by the project to the contaminants of concern. For risk assessment purposes, an exposure pathway consists of a contaminant source, a mechanism of chemical release, a retention or transport medium, a point of potential contact with the contaminated medium (exposure point), and including an exposure route (ingestion, inhalation, dermal contact) by which a chemical physically contacts or enters the body (Government of Canada, 2021)

For an exposure to occur, a complete exposure pathway must be present. For there to be a potential risk, all three components (receptor, exposure and contaminant(s) of concern) must intersect (**Figure 5-2**).

Figure 5-2: Exposure Pathways

Biophysical determinants to human health refer to the biological and physiological aspects of health. These effects are examined in the context of exposure to chemicals in the environment such as soil, water, and air (Government of Canada, 2024a). The description of effects considered magnitude, geographical extent, timing, frequency, duration, reversibility, social and ecological contexts and uncertainty (Government of Canada, 2024d).

This problem formulation is looking at the biophysical hazards that humans may be exposed to related to changes in the environment from the construction and operation and maintenance of the project. Whilst this does include an assessment of potential human exposure to chemicals in country foods harvested from the community, it does not include any analysis of impacts to the Fish, Wildlife, Birds and / or Ungulates from chemical contaminants and from physical hazards (i.e. accidents involving vehicles). These potential ecological impacts are assessed in the respective technical support documents.

5.2 Scope of Problem Formulation

Each technical discipline (Atmospheric Environment, Groundwater, Surface Water, Physiography, Terrain and Soils, Noise and Vibration, Fish and fish Habitat, Birds, Wildlife, Ungulates, and Vegetation) was responsible for identifying, assessing and evaluating the potential effects of the project on their discipline.

In an Environmental Assessment scenario, future exposure and subsequent risks for various phases of the project must be based on the prediction of environmental concentrations through modelling. Depending on model inputs and assumptions, phases of the project that are modelled, locations and timeline, sometimes modelling may result in exposures to different concentrations of the same chemical over the life of the project.

Existing concentrations of chemicals of potential concern can be measured in soils, sediment, water (surface and groundwater) and air. Future impacts can be modelled based on project specific releases. If the project releases contaminants of potential concern to air, then aerial deposition rates should be included in predicting soil, sediment and water concentrations.

Where a project is expected to result in release of contaminants to the environment and vegetation, animals or aquatic life may be impacted, ingestion of contaminants via food can be a significant pathway of exposure. To assess the potential health effects associated with increased levels of contaminants in foods grown or obtained near the site, it is necessary to have a measurement of the existing conditions concentrations of the contaminants in edible foods.

In some situation the levels of some contaminants may be identified as being higher than applicable standards during the existing conditions assessment. If the project is expected to contribute contamination to the environment of these same contaminants additional monitoring during the project is recommended (Government of Canada, 2024c).

Cumulative effects consider any environmental effects that are likely to result from the project in combination with the environmental effects of other physical activities that have been or will be carried out. Cumulative effects build on the negative residual effects of the project and the incremental changes from other existing nearby activities and proposed

nearby activities. The activities that may overlap with the project may overlap spatially, temporally or both. The overlaps may be different for each technical study area.

This Problem Formulation draws information from a variety of sources including discipline specific reports prepared for the Environmental Assessment / Impact Statement. Further information related to each discipline can be found in the appropriate discipline specific reports.

5.3 Identification of Study Boundaries

5.3.1 Spatial Boundaries

The Problem Formulation relies on the spatial boundaries from each of the source disciplines. Additional information on each discipline boundary can be found in the individual discipline reports. Study area mapping for each discipline is included in **Attachment A** - **Figures** and described in **Table 5-1**.

Table 5-1: Study Boundaries

Study Area	Map Name	Figure Number
Surface Water and Sediment	Aquatics Habitat Effects Assessment Local and Regional Study Area	Appendix A – Figures Figure A-1
Groundwater	Groundwater Effects Assessment Local and Regional Study Areas	Appendix A – Figures Figure A-2
Peatlands	Peatlands Effects Assessment Local and Regional Study Areas	Appendix A – Figures Figure A-3
Soils	Physiography, Terrain and Soils Effects Assessment Local and Regional Study Area	Appendix A – Figures Figure A-4
Acoustic and Vibration	Acoustic and Vibration Environmental Effects Assessment Local and Regional Study Area	Appendix A – Figures Figure A-5
Archaeology and Cultural Heritage	Archaeology and Cultural Heritage Study Area	Appendix A – Figures Figure A-6
Air Quality	Air Quality Study Area	Appendix A – Figures Figure A-7
Land and Resource Use	Land and Resource Use Study Area Map	Appendix A – Figures Figure A-8

5.3.2 Temporal Boundaries

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the project will be considered. The project is planned to occur in three phases, which are briefly described below.

- **Construction Phase:** The time from start of construction, including site preparation activities, to the start of operations and maintenance of the Community Access Road. Decommissioning of temporary construction works is

included in the construction phase. The construction phase is anticipated to take approximately three to ten years to complete.

- **Operation and Maintenance Phase:** The operation and maintenance phase starts once construction activities are complete and lasts for the life of the project. The operation and maintenance phase of the project is considered to be permanent based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.
- **Decommissioning Phase:** There are currently no plans to decommission the Community Access Road as there is no expected / known end date for its need. Therefore, future suspension, decommissioning, and eventual abandonment will not be considered in this report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long duration of operation and maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations. For human health risk assessment, the consideration when calculating risk to a human is to consider exposures over an 80-year lifespan (Government of Canada, 2024c).

5.4 Identification of Contaminants of Potential Concern

The Problem Formulation process identifies what and how people within the Construction Disturbance Area may be exposed to contaminants in soil, surface water, groundwater, air, sediment, soil leachate, and country foods because of the project and its activities. This can be during either one or all phases of the project. Foods can include traditional foods obtained through hunting, fishing or gathering. It also includes foods grown in produce gardens in the community (R. Moonias, personal communication, March 7, 2025). Contaminants in food arise from exposure of the foods made with ingredients of plants and animals to the same water, sediment, soil, and air. For each technical discipline, existing conditions, potential effects of the project, mitigations and residual effects were assessed to identify the potential for any human exposure to contaminants above applicable provincial standards and federal guidelines or at levels which may pose an unacceptable risk to human health. The project's potential effects were also considered in cumulation with other nearby projects.

5.4.1 Water

Biophysical determinants to human health could be effected by chemical and microbial exposures through the consumption of contaminated water or absorption of contaminants through the skin during recreational activities involving water or bathing. Both surface

water and groundwater, which can be used as potable water sources, may be used for cooking and bathing. Currently the community is on a boil water advisory and bottled water is provided for drinking. This is expected to continue for as along as the boil water order is in effect. Project plans for camp locations are to transport potable water to the camps and not source drinking water from nearby surface water or groundwater sources.

5.4.1.1 Surface Water and Sediment Quality

5.4.1.1.1 Existing Conditions

The *Surface Water Technical Support Document: Existing Conditions and Effects Assessment* (WSP, 2025c) presents the studies conducted for surface water and sediment. A total of 45 waterbodies are crossed by the Preferred Route and an additional 24 defined waterbodies are crossed by temporary access roads.

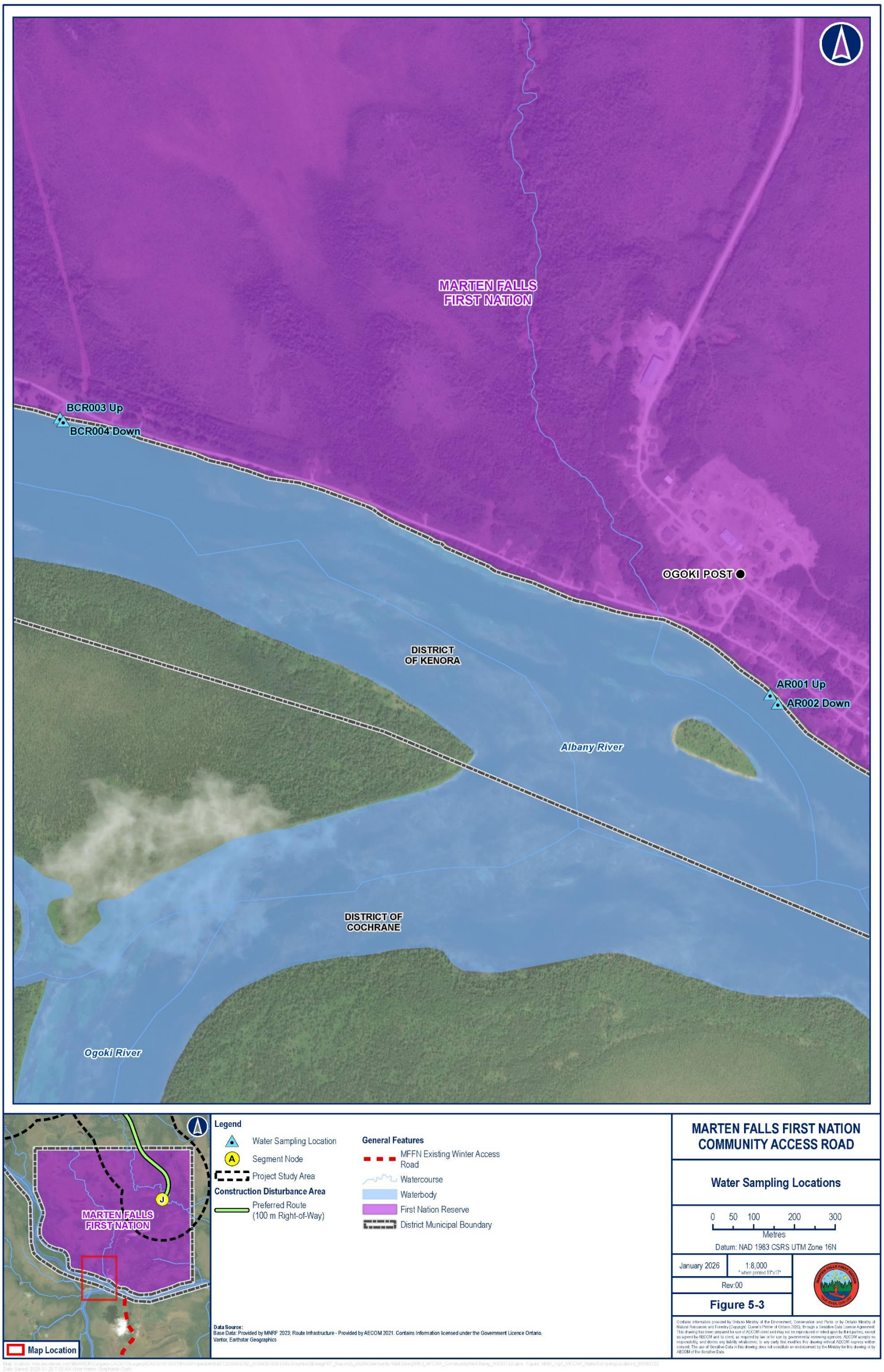
On May 23, 2023, a review of the Ministry of Environment and Climate Change 2018 Provincial Water Quality Monitoring Network data identified six water quality monitoring stations in and around the Regional Study Area. Additionally, water and sediment quality data from the Cliffs Chromite Project were used to further assess local and regional conditions. This included monitoring water quality at 43 waterbody crossings and sediment quality at 38 crossings.

It was reported that surface water in the Albany River adjacent to Marten Falls First Nation is used as a drinking water source (R. Moonias, personal communication, February 19, 2025). During the May 2025 Project in Community meetings, four surface water samples were collected from two locations in the Albany River adjacent to the community. A sample was taken upstream and downstream of the community pier in an area reportedly used for swimming and a sample was taken upstream and downstream of the boat tie up area adjacent to the water treatment plant intake pump station.

The data tables from the sediment and surface water analysis are included in **Attachment B**.

Additional surface water sampling locations are shown on **Figure 5-3**.

Figure 5-3: Water Sampling Locations



5.4.1.1.1.1 Surface Water

The individual technical study documents compared parameters measured to selected Sediment Quality Guidelines and Surface Water Guidelines as required.

To identify any potential contaminants of concern to human health that are associated with existing conditions, screening of the surface water data against standards and guidelines protective solely of human health was conducted, assuming no pre-treatment of the source water before use for drinking water and other potable usage. The water quality results were compared to the provincial standards and federal criteria for chemical and microbiological contaminants, specifically general parameters, metals, Polycyclic Aromatic Hydrocarbons and volatile organic compounds and bacteria in surface water:

- Ontario drinking water quality standards (O. Reg 169/03)
- Guidelines for Canadian Drinking Water Quality (CDWQ) - Maximum acceptable concentration (MAC) and Aesthetic Objective (AO)
- Guidelines for Canadian Recreational Water Quality – these Guidelines focus on indicators of microbial contamination - such as fecal contamination, cyanobacteria, microbiological pathogens and basic physical, aesthetic and chemical characteristics – and do not set limits for metals, hydrocarbons and volatile organic compounds.

As it was identified that water in the Albany River was potentially used by some community members for drinking water (R. Moonias, per. Comm February 19, 2025) and a section of the Albany River adjacent to the community pier is used for swimming, four water samples were collected from the Albany River on May 28, 2025 to understand the surface drinking water and recreational water conditions. Additional Information on these samples is included in the *Country Foods and Drinking Water Report Dated January 2026*.

All of the four water samples taken from the Albany River in May 2025 contained total coliform and *Escherichia coli* counts above the Ontario drinking water standards and Health Canada recommended guidelines but below recreational water standards (**Table 5-2**). The full data screening is included in **Attachment B**.

Table 5-2: Surface Water Exceedances

Parameter	Maximum Concentration (mpn/100 mL)	O Reg 169/03 (mpn/100 mL)	CDWQ-MAC (mpn/100 mL)	CRWQ (mpn/100 mL)
Escherichia coli	3	0	0	235
Total Coliforms	200	0	0	na

Notes: CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration [summary-table-pdf-template-eng.pdf]
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards [O. Reg. 169/03 ONTARIO DRINKING WATER QUALITY STANDARDS | ontario.ca]
CRWQ are the Canadian Recreational Water Quality Guidelines https://www.canada.ca/content/dam/hc-sc/documents/services/publications/healthy-living/guidelines-canadian-recreational-water-quality-summary-document/guidelines-canadian-recreational-water-quality-summary-document.pdf

No detectable levels of polycyclic aromatic hydrocarbons and volatile organic compounds, with the exception of methylene chloride, were measured in water samples collected from any locations. Only Iron and Manganese concentrations exceeded aesthetic objectives (**Table 5-3**). Full surface water data screening tables are included in **Attachment B.** Full surface water investigation details is included in *Surface Water Technical Support Document: [Appendix F].*

Table 5-3: Maximum Concentrations of Chemicals as Compared to the Applicable Human Health-based Criteria

Chemical Name	Surface Water Max (µg/L)	O Reg 169/03 (µg/L)	CDWQ-MAC (µg/L)	CDWQ – AO (µg/L)	Number of Sample that Exceed
Iron	1200	-	-	*100	81
Manganese	270	-	-	*120	2

Notes: CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration [summary-table-pdf-template-eng.pdf]
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards [O. Reg. 169/03 ONTARIO DRINKING WATER QUALITY STANDARDS | ontario.ca]
*guideline is for an aesthetic objective
^standard if OREG153/04 Table 2 GW1

Analytical testing for PCBs, and pesticides were not conducted as part of the Surface Water Technical Study.

Microbial testing indicates that the water from the Albany River must be treated before it is safe to drink to meet the Ontario Drinking Water Quality Standards and Health Canada's Canadian Drinking Water Quality Guidelines.

5.4.1.1.1.2 Sediment

As there are no specific sediment standards / guidelines for the protection of human health, the sediment data provided in the technical support document was screened against human health-based soil criteria for direct contact including incidental ingestion and skin contact. Specifically, the sediment data was screened against:

- Canadian Council of Ministers of the Environment Human Health Soil Quality Guidelines for Residential and Parkland Land Uses (CCME HH SQG R/P)
- Ontario Soil, ground water and sediment standards, Table 2 Full Depth Generic Site Conditions Standards for Soil in a Potable Ground Water condition, Residential/Parkland/Institutional Property Use (OREG-153 (T2)/SO/R-P-I/Coarse)
- Ontario Soil, ground water and sediment standards, Table 2 Component S1 Soil Contact Full Depth Site Condition Standards for Soil in a Potable Ground Water Condition Residential/Parkland/Institutional Property Use (OREG-153 (T6)/SO/R-P-I/Coarse)

- Ontario Soil, ground water and sediment standards, Table 8 Generic Site Condition Standards for Use for Soils within 30 m of a Water Body in a Potable Groundwater Condition Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use. (OREG-153 (T8)/SO/R-P-I-I-C-C)
- Ontario Soil, ground water and sediment standards, Table 1 Full Depth Background Site Conditions Standards for Soil, Residential/Parkland/Institutional Property Use and Sediment, All Types of Property Uses, (OREG-153 (T1)(Coarse)

The sediment samples exceeded the arsenic and vanadium O.Reg 153 Table 2 Soil contact human health-based standard (S1) which is less than the generic arsenic and vanadium values for background concentrations in soil which are above the human health-based standard. The background Arsenic concentration in Sediment from O.Reg. 153 Table 1 is 6 µg/g. The background concentration of Vanadium in soil from O.Reg. 153 Table 1 is 86 µg/g, there is no background concentration provided for Vanadium in sediment. There are no exceedances in sediment samples of background soil or sediment concentrations.

5.4.1.1.2 Potential Effects and Mitigations and Residual Effects

The construction phase of the project is made up of various distinct activities which may have positive and negative effects on Water and Sediment Quality. On a longer timescale operation and maintenance activities may pose different effects on Water and Sediment Quality. The project activities along with effects expected and the proposed mitigations from each phase as well as the residual effects expected after mitigation are presented in **Table 5-4**. Only those project activities which are expected to have an impact on surface water and / or sediment quality are noted. For a full evaluation of effects on surface water and sediment refer to Surface Water Technical Support Document: Existing Conditions and Effects Assessment (WSP, 2025c).

Table 5-4: Potential Effects, Mitigations and Residual Effects

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Surface Water Quality** • **Sediment Quality**	• Constructing the Community Access Road • Construction and installation of bridges and culverts • Construction and operation of temporary infrastructure	• Construction	• Changes to surface water quality and sediment quality from short-term water discharges	• Construction water will be discharged in compliance with *Ontario Regulation 387/04* as amended by *Ontario Regulation 64/16* or *Ontario Regulation 63/16*, where applicable, and good industry practice. • Treatment and disposal of water from concrete batch plants at pits and quarries will be in compliance with Environmental Compliance Approvals issued by the Ministry of the Environment, Conservation and Parks under the *Environmental Protection Act*, where applicable. • Wash water from cleaning concrete mixing equipment and delivery systems, as well as from vehicles and equipment, will be collected in designated wash-out sites, located at least 30 meters from a waterbody. The wash-out site will be monitored regularly to verify that runoff from the area does not report to a waterbody. Following the construction phase, all temporary wash-out sites will be capped with local backfill and regraded prior to construction crews departing the site. • Domestic wastewater will be discharged to on site leaching beds at the temporary construction camps. All required permits and authorizations will be acquired for construction and operation of the leaching beds. Leaching beds will be designed and constructed according to *Ontario Building Code 2012* under *Building Code Act*. • If required and when feasible, domestic wastewater will be removed by approved disposal trucks and disposed of at wastewater treatment plants with authorization and capacity to accept this wastewater. • Owner / Operator will review discharge sites / locations to avoid discharging to sensitive areas, including areas identified through the Indigenous Knowledge Program.	• Residual changes to surface water quality and sediment quality from short-term water discharges
• **Surface Water Quality** • **Sediment Quality**	• Constructing bridges and install culverts • Decommissioning temporary infrastructure (for example, remove temporary culverts and bridges)	• Construction	• Changes to surface water quality and sediment quality during short-term water diversions at waterbody crossings	• The construction (and removal as needed) of temporary and permanent waterbody crossings, and removal of temporary waterbody crossing structures following the completion of the relevant work, will be in compliance with Ministry of the Environment, Conservation and Parks-specified conditions and Ministry of Natural Resources regulatory permits and approvals, as applicable. • Short-term water diversions (active or passive) will be carried out in accordance with *Ontario Regulation 387/04* as amended by *Ontario Regulation 301/21*. • Waterbody crossings will be designed and constructed in compliance with *Ontario Regulation 454/96* of the *Lakes and Rivers Improvement Act*, as applicable. • Waterbody crossings will be constructed in accordance with Ministry of Natural Resources' *Environmental Guidelines for Access Roads and Water Crossings*. • Environmental monitoring (including water quality sampling / testing noted in Section 8.2.6 (of the technical support document; Appendix F) will be conducted during construction phase to verify the performance and effectiveness of the planned mitigation measures. Monitoring will occur during installation works, including all in-water activities, and continue during the construction phase, including the removal of temporary crossing structures as part of construction decommissioning activities. The monitoring program will be under the direction of the Environmental Monitor and Indigenous Environmental Monitor. • Temporary waterbody crossings will be remediated at the end of construction phase. The remediation will involve removal of temporary waterbody crossing structures (if constructed), restoration, and stabilization of waterbody banks and other disturbed areas when the crossing is no longer required. • An Adaptive Management Plan will be developed in the event of an unexpected change to water quantity or quality (in other words, increase in turbidity in accordance with Canadian Council of Ministers of the Environment standards).	• Residual changes to surface water quality and sediment quality during short-term water diversions at waterbody crossings
• **Surface Water Quality** • **Sediment Quality**	• Constructing and installing bridges and culverts	• Construction	• Changes to surface water quality and sediment quality due to changes in channel hydraulics at waterbody crossings	• Waterbody crossings will be designed and constructed in accordance with permits and approvals through Fisheries and Oceans Canada, and Ministry of Natural Resources, as applicable. • All newly installed or upgraded waterbody crossing structures will be in compliance with *Ontario Regulation 239/13* and *Ontario Regulation 454/96,* as applicable. • Waterbody crossings will be designed and constructed in accordance with the Ministry of Natural Resources' Environmental Guidelines for Access Roads and Water Crossings (Ministry of Natural Resources, 1990). • Waterbody crossing structures, including clear span bridges, ice bridges / snow fills, rig mats and culverts, will be primarily based on hydrologic and hydraulic design flow calculations, which consider, but are not limited to, expected rainfall and peak flow within the geographic area as well as the relevant catchment area, channel slope, and channel substrate. • At some locations where it is determined that spring-melt or storm runoff needs to pass from one side of the right-of-way to the other to prevent flooding and / or erosion, equalization culverts will be installed. • Each waterbody crossing will be visited ahead of construction by qualified environmental personnel and fisheries biologists and / or technicians (such as, Aquatics Specialist) to verify that the crossing location is conducive to the planned crossing structure installation, such that any changes in site conditions can be addressed through necessary design adjustments. • If site-specific changes to waterbody crossing structure type are required, engagement with appropriate regulatory authorities (such as, Fisheries and Oceans Canada, Ministry of Natural Resources) will occur prior to any instream construction activities, where appropriate (such as, placement of additional fill, regrading and / or stabilization of bed or banks).	• Residual changes to surface water quality and sediment quality due to changes in channel hydraulics at waterbody crossings

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
				• Waterbody crossing design and construction will maintain the characteristic channel width, depths, slopes, and substrate in the event that a channel realignment is required, noting that: – Channel realignments and / or infillings will be avoided through project planning and design to the extent practicable. – Channel realignments and / or infilling will only be undertaken in locations where specific conditions are met and / or where required for safety and security purposes; and if required. – A realignment would avoid the use of a Fisheries and Oceans Canada code of practice (required approval by Fisheries and Oceans Canada), with the plan and mitigations requiring reviewed by Ministry of Natural Resources through permitting the water crossing. • Prior to commencing construction work, the Owner / Operator will implement erosion and sediment control measures. • Upon completion of construction work, watercourse banks will be returned to their original profile, and disturbed areas will be stabilized as necessary to prevent soil erosion. • At the end of construction, temporary waterbody crossings will be reclaimed.	
• **Surface Water Quality** • **Sediment Quality**	• Maintain the Community Access Road and permanent access roads, including bridges and culverts [(a)]	• Operation and Maintenance	• Changes surface water quality and sediment quality due to changes in channel hydraulics at waterbody crossings	• Permanent culverts will be monitored in accordance with the *Culvert Inspection Guide* (Ministry of Transportation, 2022) to identify and remove blockages (for example, ice, woody debris), as needed, that could otherwise lead to scouring and effects on channel morphology and fish habitat and potentially interfere with fish passage. • New permanent waterbody crossing structures (bridges), and roadside drainage features will be monitored and inspected for physical function and condition in accordance with the *Ontario Structure Inspection Manual* (Ministry of Transportation, 2018). • Waterbody crossings will be maintained in accordance with permits and approvals through Fisheries and Oceans Canada and Ministry of Natural Resources, as applicable. • Problems identified during monitoring and inspection will be fixed immediately to prevent any further damage to the channel hydraulics, aquatic habitat and the fisheries resources. • In-water works will be minimized, where possible, and timing of work will also be limited to avoid period of fish spawning, incubation and migration. • Appropriate erosion and sediment control measures will be implemented in accordance with the Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV 804, OPSS.MUNI 182 and OPSS.MUNI 805) prior to commencement of repair work. • Disturbed areas will be restored and re-vegetated to mitigate erosion and sediment entry to waterbodies. • Waterbody crossings will be repaired and reinforced in a manner that prevents waterbody crossing structure materials from entering waterbodies. • Entry of waste materials to be stabilized or disposed of will be prevented in waterbodies. • Waterbody crossings will be reconstructed, when necessary, in compliance with Ministry of Natural Resources approvals.	• Residual changes to surface water quality and sediment quality due to changes in channel hydraulics at waterbody crossings
• **Surface Water Quality** • **Sediment Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Constructing the Community Access Road • Constructing and operating temporary infrastructure • Decommissioning temporary infrastructure	• Construction	• Changes to surface water quality and sediment quality due to changes in land cover	• The right-of-way, roads, and trails (existing and new) will be used for access, to the extent practicable, to minimize changes in land cover. • Upgrade and construction of new access road will be in accordance with the Ministry of Natural Resources' *Environmental Guidelines for Access Roads and Water Crossings* (Ministry of Natural Resources, 1990). • Temporary construction camps, temporary laydown areas, and other project activities will be located a minimum of 30 metres away from the ordinary high-water mark of a waterbody. • Progressive revegetation of the right-of-way will be implemented. Temporary access roads and trails, temporary construction camps, turn-around areas, waterbody crossings, and temporary laydown areas will be restored to pre-existing compatible condition at the end of construction phase. • Seeding will follow as close as possible to final cleanup and topsoil material replacement pending seasonal or weather conditions. • Only materials cleared for acid rock drainage (such as, non-potentially acid generating rock) by a geochemical verification process will be used for the road surface to avoid acid rock drainage or associated metal leaching. • Owner / Operator will limit the use of off-road vehicles during construction phase, noting that: – Off-road vehicle use will follow Fisheries and Oceans Canada's *Code of Practice for Fording (Fisheries and Oceans Canada, 2022),* Fisheries and Oceans Canada's *All Terrain Vehicle Guidance* (Fisheries and Oceans Canada, 2010) and *Ontario Regulation 316/03* under *Highway Traffic Act.* – Inspections and maintenance activities will include cleaning of off-road vehicles before and after each use to prevent the spread of invasive species and to identify any fuel leaks or equipment damage. – Avoidance of sensitive features and waterbody crossings to the extent practicable. • Erosion and Sediment Control Plan will be developed and implemented in accordance with Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV.804, OPSS.MUNI 182 and OPSS.MUNI.805). This includes provision of multistage drainage and sediment controls to collect and treat stormwater runoff from project components, as appropriate. These controls may include diversion swales / dykes, collection ditches, silt fences, rock check dams, sediment traps / basins, level spreaders and riparian buffer strips.	• Residual changes to surface water quality and sediment quality due to changes in land cover

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Surface Water Quality** • **Sediment Quality**	• Maintain the Community Access Road and permanent access roads, including bridges and culverts[(a)]	• Operation and Maintenance	• Changes to surface water quality and sediment quality due to changes in land cover	• Disturbance to existing land cover during maintenance works will be kept to a minimum level. • Disturbed areas will be restored and re-vegetated, including natural revegetation, to mitigate changes to runoff rates and erosion / sedimentation processes. • Existing access roads and trails for access, if available, will be used, to the extent practicable, to minimize new disturbance. • New access road will be upgraded in accordance with Ministry of Natural Resources' *Environmental Guidelines for Access Roads and Water Crossing* (Ministry of Natural Resources, 1990), which provides comprehensive guidance with respect to design and construction practices to mitigate environmental effects. • Materials cleared for acid rock drainage (such as, non-potentially acid generating rock) by a geochemical verification process for the road resurfacing, when necessary, will be used to avoid acid rock drainage or associated metal leaching. • Off-road vehicles will be inspected and cleaned before and after each use to prevent the spread of invasive species and to identify any fuel leaks or equipment damage. • Appropriate erosion and sediment control measures will be implemented in accordance with the Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV 804, OPSS.MUNI 182 and OPSS.MUNI 805) prior to commencement of maintenance work.	• Residual changes to surface water quality and sediment quality due to changes in land cover
• **Surface Water Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Blasting rock • Constructing the Community Access Road • Constructing and operating temporary infrastructure • Decommissioning temporary infrastructure	• Construction	• Changes to surface water quality from the transport and delivery of airborne particulate matter to nearby waterbodies	• Mitigation measures provided in the Atmospheric Environment Technical Support Document will be implemented. • Potential mitigation measures outlined in the Ontario Ministry of Transportation *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions for Provincial Transportation Projects* (Ontario Ministry of Transportation, 2020) may be implemented, if feasible.	• Residual changes to surface water quality from the emission and deposition of airborne particulate matter to nearby waterbodies
• **Surface Water Quality**	• Operate the Community Access Road and permanent access roads • Maintain the Community Access Road and permanent access roads, including bridges and culverts[(a)]	• Operation and Maintenance	• Changes to surface water quality from the transport and delivery of airborne particulate matter to nearby waterbodies	• Mitigation measures provided in the Atmospheric Environment Technical Support Document will be implemented. • Potential mitigation measures outlined in the *Ontario Ministry of Transportation Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions for Provincial Transportation Projects* (Ontario Ministry of Transportation, 2020) may be implemented, if feasible.	• Residual changes to surface water quality from the emission and deposition of airborne particulate matter to nearby waterbodies
• **Surface Water Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Constructing the Community Access Road • Construction and operation of temporary infrastructure	• Construction	• Changes to surface water quality from the wash off of trash, domestic waste, and leachate at waste handling and storage facilities to nearby waterbodies	• Owner / Operator will prepare and implement Waste Management Plans that describe the appropriate management of solid, liquid, and hazardous waste. • Portable, secure, solid waste receptacles will be provided on work sites and temporary laydown areas and the solid waste collected will be hauled periodically to waste handling and storage facilities located at the temporary construction camps. • Solid waste handling and storage facilities at temporary construction camps will be sited outside a minimum 30 metre buffer around waterbodies. • Solid waste handling and storage facilities at temporary construction camps and aggregate pits and quarries will be provided with drainage controls. • Owner / Operator will prepare and implement a Spill Prevention and Emergency Response Plan that describes specific measures that would be implemented if a spill occurred. • Only materials cleared for acid rock drainage (such as, non-potentially acid generating rock) by a geochemical verification process will be used for the road surface to avoid acid rock drainage or associated metal leaching. • Solid waste will be managed and disposed in compliance with *Ontario Regulation 347* as amended by *Ontario Regulation 105/24* under the *Environmental Protection Act*. • Hazardous waste will be periodically transported by a registered hauler to an approved disposal site.	• No residual effect anticipated
• **Surface Water Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads	• Construction	• Changes to surface water quality from the wash off of organic debris from vegetation maintenance activities to adjacent waterbodies	• A riparian buffer of 30 metres around waterbodies will be maintained for the right-of-way, unless required for access to install waterbody crossing structures, in which case a 10 metres wide right-of-way for equipment access will be cleared within right-of-way. • Temporary access roads will be cleared and will be 10 metres wide. • Vegetation clearing will consist of cutting tree trunks parallel to and within 15 centimetres of the ground or lower as well as the removal of all shrubs, debris, and other such materials. • Vegetation will be largely removed by mechanical means, except within 10 metres of a watercourse or wetland. In these areas, vegetation will be removed manually, using chain saws and other hand-held equipment, while leaving the undergrowth and duff layer undisturbed to prevent erosion. • Vegetation clearing or disturbed areas within the 30 metre buffer will be provided with appropriate erosion and sediment controls in accordance with the Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV 804, OPSS.MUNI 182 and OPSS.MUNI 805). • Removed vegetation will be immediately transported outside a waterbody buffer zone (30 m) and above its high-water mark. • Chemical vegetation maintenance, including the use of pesticides and herbicides, will be in accordance with the Ministry of Transportation requirements and / or *Pesticide Act and Regulations,* as applicable, noting that the use will be reserved for situation that cannot be managed by other methods and the use of herbicide will be restricted around sensitive area (for example, wetlands).	• No residual effect anticipated

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Surface Water Quality**	• Maintain the Community Access Road and permanent access roads, including bridges and culverts [(a)]	• Operation and Maintenance	• Changes to surface water quality from the wash off of organic debris from vegetation maintenance activities to adjacent waterbodies	• Vegetation will be removed using mechanical means, except within 10 metres of a waterbody where chain saws and other hand-held equipment will be used. • Soil disturbance, including grubbing, will be avoided within 30 metres of a waterbody. • A riparian buffer of 30 metres around waterbodies for the right-of-way will be maintained, unless required for access to repair / replace waterbody crossing structures, in which case a 10 metres wide right-of-way for equipment access will be cleared within right-of-way. Temporary access roads will be cleared and will be 10 metres wide. • Appropriate erosion and sediment controls will be implemented in accordance with the Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV 804, OPSS.MUNI 182 and OPSS.MUNI 805) when clearing or disturbing areas within the 30 metre buffer. • Removed vegetation will be relocated immediately outside a waterbody buffer zone (30 m) and above its high-water mark. • Chemical vegetation maintenance, including the use of pesticides and herbicides, will be in accordance with the Ministry of Transportation requirements and / or *Pesticides Act and Regulations*, as applicable, noting that the use will be reserved for situation that cannot be managed by other method and the use of herbicide will be restricted around sensitive area (for example, wetlands).	• No residual effect anticipated
• **Surface Water Quality** • **Sediment Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Constructing the Community Access Road • Constructing and operating temporary infrastructure • Decommissioning temporary infrastructure	• Construction	• Changes to surface water quality and sediment quality from the wash off of organic debris to nearby waterbodies and / or increased rates of erosion in disturbed and exposed areas with sediment transport and delivery to adjacent waterbodies	• During Construction, existing access to roads or trails, if available, will be used as much as possible to limit disturbance resulting from construction of new Community Access Road. • Temporary laydown areas and temporary construction camps will be constructed on existing disturbed areas and / or at reasonably flat areas with stable soil, where possible. • The new Community Access Road and waterbody crossings will be designed and constructed in accordance with the Ministry of Natural Resources' *Environmental Guidelines for Access Roads and Water Crossings* (Ministry of Natural Resources, 1990). • Water crossings will be constructed in compliance with Ontario Regulation 239/13 under *Public Lands Act* and / or Ontario Regulation 454/96 under the *Lakes and Rivers Improvement Act* as applicable. • Buffer zones of 30 metres will be maintained around waterbodies and clearing of riparian vegetation will be limited to the extent practicable and to the requirement of the access road and alignment clearing width only. Clearing at waterbody crossings along the Community Access Road right-of-way will generally be limited to a 10 metres wide right-of-way for equipment access to waterbody crossing structures (for example, temporary bridges). • Removed vegetation will be immediately transported outside a waterbody buffer zone and above its high-water mark to minimize disturbance to the bed and banks. • Owner / Operator will work with both Indigenous communities and forest management units to manage merchantable timber cleared by the project. • Slash and debris will be chipped and spread over the right-of-way or will be burned in accordance with provincial *Forest Fires Prevention Act* and in compliance with *Ontario Regulation 207/96*. • Owner / Operator will develop and implement Erosion and Sediment Control Plan. Owner / Operator will install, monitor, and manage appropriate erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specifications for erosion and sediment control measures (OPSS.PROV.804, OPSS.MUNI 182 and OPSS.MUNI.805) to minimize or avoid sediment mobilization to drainages, or waterbodies. Adequate and appropriate erosion and sedimentation control materials shall be on site and available prior to commencement of Construction. • Disturbed areas will be stabilized (for example, cover exposed areas with erosion control blankets or tarps to keep the soil in place and prevent erosion) as needed. Such areas will be covered with mulch to prevent erosion. • Sedimentation in the receiving environment will be controlled by directing sediment-laden water to various temporary storage and settlement features (such as, sumps, settling ponds or catch basins) prior to discharge. Alternately, where appropriate, the sediment-laden water will be directed to drain / filter through low gradient, well-vegetated areas away from watercourses (such as, using pumps and hoses). • Sediment control measures will be incorporated prior to construction activities or immediately after disturbance on site-specific cases throughout the project to avoid introduction of sediment to the environment, and, as part of this, to stabilize drifting soils or loss of topsoil, as practicable. Sediment control measures may include silt fences, filter bags, straw bale fences, berms, ponds and gravel or vegetative filters, check dams, erosion control blankets, and other features. • Additional contingency measures will be implemented as appropriate in the event of excessive rain, wet weather, or flood-like conditions (when the planned activity could cause significant damage to soils, such as rutting by traffic through the topsoil, soil structure damage during soil handling, or compaction and associated pulverization of topsoil structure damage due to heavy traffic): – Reschedule work or reduce / detour traffic in areas where soils are considered to be excessively wet. – Restrict construction traffic, where feasible, to equipment with low-ground pressure tires or wide pad tracks. – During excessively wet conditions, work only in non-problem areas, such as well-drained soil or well-sodded lands, until conditions improve.	• Residual changes to surface water quality and sediment quality from the wash off of organic debris to nearby waterbodies and / or increased rates of erosion in disturbed and exposed areas with sediment transport and delivery to adjacent waterbodies

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
				– Limit vehicle access through soft / wet areas to periods when frozen conditions occur (such as, early morning / evening) and have crews park in a stable area and walk to on-site equipment if feasible. – Install access or rig matting in problem areas to protect soils. – If necessary, work will be suspended until soils dry out or appropriate site-specific mitigation can be used to prevent soil disturbance. • Progressive reclamation of disturbed areas will be practiced. Natural recovery will be the preferred method over seeding of reclamation on level terrain where erosion is not expected. If seeding is required, erosion prone areas will be seeded with a native cover crop and certified seed mix approved by the applicable regulatory agency, as soon as feasible after Construction. • All aggregate pits will be located a minimum of 120 metres away from the ordinary high-water mark of a waterbody, where possible. The aggregate pits will follow the guidelines and associated conditions / requirements of the approved permits, including development of a rehabilitation plan, outlined in the *Aggregate Permits on Crown Lands for Pits and Quarries above Water* (Ontario Ministry of Natural Resources and Forestry, 2014) and the *Forest Management Planning Manual* (Ontario Ministry of Natural Resources and Forestry, 2017)	
• **Surface Water Quality** • **Sediment Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Blasting rock • Constructing the Community Access Road • Constructing bridges and install culverts • Construction and operation of temporary infrastructure • Decommissioning temporary infrastructure	• Construction	• Changes to surface water quality and sediment quality from the wash off of accidental spills and leaks to nearby waterbodies	• The transportation, storage, and handling of fuels during construction will be in compliance with Canada's *Transportation of Dangerous Goods Act* and the *Technical Standards and Safety Act.* • The aboveground storage tanks will meet the requirements of the Canadian Council of Ministers of the Environment (2003). • Owner / Operator will prepare and implement Waste Management Plans that describe the appropriate management of solid, liquid, and hazardous waste. • Owner / Operator will prepare and implement a Spill Prevention and Emergency Response Plan in accordance with Part X of the *Environmental Protection Act* and *Ontario Regulation 675/98* under *Environmental Protection Act.* • Fuel and hazardous materials will be transported in approved containers in licensed vehicles. • Transportation of fuel on winter roads will only take place in safe ice conditions, noting that at the onset of the project, fuel will be transported by aircraft to the fuel storage facility. • Vehicles used for transportation will be licensed and maintained according to safety requirements. Vehicles and equipment used for construction will be regularly serviced, maintained and inspected for leaks. • Fuel and hazardous materials will be stored and handled in designated areas with appropriate secondary containment. • Refuelling, service, and maintenance of vehicles and equipment will generally be carried out in designated areas at temporary construction camps and temporary laydown areas located a minimum of 120 metres from waterbodies to the extent possible. • Designated refuelling, service, and maintenance areas will be designed and constructed to collect and contain minor leaks and spills and will also have adequate lighting available to help prevent the potential for spills during hours when daylight is not available. • If refuelling within 120 metres of a waterbody cannot be avoided, enhanced spill containment measures, such as a Spill Prevention and Emergency Response Plan, will be used. • In the event that refuelling, servicing, and maintenance is required in the field, 120-metre buffer will be respected to the extent possible. There may be locations where this is not possible due to the prevalence of wetlands; however, in these locations, enhanced spill containment measures will be used. • Spill response kits will be provided in fuel and hazardous materials storage and handling facilities at temporary construction camps and temporary laydown areas, in on-site work areas, and / or in vehicles and equipment, and personnel will be trained in spill response practices and procedures. • Spills and leaks will be contained and cleaned up as soon as possible following incident and disposed of at a treatment facility with authorization and capacity to accept this waste.	• Residual changes to surface water quality and sediment quality from the wash off of accidental spills and leaks to nearby waterbodies
• **Surface Water Quality** • **Sediment Quality**	• Maintain the Community Access Road and permanent access roads, including bridges and culverts [(a)]	• Operation and Maintenance	• Changes to surface water quality and sediment quality from the wash off of accidental spills and leaks to nearby waterbodies	• Vehicles or equipment for maintenance activities will be licensed and maintained according to safety requirements. • Regular inspections of vehicles and equipment for leaks will be performed. • Hazardous materials will be stored in designated areas designed and constructed to collect and contain minor leaks and spills. • Spill Prevention and Emergency Response Plan (including clean-up equipment and material, instructions, education and emergency numbers) for maintenance activities will be developed and implemented. • Contaminated soil will be removed and hauled to an approved land facility for disposal. • Sand will be used on bridge decks and roadways for de-icing instead of salt.	• Residual changes to surface water quality and sediment quality from the wash off of accidental spills and leaks to nearby waterbodies

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Surface Water Quality** • **Sediment Quality**	• Clearing of the right-of-way for the Community Access Road and supporting access roads • Blasting rock (for example, remove rock at quarries and as required, at specific locations in association with road and bridge construction) • Constructing the Community Access Road • Constructing bridges and install culverts	• Construction	• Changes to surface water quality and sediment quality from the wash off of explosives spills and residues from blasting activities to nearby waterbodies	• The transportation and storage of explosives will be in compliance with the *Explosives Act* and the *Transportation of Dangerous Goods Act*, where applicable. • Ammonium nitrate and fuel oil will not be used. Explosives will be in emulsion form to mitigate potential dissolution and poor explosive performance in the presence of water. • Blasting activities will also be in accordance with aggregate permit / licence issued under *Aggregate Resources Act.* • Owner / Operator will prepare and implement a Blasting and Communication Management Plan that describes specific measures that would be implemented if blasting is required. • The Environmental Inspector will monitor blasting operations for adherence to the Blasting and Communication Management Plan. • Discarded explosives will either be detonated on site as part of the blast with explosives packaging daily or temporarily stored in the explosives magazine and returned to the explosives' distributor.	• Residual changes to surface water quality and sediment quality from the wash off of explosives spills and residues from blasting activities to nearby waterbodies

Notes: (a) Includes General Maintenance (for example, grading, erosion control, quarrying, and borrow pits), Seasonal Maintenance (for example, snow clearing and bridge and culvert maintenance), and Special Maintenance (for example, slope failures and road settlement / break-up).

5.4.1.1.3 Residual Effects in Relation to Human Health

Generally, construction, operations and maintenance activities may result in negative residual changes to surface water quality and sediment quality from surface runoff and releases of suspended solids, chemical, biological and physical contaminants and physical disturbance and debris. Additionally, the deposition of particulate from air emissions and dust generated during construction and operations and maintenance activities may also negatively impact surface water and sediment quality. Predicted surface water and sediment contaminant concentrations resulting from these activities has not been modelled. As the surface water in the Albany River adjacent to Marten Falls First Nation is used as a drinking water source, these activities and residual changes to surface water quality may have a negative effect on the quality of the drinking water.

5.4.1.2 Groundwater and Geochemistry

5.4.1.2.1 Existing Conditions

Review of the water well records database maintained by the Ministry of the Environment, Conservation and Parks (Ontario, 2024b) indicated that there were no well records within the existing conditions Regional Study Area. Thirteen well records were located just outside the existing conditions Regional Study Area (within about 6 km of the project centreline). Nine well records were located just west, or northwest of Marten Falls First Nation, including five test wells, three water supply wells, and one abandoned well record. According to the Marten Falls First Nation community and the Ministry of the Environment, Conservation and Parks, these wells are not used for water supply.

Marten Falls First Nation community representatives were consulted about water supply wells in the community, they indicated that there were no drinking water supply wells in the community but noted that there was some monitoring wells associated with the landfill and that there was a well in use at the community airport. No information on spring water sources was available. Follow up consultation with the airport operator (Marten Falls First Nation, personal communication 2025) revealed that the well at the airport was not a source of potable water. Based on these consultations it is understood that groundwater is not used for drinking water in Marten Falls First Nation and therefore the water supply well sampling program originally proposed for the community was not carried out.

Previous regional studies of groundwater quality have shown that groundwater in northern Ontario often exceeds drinking water aesthetic guidelines for hardness (over 100 milligrams per litre [mg / L]) and iron (over 0.3 mg / L) (Wang & Chin, 1978).

For the groundwater field investigations, boreholes were drilled to install monitoring wells. Groundwater samples were taken from selected monitoring wells and compared to applicable drinking water standards. The data tables from the Groundwater analysis are including in **Attachment B.**

Full details of the Groundwater investigations are included in the *Groundwater Technical Study Document Appendix F*

Groundwater

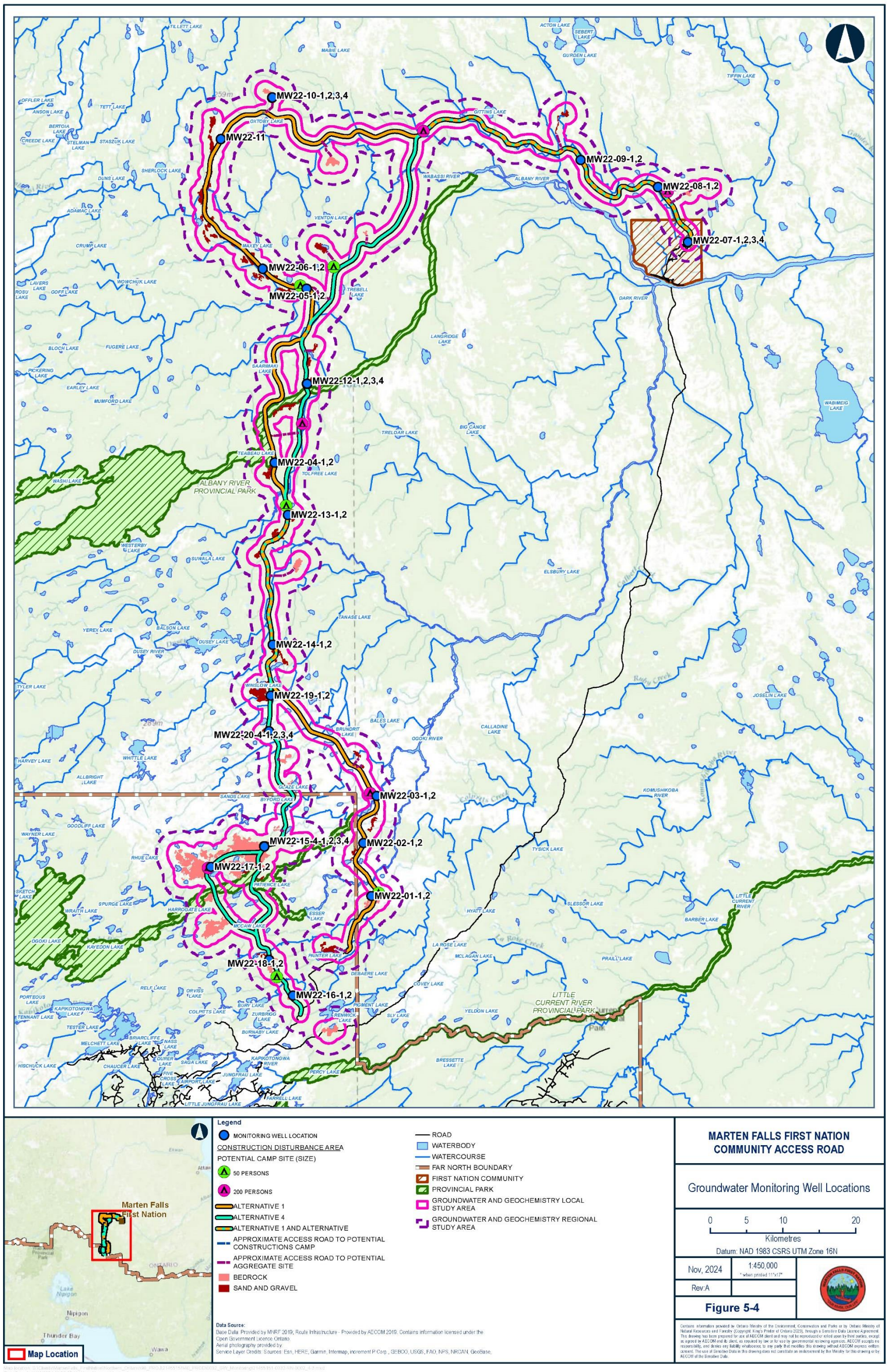
The groundwater sampling conducted as part of the technical study documents was used to determine potential for human health concerns associated with existing conditions. The parameters measured have been compared the following applicable guidelines:

- Ontario drinking water quality standards (O. Reg 169/03)
- Guidelines for Canadian Drinking Water Quality (CDWQ) - Maximum acceptable concentration (MAC) and Aesthetic Objective (AO)
- Ontario Soil, ground water and sediment standards, Table 2 Full Depth Generic Site Conditions Standards for Potable Ground water in a Potable Ground Water condition, Coarse, All types of Property Use (OREG-153 (T2))
- Ontario Soil, ground water and sediment standards, Table 2 Full Depth Component Potable (GW1) Site Conditions Standards for Potable Ground water in a Potable Ground Water condition, Coarse, All types of Property Use (OREG-153 (T2 GW1))

Based on the available information, no operable exposure pathway for vapour intrusion and indoor air inhalation exposure to volatile chemical contaminants in groundwater was identified because the analytical data for volatile organic compounds in groundwater were all less than their reportable detection limits with the exception of methylene chloride which was marginally detectable. As such, groundwater concentrations were not compared to *Federal Interim Groundwater Standards Tier 2 Water Use/Exposure Pathway for Inhalation*

Groundwater sample locations are shown on **Figure 5-4**.

Figure 5-4: Groundwater Sample Locations



Groundwater concentrations did not exceed the standards for benzene, toluene, ethylbenzene, xylenes, polycyclic aromatic hydrocarbons, and Volatile organic carbons but concentrations of various metals in groundwater exceed the selected screening criteria (**Table 5-5**).

Table 5-5: Groundwater Exceedances

Parameter	Generic Ontario Standards	Human Health Based Guidelines/Standards			Max Concentration	Number of samples exceeding
	OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ	Component GW1, OREG 153/04 [(a)]		
Aluminum	--	2.9	--	na	**535**	**45**
Arsenic	0.025	0.01	0.01	0.025	**0.12**	**39**
Barium	1	2	1	1	**4.3**	**3**
Beryllium	0.004	--	--	0.004	**0.0201**	**5**
Chromium	0.05	0.05	0.05	0.05	**1.12**	**11**
Cobalt	0.0038	--	--	0.003	**0.311**	**39**
Lead	0.01	0.005	0.01	0.01	**0.297**	**20**
Molybdenum	0.07	--	--	0.07	**0.0844**	**2**
Nickel	0.1	--	--	0.1	**0.767**	**5**
Thallium	0.002	--	--	0.002	**0.00737**	**3**
Uranium	0.02	0.02	0.02	0.02	**0.0698**	**5**
Vanadium	0.0062	--	--	0.0062	**1.25**	**64**

Noes: All units in mg/L
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
--: No Standard/Guideline

Groundwater concentrations for Iron and Manganese also exceeded the aesthetic objectives. Aesthetic objectives do not indicate a potential risk to human health.

Based on groundwater testing and available information, the groundwater is not suitable to be used for drinking water without treatment and can pose an unacceptable risk to human health.

5.4.1.2.2 Potential Effects and Mitigations and Residual Effects

The construction phase of the project is made up various distinct activities which may have negative effects on Groundwater Quality. On a longer timescale, operation and maintenance activities may pose different effects on Groundwater Quality. The project activities along with effects expected and the proposed mitigations from each phase as well as the residual effects expected after mitigation are presented in **Table 5-6**. Only those project activities which are expected to have an impact on Groundwater quality are noted below. For a full evaluation of effects on Groundwater refer to *Groundwater and Geochemistry Technical Support Document: Existing Conditions and Effects Assessment* (WSP, 2024b).

Table 5-6: Potential Effects and Mitigations

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Groundwater**	• Temporary construction staging areas • Temporary access roads and trails • Temporary construction camps • Right-of-way clearing and grubbing • Pits and quarries • Temporary concrete batch plants • Drilling, blasting, and / or aggregate production • Road construction (stripping, subgrade excavation, embankment fill placement, grading, and ditching) • Bridge and culvert installation (approach embankments, foundations, substructures, superstructures, traffic protection, and erosion controls) • Construction site restoration • Decommissioning of pits and quarries • Decommissioning of temporary camps, roads, trails, and staging areas	• Construction	• Changes to groundwater quality due to accidental spills and leaks	• A Spill Prevention and Emergency Response Plan should be developed and implemented for the project. • Project staff will be trained on the Spill Prevention and Emergency Response Plan. • Machinery and equipment will be regularly inspected and have appropriate spill containment supplies available at all worksites. • Fuelling should be limited to designated areas where secondary containment and adequate spill containment measures are available. • Fuels and hazardous materials should be stored and handled according to applicable regulations and best management practices such as the *Technical Standards and Safety Act* and the *Transportation of Dangerous Goods Act.*	• Some negative residual effects may be possible even after application of the mitigation measures. Accidental spills and leaks may still result in measurable changes to groundwater quality
• **Groundwater**	• Operation, usage, and maintenance of the right-of-way and permanent access roads	• Operation and Maintenance	• Changes to groundwater quality due to accidental spills and leaks	• A Spill Prevention and Emergency Response Plan should be developed and implemented for the project operations and maintenance. • Project staff will be trained, and staff will be equipped on-site to be ready to implement the Spill Prevention and Emergency Response Plan. • Machinery and equipment will be regularly inspected and have appropriate spill containment supplies available at all worksites. • Fuelling should be limited to designated areas where secondary containment and adequate spill containment measures are available. • Fuels and hazardous materials should be stored and handled according to applicable regulations and best management practices such as the *Technical Standards and Safety Act* and the *Transportation of Dangerous Goods Act.* • The Community Access Road will be maintained in accordance with provincial standards to reduce the risk of accidents and associated spills.	• Some negative residual effects may be possible even after application of the mitigation measures. Accidental spills and leaks may still result in measurable changes to groundwater quality.
• **Groundwater**	• Temporary construction staging areas • Temporary construction camps • Pits and quarries • Temporary concrete batch plants • Drilling, blasting, and / or aggregate production • Road construction (stripping, subgrade excavation, embankment fill placement, grading, and ditching) • Bridge and culvert installation (approach embankments, foundations, substructures, superstructures, traffic protection, and erosion controls) • Construction site restoration • Decommissioning of pits and quarries • Decommissioning of temporary camps, roads, trails, and staging areas	• Construction	• Changes to groundwater quality due to construction wastes and wastewater discharges	• A Waste Management Plan will be developed for the project and include details for how wastes should be stored, handled, and disposed of. • All project staff will be trained in and staff will be equipped on-site to be ready to implement the Waste Management Plan. • Project wastes should be stored in designated containment areas according to applicable legislation (for example, Ontario Regulation 347) until removed for final disposal. • Any wastewater generated by the project should be disposed of at a licensed disposal site or treated to meet water quality guidelines such as the Ministry of the Environment, Conservation and Parks Provincial Water Quality Objectives before release. • Any releases of wastewater should be permitted by an Environmental Compliance Approval from the Ministry of the Environment, Conservation and Parks.	• Some negative residual effects may be possible even after application of the mitigation measures. The release of treated wastewater may still result in measurable changes to groundwater quality.
• **Groundwater**	• Temporary access roads and trails • Pits and quarries • Drilling, blasting, and / or aggregate production • Road construction (stripping, subgrade excavation, embankment fill placement, grading, and ditching) • Bridge and culvert installation (approach embankments, foundations, substructures, superstructures, traffic protection, and erosion controls) • Decommissioning of pits and quarries	• Construction	• Changes to groundwater quality due to blasting residues	• Project blasting should be carried out according to applicable regulations such as the *Explosives Act* and *the Transportation of Dangerous Goods Act*. • A Blasting and Communication Management Plan will be developed for the project and include guidelines for explosives handling, storage, and loading to minimize explosives exposure to the environment and minimize explosives residue after blasting. • Regular monitoring of water quality in quarry sumps and downstream of blasting areas should be conducted and compared to action levels of contaminants of concern set based on regulatory guidelines. • Post-blast inspections will be regularly carried out to identify issues with blast design and detonations.	• Some negative residual effects may be possible even after application of the mitigation measures. The use of blasting explosives may still result in measurable changes to groundwater quality.

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Groundwater**	• Temporary construction staging areas • Temporary access roads and trails • Temporary construction camps • Pits and quarries • Drilling, blasting, and / or aggregate production • Road construction (stripping, subgrade excavation, embankment fill placement, grading, and ditching) • Bridge and culvert installation (approach embankments, foundations, substructures, superstructures, traffic protection, and erosion controls) • Decommissioning of pits and quarries	• Construction	• Changes to groundwater quality due to exposure of acid-generating or metal leaching materials	• A geochemical monitoring program will be developed to test bedrock and soils in areas where they will be exposed by excavation. • Any materials identified as at risk for acid generation or metal leaching should not be excavated.	• No predicted residual effect.
• **Groundwater**	• Operation, usage, and maintenance of the right-of-way and permanent access roads	• Operation and Maintenance	• Changes to groundwater quality due to road maintenance	• Road maintenance should be carried out according to best management practices such as those outlined by *Best Practices for the Use and Storage of Chloride-Based Dust Suppressant* (Environment Canada, 2007) to reduce the use of chemicals for dust control and minimize runoff of chemicals to the environment. • Alternative chemicals or methods of dust control that pose less risk of runoff and infiltration should be considered for use.	• Some negative residual effects may be possible even after application of the mitigation measures. The use of chemicals for road maintenance may still result in measurable changes to groundwater quality.

Notes:

- *Temporary construction staging areas, access roads, construction camps, and pits and quarries activities include construction and use of this equipment or infrastructure.*
- *Maintenance of the route includes general maintenance activities (for example, grading, erosion control, quarrying, and borrow pits), seasonal maintenance activities (for example, snow clearing and bridge and culvert maintenance), and special maintenance activities (for example, slope failures and road settlement / break up).*

5.4.1.2.3 Residual Effects in Relation to Human Health

Elevated baseline levels of some metals are present in soils and groundwater in the local study area. The residual effects from project activities can increase concentrations of contaminants of concern in groundwater. Predicted soil and groundwater concentrations have not been modelled.

5.4.1.3 Water Cumulative Effects

Projects considered in the cumulative effects assessment for water are presented in **Figure 5-5** and **Figure 5-6** and detailed in **Table 5-7**. Where no spatial or temporal overlap with surface water, sediment or groundwater study areas was determined, these were not carried through to cumulative effects assessment.

The following projects were considered in relation to cumulative effects on water:

- Northern Road Link
- Anaconda and Painter Lake Forestry Access Road Upgrades
- Rapid Lynx Broadband

Figure 5-5: Physical Activities Inclusions in the Aquatics Regional Study Area

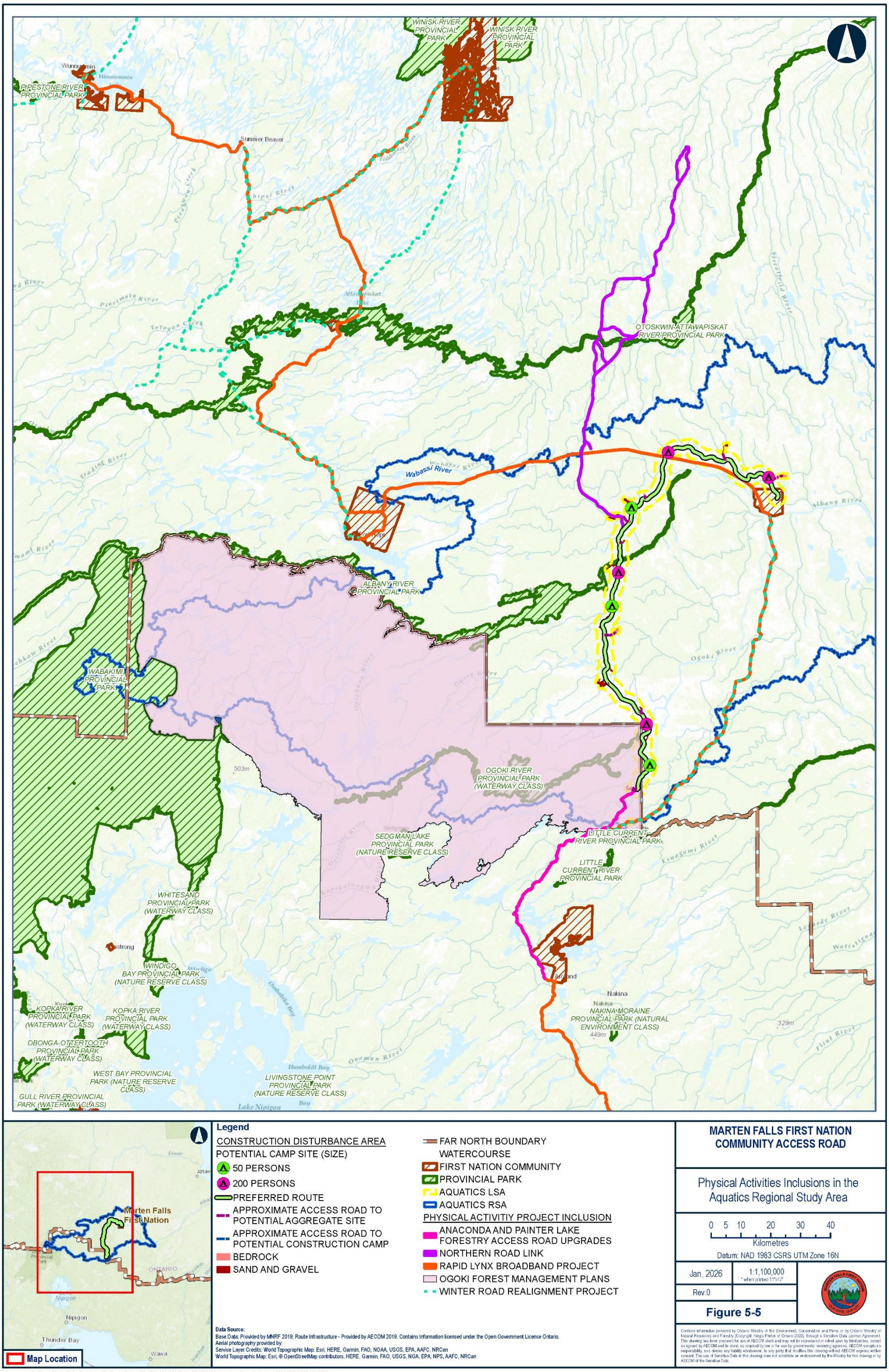


Figure 5-6: Physical Activities Inclusions in the Groundwater and Geochemistry Regional Study Area

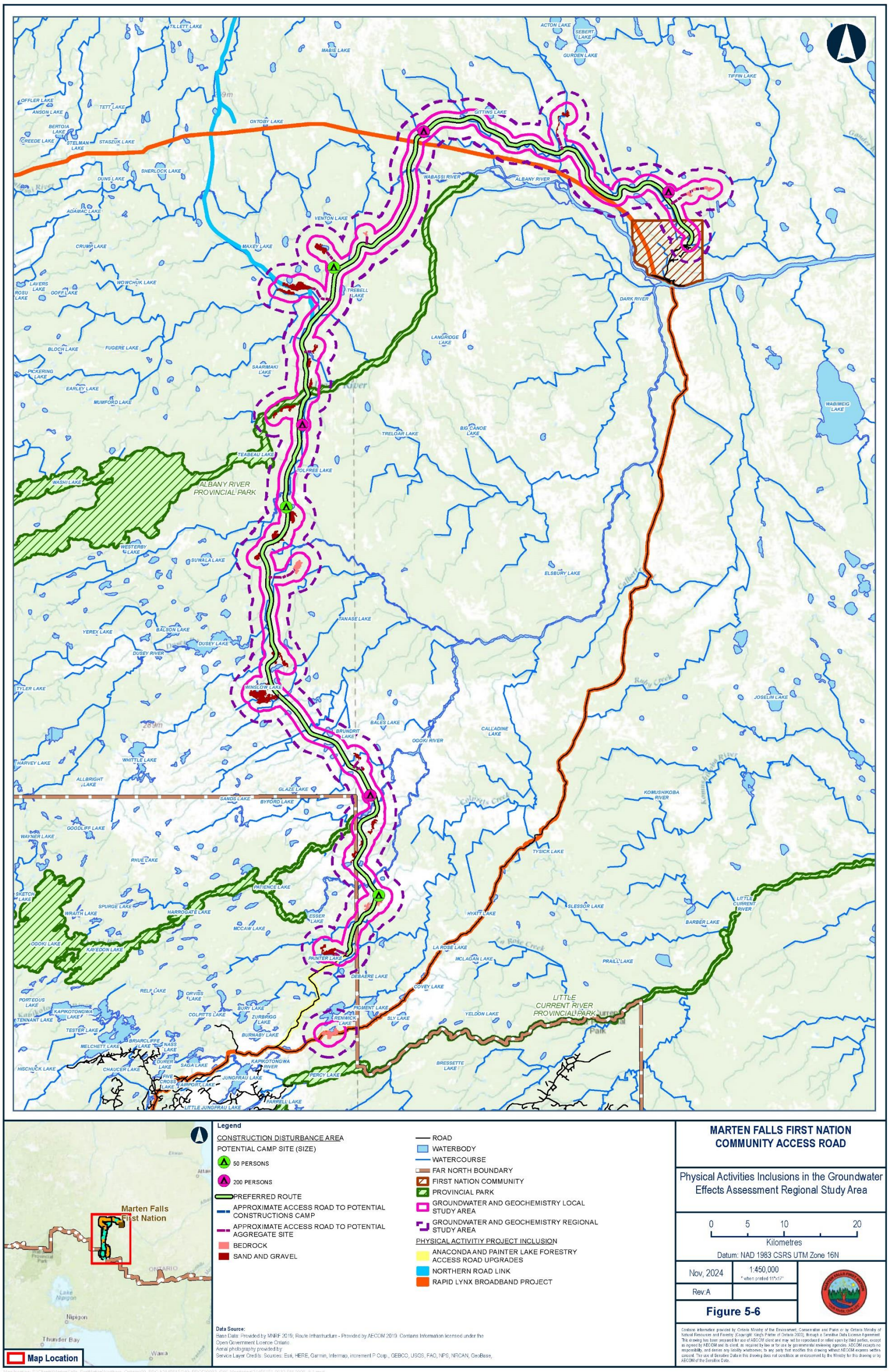


Table 5-7: Water Cumulative Effects

Discipline(s)	Project	Project Description	Valued Components Temporal Overlap with Project (Y / N)	Valued Components Spatial Overlap with Project (Y / N)
• **Surface Water** • **Fish and Fish Habitat** • **Groundwater and Geochemistry** • **Peatlands**	• Northern Road Link	• Marten Falls First Nation and Webequie First Nation are proposing to build, operate and maintain an all-season multi-use road and associated infrastructure between the Community Access Road that has been proposed by Marten Falls First Nation (the Community Access Road) and the supply road that has been proposed by Webequie First Nation. • Terms of Reference for the preparation of an Environmental Assessment were approved March 3, 2023.	• Yes	• Local Study Area – Yes • Regional Study Area – Yes
• **Fish and Fish Habitat** • **Groundwater and Geochemistry** • **Peatlands**	• Anaconda and Painter Lake Forestry Access Road Upgrades	• Upgrades to existing road will be required for heavy vehicles accessing the Community Access Road route during construction and operations. • Currently discussions on proponency and scope of work are underway. • Potential scope of work is expected to include roadway widening, culvert and bridge replacements / rehabilitations to accommodate higher weight vehicles, and road base improvements. • This project will be completed prior to the start of the construction of the Community Access Road; therefore, the upgrade to these roads is not expected to overlap with the construction of the Community Access Road.	• Yes	• Local Study Area – Yes • Regional Study Area – Yes
• **Surface Water** • **Fish and Fish Habitat** • **Groundwater and Geochemistry** • **Peatlands**	• Rapid Lynx Broadband	• Approximately 810 kilometres of fibre-optic cables, providing reliable high-speed internet service to 5 Matawa First Nation communities: Eabametoong First Nation, Marten Falls First Nation, Neskantaga First Nation, Nibinamik First Nation, and Webequie First Nation with an interconnection at Aroland First Nation.	• Yes	• Local Study Area – Yes • Regional Study Area – Yes

For the Marten Falls Community Access Road, the Northern Road Link, the Anaconda and Painter Lake Forestry Access Road Upgrades and the Rapid Lynx Broadband projects, the predicted cumulative effects of surface water quality and sediment quality are not expected to be significantly greater than the anticipated residual effects identified for the project. As a best practice, it is suggested that monitoring programs of each project for existing and future physical activities / project works be shared relevant monitoring data for areas where predicted effects may overlap, as well as share the timing of such construction activities. Additional timing and monitoring data of related works, such as short-term water takings or discharges, should be shared between projects as these potential impacts to surface water quantity, surface water quality and sediment quality could lead to compounding cumulative effects if the works occur during the same construction periods in the same spatial overlapping project areas. Because surface water is a source of Drinking Water for the community **negative** effects on surface water quality could be **significant**.

For groundwater, the activities that have been considered are construction wastes and wastewater discharges; changes to groundwater quality due to blasting residues; and due to road maintenance.

Based on the similar work scopes of the Northern Road Link and the Anaconda and Painter Lake forestry road upgrades compared to the Marten Falls Community Access Road project, the residual effects were assumed to be similar per road segment for each project. Due to the relationship of the road building projects being continuations of a road corridor, the cumulative impacts from any two projects combined were generally assessed to have the same characteristics as the residual effects of each project per road segment. At the junction between the project and the Northern Road Link it could be possible for slightly increased cumulative effects to occur locally since three road segments would be joining however these effects would still be characterized the same as the residual effects and managed with the same monitoring and mitigation plans.

Due to the similarity of the project's predicted cumulative effects and predicted residual effects characterizations, no additional mitigation measures were proposed to manage cumulative effects aside from the recommendation for sharing relevant monitoring data between projects.

Additional uncertainties were involved in predicting the cumulative effects due to limited information for the other projects. The overall uncertainty level for the cumulative negative effects assessment was considered to be moderate because, although there are increased uncertainty levels due to limited information on the details of the other projects, the commonalities of the projects allowed for the uncertainty levels of the residual effects assessment to be generally retained.

5.4.2 Peatlands

Peatlands contribute specialized habitat, carbon sequestration and storage, hydrological and climate regulating functions. There is a connectivity of the large peatland complexes that dominate the landscape and provides surface and groundwater connections which impact an area larger than the Community Access Road Regional Study Area. Peatlands are wetlands that accumulate more than 40 centimetres of organic soils and are classified as bog, fen, organic swamp and organic marsh. Peatland systems within the existing conditions Local Study Area function as carbon dioxide sinks. Both fens and bogs were found to be sinks for carbon dioxide while organic swamp communities were sources of carbon dioxide. Peatlands within the existing conditions Local Study Area are also sources Carbon dioxide and methane. Construction activities will remove portions of the wetland, slightly reducing the carbon dioxide and methane released (predicted daily methane emissions drop to 12 tonnes from 19 tonnes in the LSA) and the air quality and greenhouse gases emissions are anticipated to slightly improve (i.e., lower methane emission).

5.4.3 Physiography, Terrain, and Soils

Biophysical determinants to human health could be effected by chemical exposures through the incidental consumption of soils on country foods, ingestion of soil / dust on hands, inhaled dust and airborne particulates, and absorption through the skin.

5.4.3.1 Existing Conditions

One hundred and eight geological samples were taken (13 organics, 14 bedrocks, and 81 soils). Leaching tests showed the soil samples had elevated levels of fluoride and copper, organic samples had elevated levels of boron, and bedrock samples had elevated levels or silver, aluminum and vanadium. Two potentially acid generating samples were from the Construction Disturbance Area and further analysis showed they had no geochemical acid generating potential (WSP, 2024b).

Soil samples were taken from seventeen locations. A total of fifty-seven samples were collected and sent to Bureau Veritas Laboratories for testing. Some samples were tested for chemicals and radioactive materials. The samples tested for radioactivity had less than 1.0 becquerels per gram.

Three soil samples have concentrations of metals higher than the guidelines:

- M22S258-GEOCHEM exceeds the criteria for chromium and nickel (within the SG-15 aggregate area);

- M22S011-GEOCHEM exceeds the criteria for arsenic (approximately 2 km east of aggregate area SG-17); and
- M22S032-GEOCHEM exceeds the criteria for chromium (within the BR-05 aggregate area).

See Physiography, Terrain, and Soils Technical Support Document [Appendix N] (WSP, 2024c).

The data tables from the soil analysis are including in **Attachment B**.

Soils

Soil parameters measured in samples collected from the Construction Disturbance Area have been compared to the applicable federal and provincial criteria as required by the technical study.

To identify potential contaminants of concern to human health, the soil data for samples collected during the Technical Study were compared to the following criteria for protection of human receptors by the direct contact pathway for soil and for leaching to groundwater:

- Canadian Council of Ministers of the Environment Human Health Soil Quality Guidelines for Residential and Parkland Land Uses (CCME HH SQG R/P)
- Ontario Soil, ground water and sediment standards, Table 2 Full Depth Generic Site Conditions Standards for Soil in a Potable Ground Water condition, Residential/Parkland/Institutional Property Use (OREG-153 (T2)/SO/R-P-I/Coarse)
- Ontario Soil, ground water and sediment standards, Table 2 Component S1 Soil Contact Full Depth Site Condition Standards for Soil in a Potable Ground Water Condition Residential/Parkland/Institutional Property Use (OREG-153 (T6)/SO/R-P-I/Coarse)
- Ontario Soil, ground water and sediment standards, Table 8 Generic Site Condition Standards for Use for Soils within 30 m of a Water Body in a Potable Groundwater Condition Residential / Parkland / Institutional / Industrial / Commercial / Community Property Use. (OREG-153 (T8)/SO/R-P-I-I-C-C)

Exceedances of the applicable human health based standards are included in **Table 5-8**.

Table 5-8: Maximum Concentrations of Chemicals in Soils that Exceed the Applicable Human Health-based Standards

Chemical Name	Max (µg/g)	OREG 153 (T2) (µg/g)	OREG 153 (T8) (µg/g)	CCME HH SQG (µg/g)	OREG 153 (T2 S1) (µg/g)	Number of Samples Exceed	Regulation
Arsenic	30	**18**	**18**	**12**	**0.79**	99	All
Chromium	410	**160**	**70**	**220**	**28000**	5	CCME and OReg-153 (T2, T8)
Cobalt	27	**22**	**22**		**22**	2	OReg-153
Manganese	1800				**1019**	1	OREG-153 (T2 S1)
Nickel	210	**100**	**82**	**200**	**180**	1	CCME and OReg 153
Vanadium	93	**86**	**86**		**39**	21	OReg-153 (T2 S1)

Notes: CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutional Property Use, Coarse
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Industrial/Commercial Property Use
OREG-153 (T2 S1) Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutional Property Use, Coarse

Soil samples exceeded Arsenic and Vanadium human health-based standards/guidelines in multiple locations. Two Cobalt, five Chromium, one Manganese and one Nickel sample exceedances were identified.

The arsenic and vanadium soil contact human health-based standards are less than the generic arsenic and vanadium standards due to the presence of background arsenic and vanadium concentrations in soil which are above the human health-based standard (O.Reg 153 Table 2). Background concentrations of arsenic in agricultural soil in Ontario are 11 µg/g Agricultural or Other Property Use and 18 µg/g Residential / Parkland / Institutional / Industrial / Commercial / Community Property Use (O.Reg 153 Table 1 Full Depth Background Site Condition Standards, MECP, 2011). Only one sample with a concentration of 30 µg/g has arsenic concentrations in excess of this background concentration. Ninety-nine samples exceed the human health-based standard. Background concentrations of vanadium in Ontario are 86 µg/g (O.Reg. 153 Table 1). Only one sample with a concentration of 93 µg/g has vanadium concentration in excess of this background concentration. Twenty-one samples exceed the human health-based standard. Ontario Background values may not be representative of Northern Ontario Regions.

Due to the release of new toxicity reference values by Health Canada in Federal Contaminated Sites Risk Assessment in Canada: Toxicity Reference Values (TRVs) Version 4.0 in June 2025 and the requirement by the Ontario Government to evaluate Ontario regulations in light of new toxicity reference values, new O.Reg. Table 2 S1 values were calculated for manganese of 883 µg/g.

Two cobalt samples minimally exceed the O.Reg. Table 2 standard of 22 µg/g with a maximum concentration of 27 µg/g. One sample exceeds the calculated manganese standard of 1019 µg/g with a maximum concentration of 1800 µg/g/. One sample minimally

exceeds the nickel O Reg Table 2 standard of 180 µg/g with a maximum concentration of 210 µg/g. Five samples exceed the Chromium Ontario SCS Table 2 value of 160 µg/g and the CCME SQG-HH of 220 µg/g with a maximum concentration of 410 µg/g.

No antimony was detected in any of the soil samples, however the detection level (6 µg/g) was greater than the Ontario Regulation 153/04 Table 1 and Table 8 generic standards. No silver was detected in any samples, however the detection level (<1 µg/g) was greater than the Ontario Regulation 153 Table 1 and Table 8 standards.

Exceedances of their respective soil quality guidelines indicate a potential for unacceptable risk for direct contact with soil and inhalation of dust and particulate matter derived from soil. These samples extend along the entire length of the North South section of the Community Access Road. Some of the sampled soil material may be used as road construction materials. Dust containing these parameters may be generated during construction and operations and maintenance activities. Chemical analysis of quarry materials should be conducted prior to road construction, and dust mitigation methods and use of screens for prevention of transport of soil and dust should be employed during construction and operations and maintenance.

Soil Leachate

Soil samples were also evaluated for leachate potential through Toxicity Characteristic Leaching Procedure to see if soil had the potential to create contaminated run-off through leaching. The laboratory procedure is not a direct representation of natural conditions; however as a precautionary approach the results of the leachate testing were compared to the following criteria for the protection of human health:

- *Ontario drinking water quality standards (O. Reg 169/03)*
- *Guidelines for Canadian Drinking Water Quality (CDWQ) - Maximum acceptable concentration (MAC) and Aesthetic Objective (AO)*
- *Ontario Soil, ground water and sediment standards, Table 2 Full Depth Component Potable (GW1) Site Conditions Standards for Potable Ground water in a Potable Ground Water condition, Coarse, All types of Property Use (OREG-153 (T2 GW1))*

Leachate is diluted as it enters groundwater and surface water systems. No dilution was accounted for. Exceedances of soil leachate of potable water standards / guidelines is in **Table 5-9**.

Table 5-9: Soil Leachate Exceedances of Potable Water Standards

Parameter	Generic Ontario Standards	Human Health Based Guidelines/Standards			Max Concentration	Number of Samples Exceeding
	OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ	Component GW1, OREG 153/04 [(a)]		
Aluminum	--	2.9	--	na	**6.53**	**2**
Arsenic	0.025	0.01	0.01	0.025	**0.303**	**13**
Cobalt	0.0038	--	--	0.003	**0.0069**	**2**
Lead	0.01	0.005	0.01	0.01	**0.007**	**1**
Vanadium	0.0062	--	--	0.0062	**0.048**	**19**

Twelve of the arsenic exceedances were in Geochem samples. Leachate samples also exceeded the aesthetic objective for iron and manganese.

Surplus soils from the project disturbance area should not be moved outside this area for disposal. Leachate can enter surface water and groundwater. It is recommended that surface and groundwater not be used as drinking water without treatment.

Soil sampling locations are shown on **Figure 5-7**. Soil that was evaluated for acid leachate potential are shown on **Figure 5-8**.

Further information on the Existing conditions can be found in *Physiography, Terrain, and Soils Technical Support Document: Existing Conditions & Effects Assessment* (WSP, 2024c).

5.4.3.2 Potential Effects and Mitigations and Residual Effects

The construction phase of the project is made up various distinct activities which may have effects on Soil Quality. On a longer timescale operation and maintenance activities may pose different effects on Soil Quality. The project activities along with effects expected and the proposed mitigations from each phase as well as the residual effects expected after mitigation are presented in **Table 5-10**. Only those project activities which are expected to have an impact on Soil quality are noted below. For a full evaluation of effects on Soils refer to *Physiography, Terrain, and Soils Technical Support Document [Appendix N]* (WSP, 2024c).

Figure 5-7: Soil Sampling Locations

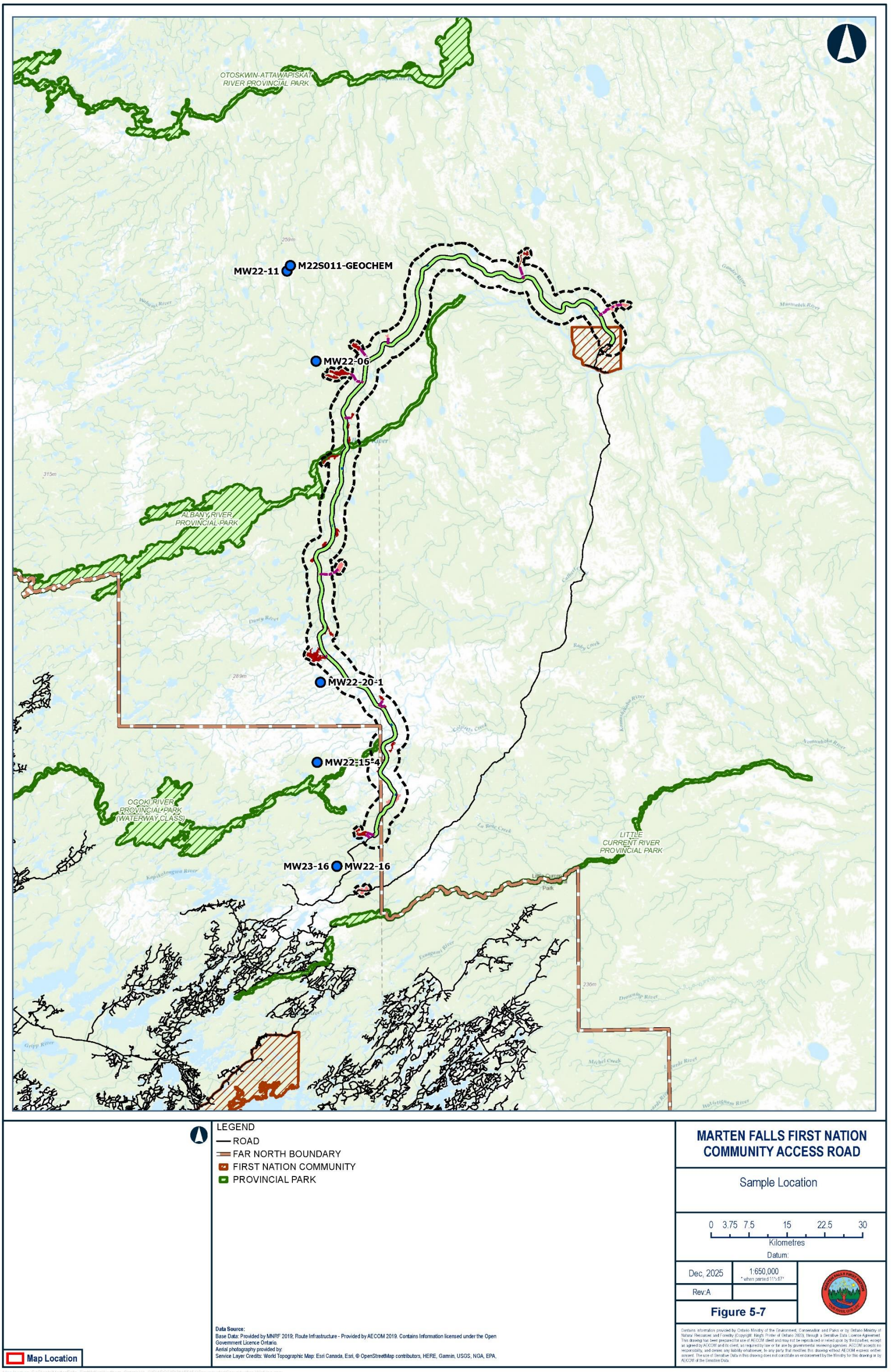


Figure 5-8: Soil Sensitivity to Acidification

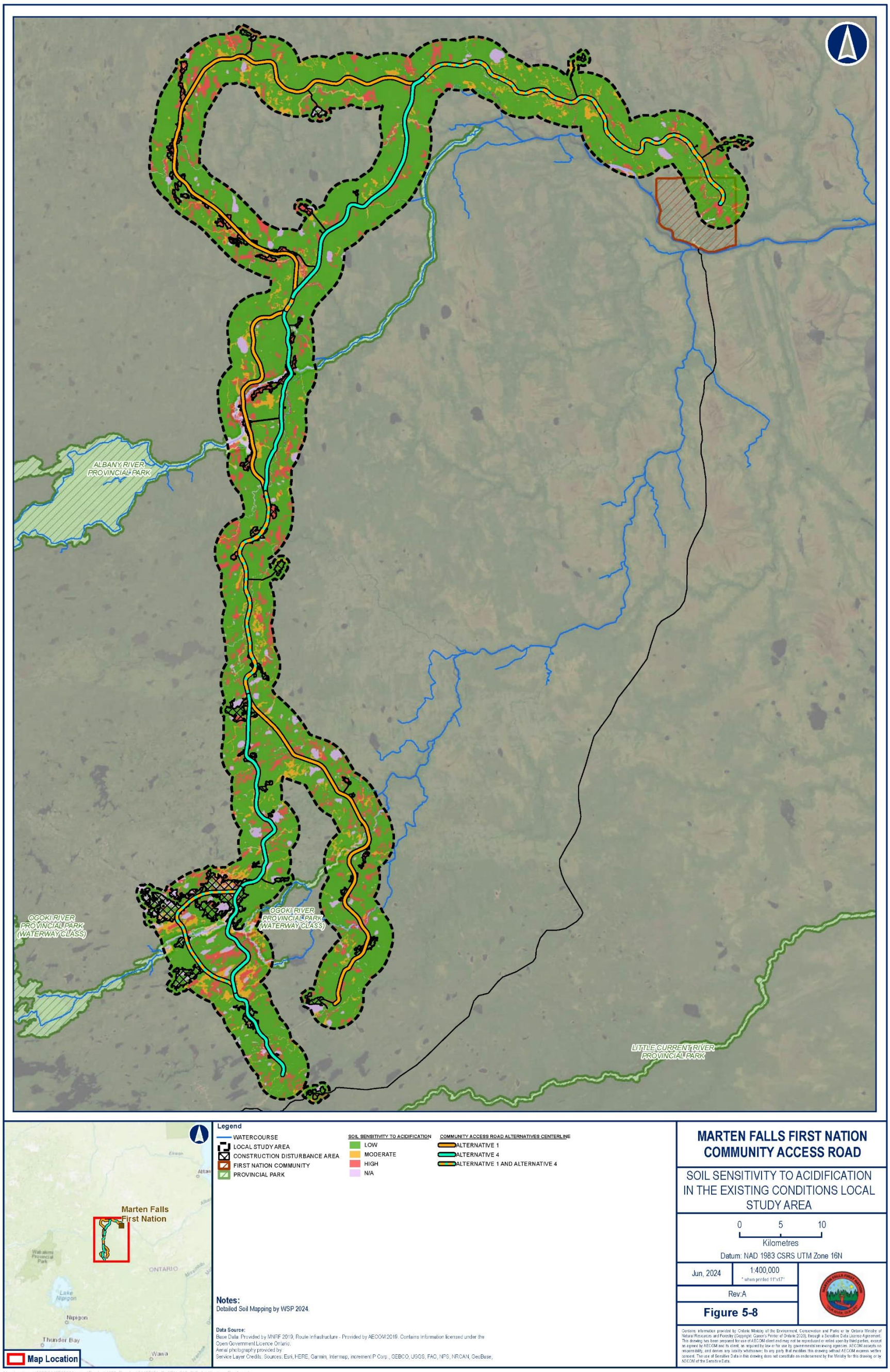


Table 5-10: Potential Effects and Mitigations for Soils

Valued Component	Project Activities	Project Phase	Description of Project Environmental Interaction	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Physiography, Terrain, and Soils**	• Mobilization of equipment, supplies, and personnel (for example, haulage of materials, solid and liquid waste management, fuel storage, and hazardous materials handling, sewage and effluent treatment and water storage and effluent monitoring for temporary construction camps)	• Construction	• Changes to soil quality from contamination due to potential leaks or spills of deleterious or hazardous substances from project activities	• Develop and implement a Spill Prevention and Emergency Response Plan, in the event of a spill. • Adhere to Standard Operating Procedures for fuel handling. • Construction machinery will arrive on site in a clean condition, free from leaks. • Construction crews will always keep a spill response kit on site during the work. • Contain and clean up spills immediately in accordance with provincial regulatory requirements and the Spill Prevention and Emergency Response Plan. • Transport fuel and hazardous materials in approved containers in licensed vehicles; and • Require construction crews and drivers of vehicles using the Community Access Road system to report spills to the Ontario Spills Action Centre at 1-800-268-6060. • Provide and make sure holding bats are readily available, so there is less chance of spillage. • Provide adequate lighting at fuelling stations and monitoring so that people clean up after any spills. • Provide various pit stops along the Community Access Road where drivers can check their tanks and valves; and • Provide barriers along the sides of bridges to prevent other chemicals from spilling into waterways beneath them.	• Negative residual change to soil quality from contamination due to potential leaks or spills or deleterious or hazardous substances during project activities
• **Physiography, Terrain, and Soils**	• Operate the preferred route • Maintain the preferred route[(a)]	• Operation and Maintenance	• Changes to soil quality from contamination due to potential leaks or spills of deleterious or hazardous substances from project activities	• Same as for Construction above	• Negative residual change to soil quality from contamination due to potential leaks or spills or deleterious or hazardous substances during project activities
• **Physiography, Terrain, and Soils**	• Constructing the Community Access Road (for example, overburden excavation and removal, excavation of granular material at pits, remove unsuitable soil, place and compact rock and granular material, trim and shape the road, stockpiling of mineral soil and leaf litter [organic material], and soil handling and replacement from stockpiles at decommissioning) • Blasting rock (for example, remove rock at quarries, and as required, at specific locations in association with road and bridge construction) • Mobilization of equipment, supplies, and personnel (for example, haulage of materials, solid and liquid waste management, fuel storage, and hazardous materials handling, sewage and effluent treatment and water storage and effluent monitoring for temporary construction camps)	• Construction	• Changes to soil quality from the transport and deposition of air contaminant emissions (for example, potential acid inputs) and particulate matter (dust) from project activities	• Mitigation measures that will be implemented during the Construction and Operation and Maintenance Phases to reduce changes to soil from emissions and deposition include those listed in the Atmospheric Environment Existing Conditions and Effects Assessment Technical Support Document (Dillon Consulting Limited, 2025).	• Negative residual changes to soil quality from the transport and deposition of air contaminant emissions and particulate matter
• **Physiography, Terrain, and Soils**	• Blasting rock (for example, remove rock at quarries) • Mobilization of equipment, supplies, and personnel (for example, haulage of materials, solid and liquid waste management, fuel storage)	• Operation and Maintenance	• Changes to soil quality from the transport and deposition of air contaminant emissions (for example, potential acid inputs) and particulate matter (dust) from project activities	• Same as for Construction above	• Negative residual changes to soil quality from the transport and deposition of air contaminant emissions and particulate matter

Notes:

(a) Includes general maintenance activities (for example, grading, erosion control, excavation at pits / quarries and processing aggregate, dust suppression), seasonal maintenance activities (for example, clear vegetation on road shoulders, snow clearing and bridge and culvert maintenance, ditch maintenance), and special maintenance activities (for example, slope failures and road settlement / break up).

- Various mitigation and enhancement measures have been included from the Marten Falls First Nation Community Access Road Preferred Route Selection and Preliminary Environmental Work Project Proposal (Marten Falls First Nation Chief and Council 2017).

5.4.3.3 Residual Effects in Relation to Human Health

Biophysical soil quality is expected to be negatively impacted by leaks or spills of hazardous material or from the deposition of air emissions or dust from the air during Construction and Operations and Maintenance Activities. Accidental spills and leaks will be confined to the Construction Disturbance Footprint.

Chemical analysis of existing conditions in soils has revealed some concentrations in soils in excess of applicable Ontario Regulation 153/04 site condition standards and Canadian Soil Quality Guidelines. Any negative residual effect would be in addition to these existing conditions exceedances. Predicted soil concentration have not been modelled.

5.4.3.4 Soils Cumulative Effects

Where residual effects were assessed to be negligible in magnitude, unlikely or impossible to occur, or positive in direction, the effect was not carried forward into the cumulative effects assessment.

To determine the spatial boundaries of potential cumulative effects, the projects listed in **Table 5-11** were considered for the cumulative effects assessment. The remaining projects on the Project Inclusions List were determined to have no spatial or temporal overlap with the land disciplines study areas; therefore, they were not considered as part of the cumulative effects assessment. The predicted cumulative effects of soil quality are not expected to be significantly greater than the anticipated residual effects identified for the project.

Based on the similar work scopes of the Northern Road Link and the Anaconda and Painter Lake forestry road upgrades compared to the project the residual effects were assumed to be similar per road segment for each project. Due to the relationship of the road building projects being continuations of a road corridor, the cumulative impacts from any two projects combined were generally assessed to have the same characteristics as the residual effects of each project per road segment. At the junction between the project and the Northern Road Link it could be possible for slightly increased cumulative effects to occur locally since three road segments would be joining however these effects would still be characterized the same as the residual effects and managed with the same monitoring and mitigation plans.

Due to the similarity of the project's predicted cumulative effects and predicted residual effects characterizations, no additional mitigation measures were proposed to manage cumulative effects aside from sharing relevant monitoring data between projects.

Additional uncertainties were involved in predicting the cumulative effects due to limited information for the other projects. The overall uncertainty level for the cumulative effects assessment was considered to be moderate because, although there are increased uncertainty levels due to limited information on the details of the other projects, the commonalities of the projects allowed for the uncertainty levels of the residual effects assessment to be generally retained.

Table 5-11: Cumulative Effects

Discipline(s)	Project	Project Description	Valued Components Temporal Overlap with Project (Y / N)	Valued Components Spatial Overlap with Project (Y / N)
• **Vegetation** • **Wildlife** • **Wildlife – Birds** • **Wildlife - Ungulates** • **Physiography, Soils and Terrain**	• Northern Road Link	• Marten Falls First Nation and Webequie First Nation are proposing to build, operate and maintain an all-season multi-use road and associated infrastructure between the Community Access Road that has been proposed by Marten Falls First Nation (the Community Access Road) and the supply road that has been proposed by Webequie First Nation. • Terms of Reference for the preparation of an Environmental Assessment were approved March 3, 2023.	• Yes	• Yes
• **Vegetation** • **Wildlife** • **Wildlife – Birds** • **Wildlife - Ungulates** • **Physiography, Soils and Terrain**	• Anaconda and Painter Lake Forestry Access Road Upgrades	• Upgrades to existing road will be required for heavy vehicles accessing the Community Access Road route during construction and operations. • Currently discussions on proponency and scope of work are underway. • Potential scope of work is expected to include roadway widening, culvert and bridge replacements / rehabilitations to accommodate higher weight vehicles, and road base improvements. • This project will be completed prior to the start of the construction of the Community Access Road; therefore, the upgrade to these roads is not expected to overlap with the construction of the Community Access Road.	• Yes	• Yes
• **Vegetation** • **Wildlife** • **Wildlife – Birds** • **Wildlife - Ungulates** • **Physiography, Soils and Terrain**	• Rapid Lynx Broadband	• Approximately 810 kilometres of fibre-optic cables, providing reliable high-speed internet service to 5 Matawa First Nation communities: Eabametoong First Nation, Marten Falls First Nation, Neskantaga First Nation, Nibinamik First Nation, and Webequie First Nation with an interconnection at Aroland First Nation.	• Yes	• Yes

Notes: – Vegetation, wildlife, birds, ungulates are considered in this biophysical human health assessment due to the potential impacts to them from uptake of contamination from soils effecting their quality as traditional foods.

5.4.4 Acoustics and Vibration

Biophysical determinants to human health is effected by exposures to noise and vibration. Noise is a unique change to the environment as it is an energy added to the air. Noise can cause sleep disturbance, short and long-term high annoyance (reversible) and may cause long-term harm depending on its intensity, duration and frequency and the sensitivity of the exposed receptor. Human response to noise varies among individuals, the type of noise and according to specific situations. The most common community reaction to noise are complaints and annoyance (Health Canada, 2023).

5.4.4.1 Existing Conditions

Two long-term noise monitoring sites were set up in the community. One near the band office and school (community) and a second in a forested area (remote). Daytime and night-time noise measurements are in **Table 5-12**. These noise monitoring locations are show on **Figure 5-9**.

Table 5-12: Acoustics and Vibrations Existing Conditions

Location	Period	Average L_{eq} (dBA)	Average L_{90} (dBA)
Community	Daytime	43	38
	Nighttime	42	35
Remote	Daytime	37	28
	Nighttime	33	29

Notes: - dBA is an A-weighted decibel
- L_{eq} is equivalent noise level
- L_{90} is noise level exceeded 90 percent of the time

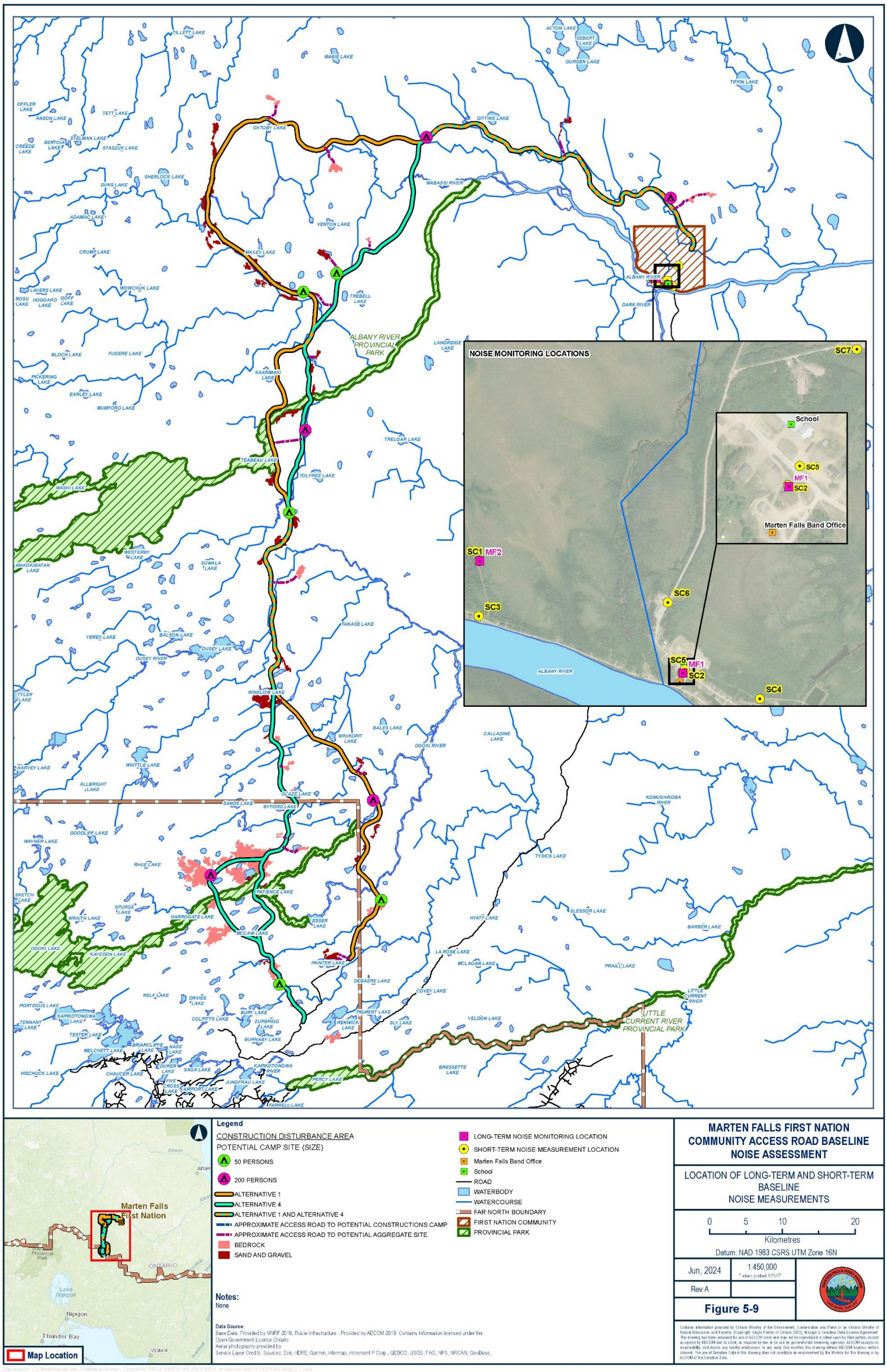
Short-term noise measurements were also taken. The noise levels in the community are usually between 22 to 38 dBA, which means it is generally quiet with some noise from human activities. At one spot (SC2), the noise reached 50 dBA during wind gusts. Another spot (SC7) near diesel generators had a noise level of 55 dBA. In more remote areas, away from people, the noise levels are low and not effected by human activities.

The current vibration levels are mostly caused by natural sources, with little to no human-made vibrations. In most of the Construction Disturbance Area, the vibration levels are very low (less than 0.1 mm / s), which is normal for rural and remote areas.

A study was conducted to determine where people might be effected by noise and vibration. These areas were called potential points of reception. 341 potential points of reception were identified with Alternative 1 and 379 points of reception with Alternative 4.

The technical support document for acoustics, entitled *Draft Acoustic and Vibration Environmental Technical Support Document: Existing Conditions and Effects Assessment* (WSP, 2025a), contains additional information.

Figure 5-9: Location of Long-Term and Short-Term Baseline Noise Measurements



5.4.4.2 Potential Effects and Mitigations and Residual Effects

The construction phase of the project is made up various distinct activities which may have effects on Noise and Vibration levels. On a longer timescale operation and maintenance activities may pose different effects on Noise and Vibration.

Modeling was conducted as part of *the Noise and Vibration Technical Support Document*. The noise modelling predicted the noise levels presented in **Table 5-13**.

Table 5-13: Noise

Receiver Sample Name	Modeled Traffic Noise Levels				
	Existing LAeq (dBA)	LAeq		Increase Over Existing	
		Calc. (dBA)	Absolute Criterion (dBA)	Calc. (dBA)	Relative Criterion (dBA)
R059003_380_A	-	42.3	0	-	-
R059012_783_3664	-	52.6	0	-	-
R059012_67_2651-4	-	37.3	0	-	-

Notes: - LAeq = A-weighted equivalent continuous sound level in decibels
- dBA = A-weighted decibels (relative loudness)

The project activities along with effects expected and the proposed mitigations from each phase as well as the residual effects expected after mitigation are presented in **Table 5-14**. Only those project activities which are expected to have an impact on Noise and Vibration are noted below. For a full evaluation of effects on Noise and Vibration refer to *Acoustic and Vibration Environment Technical Support Document [Appendix P]* (WSP, 2025a).

5.4.4.3 Residual Effects in Relation to Human Health

Because the residual effects from the increased noise during Construction are not predicted to be long-term in duration or frequent, the noise and vibrations technical support team determined residual effects during Construction are assessed as **not significant**.

As the magnitude of the residual effects from the increased noise due to road operations is low, and the residual effects from the increased noise due to quarry use are not predicted to be frequent, the noise and vibrations technical support team determined residual effects during operations are assessed as **not significant**.

Because the residual effects from the increased vibration during Construction and operations and maintenance are not predicted to be long-term in duration or frequent, the noise and vibrations technical support team determined residual effects during are assessed as **not significant**.

Table 5-14: Potential Effects and Mitigations for Acoustics and Vibration

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Noise**	• Clearing, grading, earth moving, grubbing of vegetation, and stockpiling of materials along the right-of-way and other access and construction areas, and construction of infrastructure (for example, access roads, bridges, temporary laydown areas, turn-around areas, and temporary construction camps) • Reclamation and decommissioning of access roads, temporary laydown areas, staging areas and construction camps • Use of pits and quarries	• Construction	• Project construction activities may result in an increase in noise levels	• Conduct construction activities during the daytime period (7 a.m. to 7 p.m.). Nighttime work is not anticipated. In the event construction will occur beyond the daytime period, applicable mitigation measures will be reviewed and implemented as required. • Check that equipment and machinery used on site is maintained in good working conditions through regular maintenance and inspection. • Design access roads to minimize reversing, which is expected to minimize use of backup beepers, where possible. • Locate and operate construction equipment as far as possible from points of reception. • Engage with Indigenous communities and relevant stakeholders to coordinate the planned construction schedule before the start of construction and prior to specific noisy activities to minimize overlap with the timing of traditional land use activities (for example, fall and spring hunting seasons). • Where reasonable and practicable, turn off vehicles and equipment when idle, unless weather and / or safety conditions dictate the need for them to remain turned on and in a safe operating condition. • Investigate noise concerns as they arise through a complaint resolution mechanism developed by the Owner / Operator whereby persons can contact the Project team if there are perceived noise issues. • Operate vehicles and equipment to minimize impulsive noise, where possible.	• Net change in noise levels during construction activities. • Activities are assumed to be between 7 a.m. and 7 p.m. • Monitoring of noise levels will be completed by Noise and Vibration team.
• **Noise**	• Operation and maintenance of the right-of-way, fencing, and permanent access roads • Use of pits and quarries	• Operation and Maintenance	• Project operation and maintenance activities may result in an increase in noise levels	• Maintain the surface of the roadway such that rough surface conditions are avoided. • Operate pits and quarries in accordance with NPC-300 and applicable permitting requirements. • Conduct maintenance activities during the daytime period (7 a.m. to 7 p.m.). • Check that equipment and machinery used for site maintenance is maintained in good working conditions through regular maintenance and inspection. • Where reasonable and practicable, turn off maintenance equipment when idle, unless weather and / or safety conditions dictate the need for them to remain turned on and in a safe operating condition. • Operate maintenance equipment to minimize impulsive noise, where possible.	• Net change in noise levels during operation and maintenance activities (road / quarry). • Activities are assumed to be between 7 a.m. and 7 p.m. • Monitoring of noise levels will be completed by Noise and Vibration team.
• **Vibration**	• Clearing, grading, earth moving, grubbing of vegetation, and stockpiling of materials along the right-of-way and other access and construction areas, and construction of infrastructure (for example, access roads, bridges, temporary laydown areas, turn-around areas, and temporary construction camps) • Reclamation and decommissioning of access roads, temporary laydown areas, staging areas and construction camps • Use of pits and quarries	• Construction	• Project construction activities may result in an increase in vibration levels	• Develop a Construction Vibration Workplan prior to the start of construction describing the construction schedule, list of construction equipment, list of point of reception locations (such as, traditional land use, residential, heritage structures and utilities), applicable guidance documents including criteria and control measures. • Consider the use of frequency-dependent vibration limits as more detailed information regarding the construction activities is known. • Engage with Indigenous communities and relevant stakeholders to coordinate the planned construction schedule before the start of construction and prior to specific activities that may generate vibration to minimize overlap with the timing of traditional land use activities (for example, fall and spring hunting seasons). • Investigate vibration concerns as they arise through a complaint resolution mechanism whereby persons can contact the Project Team if there are perceived vibration issues. • Construction activities should be limited to the daytime period (7 a.m. to 7 p.m.). Nighttime work is not anticipated. In the event construction will occur beyond the daytime period, applicable mitigation measures will be reviewed and implemented as required. • Locate and operate construction equipment as far as possible from points of reception. • Avoid operating equipment that is expected to generate significant vibration at the same time. Operating them separately may reduce overall vibration levels. • Construction blasting will be carried out in compliance with the Ontario Provincial Standard Specification 120 and NPC-119. The Ontario Provincial Standard Specification 120 details items such as vibration limits, protective measures, pre-blast surveys and notification to nearby owners and tenants. All blasts, which might impact local structures or disrupt humans, will be monitored for ground and air vibrations. • Blasting at temporary or existing quarries will be carried out to comply with the conditions provided in the licence or aggregate permit, if a licence or aggregate permit exists or is required. • Blasting delays and blast mats will be used, as appropriate, to control vibration and fly rock as required.	• Net change in vibration levels during construction activities • Activities are assumed to be between 7 a.m. and 7 p.m. • Monitoring of noise levels will be completed by Noise and Vibration team.
• **Vibration**	• Operation and maintenance of the right-of-way, fencing, and permanent access roads • Use of pits and quarries	• Operation and Maintenance	• Project operation and maintenance activities may result in an increase in vibration levels	• Maintain the surface of the roadway such that rough surface conditions are avoided. • Blasting will be carried out in compliance with NPC-119. • Quarry blasting will be carried out to comply with the conditions provided in the licence or aggregate permit, if a licence or aggregate permit exists or is required. • Blasting delays and blast mats will be used, as appropriate, to control vibration and fly rock as required.	• Net change in vibration levels during operations and maintenance activities (quarry blasting). • Activities are assumed to be between 7 a.m. and 7 p.m. • Monitoring of noise levels will be completed by Noise and Vibration team.

5.4.4.4 Acoustic Cumulative Effects

Noise emissions and vibrations from the construction of the Northern Road Link project, the operations of the Anaconda and Painter Lake forestry access road upgrades project and construction and operations and maintenance of the project may result in a potential effect because it is predicted that, after the implementation of impact management measures, exceedances of applicable criteria at potential points of reception may occur. This potential cumulative effect is therefore carried through to the characterization of cumulative effects.

Taking into account the implementation of the mitigation measures and the potential spatial and temporal overlap with other projects, the magnitude of the cumulative effects from the increased noise and vibration during Construction and operations and maintenance has the potential to range from low to high, depending on the distance between the points of reception and the construction and operations and maintenance activities. Therefore, for a conservative assessment, the cumulative effects were assessed to be high. The cumulative effects were assessed to be local in geographic extent, short-term and reversible. Due to the expected intermittent use of specific point of reception locations and the infrequent nature of project construction and operations and maintenance activities and any temporal and spatial overlap with other projects in the proximity of a given point of reception, the frequency was assessed to be infrequent.

5.4.5 Atmospheric Environment

The atmospheric environment includes air quality and greenhouse gases. From a biophysical determinants to human health perspective, the effects of air quality during the construction and operation and maintenance phases of the project are considered. Impacts to air quality will include emissions of volatile substances and from dust generated by construction, operation and maintenance. Particulate matter is also generated through emissions and burning and will impact air quality. Particulate emissions and dust can be transported and is subject to deposition onto soil, surface water and vegetation. Surface water and soil quality can be effected by contaminants in deposition materials. Dust can contain metals present in the rock it originated from. Ash from burning and diesel equipment emissions can contain Polycyclic Aromatic hydrocarbons and other contaminants. Human health would be effected by chemical exposures through the inhalation of volatile contaminants, the ingestion and respiratory exposure of inhaled dust or coming in contact with deposition materials. Exposure and adverse effects would be concentration related. The greatest impacts and concentrations will occur in the Construction Disturbance Area.

5.4.5.1 Existing Conditions

Air quality results are presented in the technical support document entitled *Air Quality and Greenhouse Gas Technical Support Document [Appendix S].* (Dillon Consulting Limited, 2025). Background air quality data collection began using enclosed trailers with air monitoring and meteorological equipment located within Marten Falls First Nation, near the community nursing station. A one-year data set was created from either continuous, hourly or discrete samples. The summary of the results of the air quality monitoring are presented in **Table 5-15**. It was anticipated that the main source of influence on air quality within the Local Study Area is the power generating station (diesel). The average annual diesel consumptions between 2019 and 2021 at the generating station was about 787,000 litres / year. Fuel consumption generates air contaminants such as particulates (including Total Suspended Particulate (TSP), Particulate Matter less than 10 micrometers diameter (PM_{10}), Particulate Matter less than 2.5 micrometer diameter ($PM_{2.5}$) and Diesel Particulate Matter), oxides of nitrogen (NO_x), carbon monoxide (CO), benzene, toluene, ethylbenzene, and xylenes, select volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs).

Table 5-15: Air Quality Standards and Exceedances

Parameter	Averaging Period	Guidelines[(a)]	Effect	Maximum Monitored or Estimated (µg / m³)	90th Percentile Monitored or Estimated (µg / m³)
$PM_{2.5}$	24 hr	27	Health	32.0	8.0
PM_{10}	24 hr	50	Health	130.3	31.2
TSP	24 hr	120	Visibility	840.3	89.1
	Annual	60	Visibility	56.6	-
Acrolein	1 hr	4.5	Health	9.1	-
	24 hr	0.4	Health	3.65	0.04
Benzo(a)pyrene	24 hr	0.00005	Health	0.000115	0.000019
	Annual	0.00001	Health	0.00002	-

Notes: (a) When multiple guidelines (Canadian Ambient Air Quality Standards or ON Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.

Select volatile organic compounds, polycyclic aromatic hydrocarbons, and diesel particulate matter were not sampled as part of the technical support document due to equipment limitations coupled with serviceability challenges given the remote location of Marten Falls First Nation. Benzo(a)pyrene concentrations were taken from the Simcoe ON National Air Pollution Surveillance network station. Monitored benzene, toluene, ethylbenzene, and xylene concentrations were used to estimate concentrations of other relevant volatile organic compounds including acetaldehyde, formaldehyde, 1,3-butadiene, and acrolein.

Emission ratios presented in the United States Environmental Protection Agency Speciate database were considered in these estimates. The following emission profiles were

selected in the *Atmospheric Environment Technical Support Document* as they represent typical activities and fuel sources found within Marten Falls First Nation include:

- Residential oil boilers;
- Diesel exhaust – light duty truck operated at 0.50C (composite);
- Gasoline exhaust – E-10 gasoline at 10C, US06 cycle; and
- Aircraft landing / takeoff (LTO) – commercial.

Of note, these did not include a contribution from wood smoke. It was reported that 90% of the houses and the school use wood for heating purposes.

The maximum observed ambient concentrations for the majority of indicator compounds were below their respective averaging period criteria for protection of ambient local air quality. Particulate matter levels were found to exceed the Ontario Ambient Air Quality Criteria and Canadian Ambient Air Quality Standards. However, the concentrations at the 90^{th} percentile were below their respective criteria. This may be due to isolated events such as forest fires influencing ambient air quality. Community wood burning or fugitive dust from vehicular traffic on unpaved roads may also contribute to elevated particulate levels.

The maximum monitored 1-hour and / or 24-hour concentrations of particulates, including Total Suspended Particulate, PM_{10}, and $PM_{2.5}$, exceeded the criteria while the 90^{th} percentiles are below their respective criteria. This indicates the concentrations exceeded the criteria on an intermittent basis.

Benzo(a)pyrene is a chemical formed as a by-product of incomplete combustion of burning organic matter such as wood. The maximum 24-hour concentration of benzo(a)pyrene exceeded the Ontario criteria while the 90^{th} percentile is well below the criteria. Elevated levels of benzo(a)pyrene may be attributed to forest fires occurring during the monitoring period as well as the burning of wood as a fuel source within Marten Falls First Nation. Diesel combustion from the adjacent diesel generation station and other mobile combustion sources (e.g., vehicle traffic) may have also contributed towards elevated levels of $PM_{2.5}$ and benzo(a)pyrene. As benzo(a)pyrene concentrations were estimated from $PM_{2.5}$ concentrations, elevated $PM_{2.5}$ concentrations would also result in elevated benzo(a)pyrene estimates.

Of the values presented in the existing conditions table, only $PM_{2.5}$ was measured, the rest were estimates. These estimates are subject to uncertainty. Full details on the baseline air quality assessment can be found in the *Air Quality and Greenhouse Gas Technical Study Document [Appendix S]*

5.4.5.2 Project Conditions

To determine the potential effects of the project on Air Quality, the Air Quality Technical Study Report includes modelling of air quality during the construction and operations . Models were completed for a North South Section of the community access road and an East West Section at the terminus of the road closest to the Marten Falls. The North South section was deemed to be a worst-case scenario as it is adjacent to a bridge and to a quarry. The construction phase modelling included an 'all construction activities' combined impact assessment. It included access road traffic, bridge building, quarry building, quarry blasting, road blasting, road construction and waste wood burning occurring simultaneously. **Figure 5-10** and **Figure 5-11** show the locations of the modelled sections.

Conditions were also modelled for the operations phase at the same North South and East West sections. This model only considered road traffic and did not include any construction or road maintenance activities.

Releases to air of Diesel Exhaust and Diesel Particulate Matter are expected from diesel vehicle operations during both construction and Operations and Maintenance. Road traffic volumes of 700 vehicles per day are expected during operation. Health Canada acknowledges that it is recognized that Canadian population exposures to DE or DEP cannot be estimated at this time; however, the guidance values represent the current state of the science and may be of use in the future. Health Canada provide a short-term exposure guidance value of 10 µg/m³ and a chronic exposure guidance value of 5 µg/m³ have been derived based on diesel exhaust particulate matter (PM) to protect against adverse effects on the respiratory system. (Health Canada 2016)

Deposition of dust particles from Construction and Operations and Maintenance has been raised as a potential concern for Human Health and for the potential deposition on vegetation particularly those used as traditional foods which may pose an exposure pathway for people who harvest and use effected plants, berries gathered within dust depositional areas. Dust deposition modelling was completed and included in the Air Quality Technical Study Document

Summaries of the model results for project activities which exceed the criteria are presented in the **Table 5-16** to **Table 5-19**. Full tables are provided in **Attachment B.**

Figure 5-10: Construction Area Model

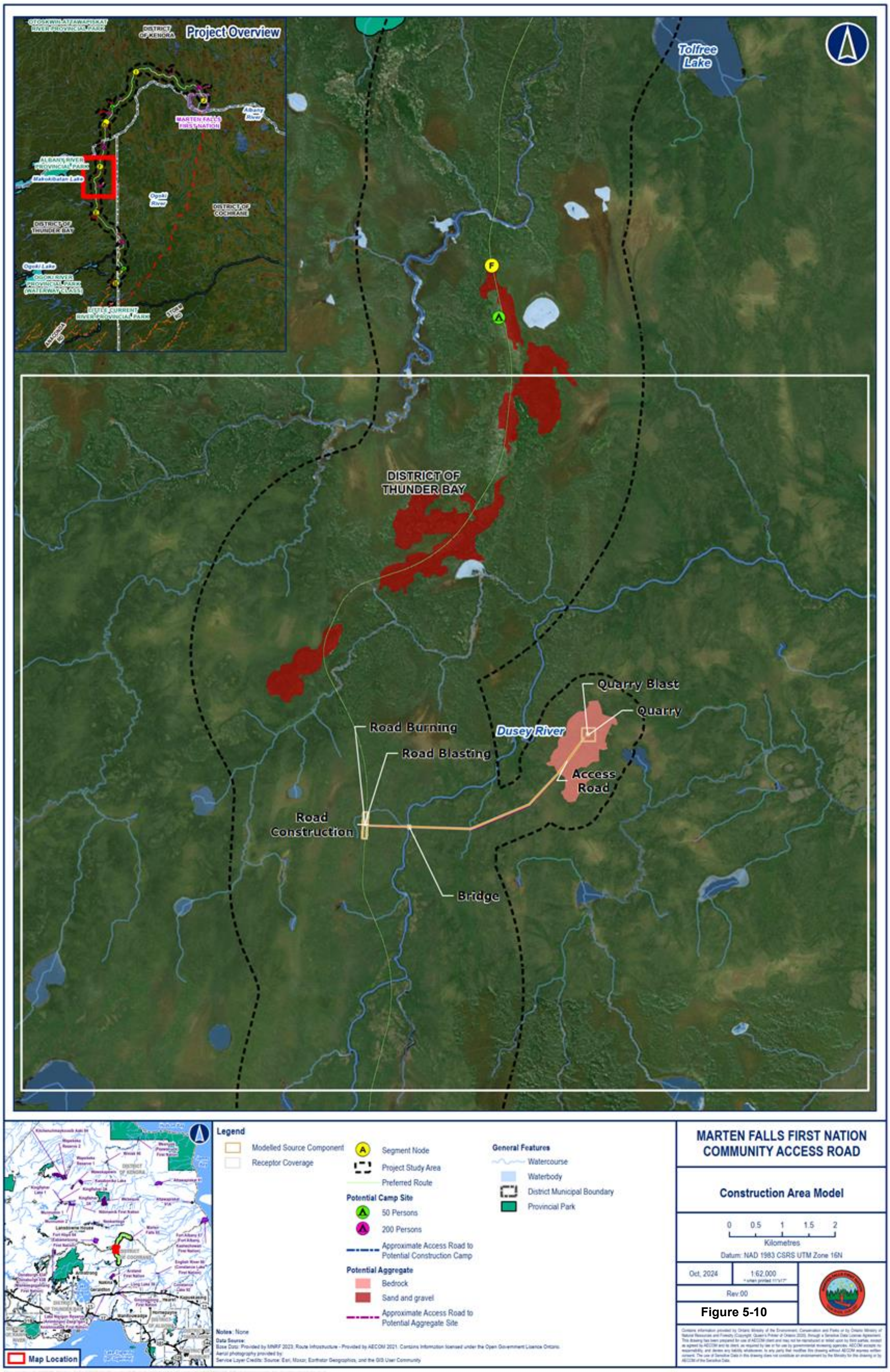


Figure 5-11: Community Area Model

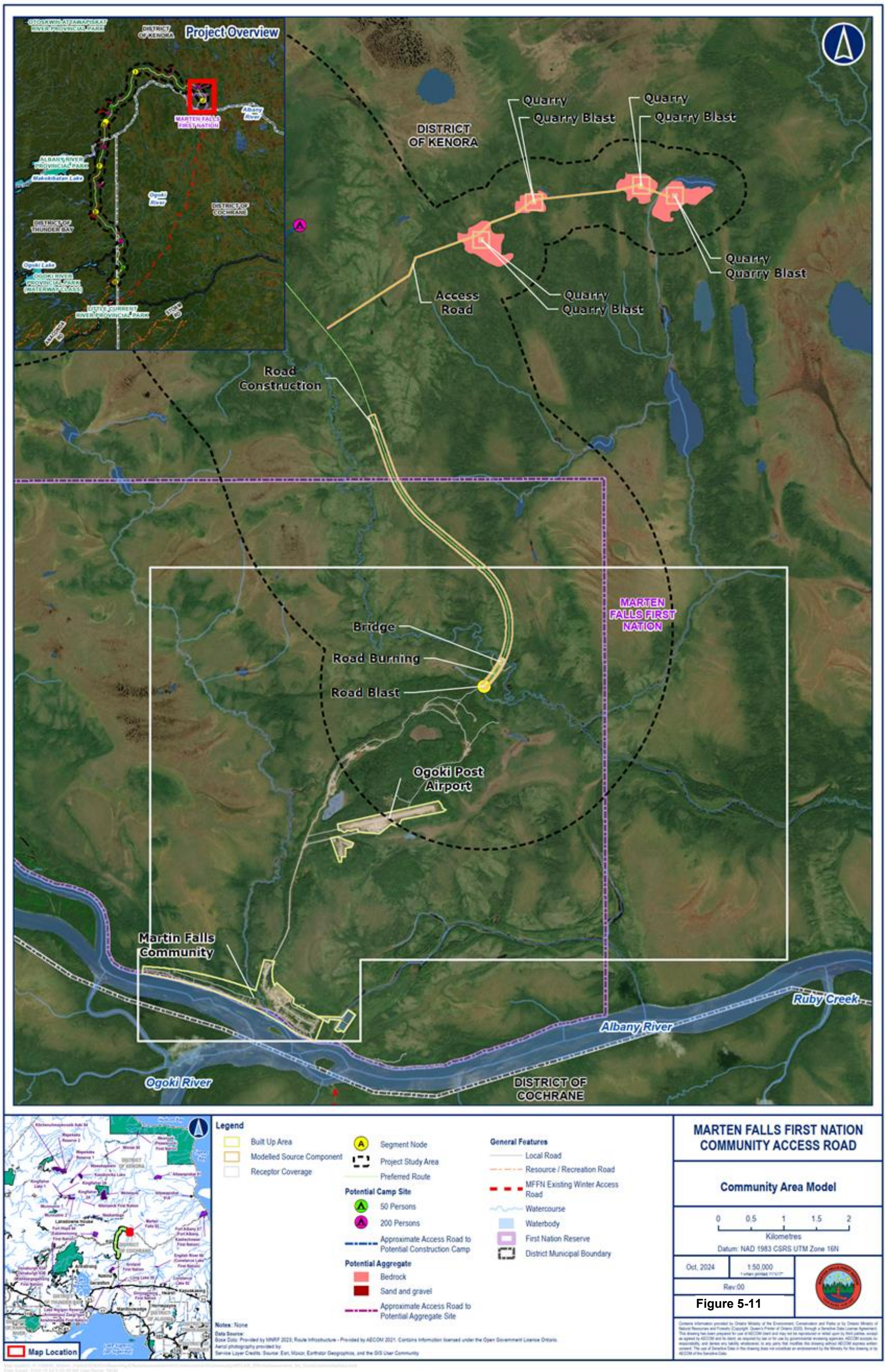


Table 5-16: Construction Phase – North South Segment

Parameter	Averaging Period	Guidelines[(a)] (µg/m^3)	Effect	Modeled Maximum at Point of Impingement (µg / m^3)	Distance to Point of Compliance (m)	Project plus background Distance to Point of Compliance	Activity
NO2	1 hr	79	Health	275	3960	5700	Quarry Blast
					2598	2733	Burning
					900	919	Bridge Building
NO2	Annual	22.6	Health	27.2	50	52	Bridge Building
PM2.5	24 hr	27	Health	245	711	1030	Burning
					297	440	Road Construction
PM10	24 hr	50	Health	308	455	1099	Burning
					157	439	Road Construction
					125	461	Access Road
TSP	24 hr	120	Visibility	433	194	709	Burning
					82	355	Road Construction
					78	434	Access Road
TSP	annual	60	Visibility	12^	na	174	Access road
SO2	10 min	178	Health	18250	EMD	EMD	Quarry Blast
					742	766	Road Blasting
SO2	1 hr	100	Health	11060	EMD	EMD	Quarry Blast
					754	764	Road Blasting
SO2	1 hr	170	Health	11060	EMD	EMD	Quarry Blast
					543	564	Road Blasting
CO	1 hr	36200	Health	189631	1459	1458	Quarry Blast
CO	8 hr	15700	Health	31419	687	699	Quarry Blast
Acrolein	24 hr	0.4	Health	0.39^	10	10	Bridge Building
Benzo(a)pyrene	24 hr	0.00005	Health	0.00008	6	74	Bridge Building
Benzo(a)pyrene	annual	0.00001	Health	0.00001^	NA	Background exceeds criteria	Bridge Building
Dust Deposition	annual	4.6 g/m^2	Soiling	28 g/m^2	280	500	All activities combined

Notes: NA – not provided as maximum is very close to standard or guideline.
(a) When multiple guidelines (Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.
^-exceeds when background is included only

NO_2 adjacent bridge construction and dust deposition exceed annual criteria. Annual NO_2 exceedances are immediately adjacent to the work area. Dust deposition rates predicted in the North South modelled area and expected to extend the whole length of the community access road in the north south direction during construction exceeds the annual dust deposition standard up to a distance of 220 m from the road. As road construction materials are expected to come from the regional area and elevated levels of metals were found in soils through out the area, metals containing dust may be generated during construction activities. Chemical analysis of quarry materials should be conducted prior to road construction, and dust mitigation methods should be employed during construction.

During the construction phase for the North / South segment (worst case scenario) other effects are generally short term, less than 24 hours duration. Concentrations of NO_2 and SO_2 in air after Quarry Blasts exceed 1 hour standards for a distance of up to 12.3 km after the blast. Explosive mixtures should be tailored to minimize NO2 and SO2 emissions from blasting activities. Burning of brush and other waste materials results in elevated concentrations of NO_2 for 1 hour approximately 1 kilometre from the burn location. Concentrations of PM2.5, PM10 and TSP are elevated for a 24 hour period up to over 700 metres from the burn location. Burning of waste material and wood debris should be minimized or eliminated.

Table 5-17: Construction Phase – East West Segment (Community)

Parameter	Averaging Period	Guidelines[(a)]	Effect	Modeled Maximum at Point of Impingement (µg / m^3)	Distance to Point of Compliance (m)	Project plus background Distance to Point of Compliance	Activity
NO2	**1 hr**	**79**	**Health**	**170**	**NC**	**NC**	
PM2.5	**24 hr**	**27**	**Health**	**156**	**NC**	**NC**	
PM10	**24 hr**	**50**	**Health**	**175**	**NC**	**NC**	
TSP	**24 hr**	**120**	**Visibility**	**348**	**NC**	**NC**	
SO2	10 min	178	Health	939	**NC**	**NC**	
SO2	1 hr	100	Health	569	**NC**	**NC**	
SO2	1 hr	170	Health	569	NC	NC	
Benzo(a)pyrene	24 hr	0.00005	Health	0.00002	NC	NC	
Benzo(a)pyrene	Annual	0.00001	Health	0.00000121	NC	NC	

Notes: NA – not provided as maximum is very close to standard or guideline.
NC – not calculated as part of Air Quality Technical Study
(a) When multiple guidelines (Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.
^-exceeds when background is included only

Nearer the Marten Falls community, air quality modelling revealed exceedances of SO_2 criteria for a one hour averaging period. Although not specified, this is assumed to be associated with Quarry and Road Blasting activities. Explosive mixtures should be tailored to minimize NO2 and SO2 emissions from blasting activities. Blasting activities should be coordinated with other activities to minimize cumulative effects. Community and nearby users should be notified when air quality is expected to be adversely effected to allow sensitive individuals to shelter indoors and avoid areas of impacts.

Table 5-18: Operations Phase – North South Segment

Parameter	Averaging Period	Guidelines[(a)]	Effect	Modeled Maximum at Point of Impingement (µg / m^3)	Distance to Point of Compliance (m)	Project plus background Distance to Point of Compliance (m)	Activity
PM2.5	24 hr	27	Health	67.4	115	207	Road Traffic
PM2.5	Annual	8.8	Health	10.00	134	414	Road Traffic
PM10	24 hr	50	Health	65.5	1986	2978	Road Traffic
TSP	24 hr	120	Visibility	2292.6	EMD	EMD	Road Traffic
TSP	Annual	60	Visibility	344.6	899	EMD	Road Traffic
Benzo(a)pyrene	Annual	0.00001	Health	6E-8	NA	Background exceeds criteria	Road Traffic
Dust deposition	30 day	7 g/m2	Soiling	11.5 g/m2	45	174	Road Traffic
Dust deposition	annual	4.6 g/m2	Soiling	54.3 g/m2	681	1280	Road Traffic

Notes: NA – not provided as maximum is very close to standard or guideline.
(a) When multiple guidelines (Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.
^-exceeds when background is included only

The operations phase considered road traffic. As traffic will travers the whole length of the North South Section, these concentrations are expected to extend along the whole of the North South Section. Exceedances of Guidelines for Particulate Matter of 2.5 and 10 microns, Total Suspended Particulate and for dust deposition extended up to 3 kilometers on either side of the roadway. Actual dust deposition was modelled almost 700 m on either side of the road. As road construction materials are expected to come from the regional area and elevated levels of metals were found in soils throughout the area, metals containing dust may be generated during operations. Chemical analysis of quarry materials should be conducted prior to road construction, and dust mitigation methods should be employed during construction. Monitoring of dust generation levels and extent of deposition should occur during the early years of operation and continue if warranted.

Table 5-19: Operations Phase – East West Segment (Community)

Parameter	Averaging Period	Guidelines[(a)]	Effect	Modeled Maximum at Point of Impingement (µg / m^3)	Distance to Point of Compliance (m)	Project plus background Distance to Point of Compliance	Activity
PM10	24 hr	50	Health	94	50	374	Road Traffic
TSP	24 hr	120	Visibility	329	119	1001	Road Traffic
TSP	annual	60	Visibility	39.9	NA	639	Road Traffic
Benzo(a)pyrene	annual	0.00001	Health	1E-8	NA	Background exceeds criteria	Road Traffic
Dust deposition	annual	4.6 g/m2	Soiling	6.28	28	102	Road Traffic

Notes: NA – not provided as maximum is very close to standard or guideline.
(a) When multiple guidelines (Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.
^-exceeds when background is included only

For the operations phase, air quality was modelled for PM2.5, PM10 and TSP accounting for mitigation measures cumulatively reaching 80% control efficiency (**Table 5-20**). Although PM2.5, PM10 and TSP all exceeded the criteria even with mitigations, the distance to compliance was only determined for total suspended particulate matter. Incorporating background, even with mitigations, total suspended particulate matter exceeded criteria a maximum distance of 2.34 kilometers on each side of the road in the north south direction and a maximum distance of 319 meters in the east west direction. The make up of the total suspended particulate has not been determined as chemical analysis of the quarry material to be used for road base is not available at this time.

The amount of traffic expected to traverse the East West Section into the community is less than for the North South Section. Although this results in less emissions and dust deposition, there are still modelling predicted exceedances of the 24 hr guidelines for ten micron particulate matter and total suspended particulates and of the annual dust deposition rates. As road construction materials are expected to come from the regional area and elevated levels of metals were found in soils throughout the area, metals containing dust may be generated during operations. Chemical analysis of quarry materials should be conducted prior to road construction, and dust mitigation methods should be employed during construction. Monitoring of dust generation levels and extent of deposition should occur during the early years of operation and continue if warranted.

5.4.5.3 Potential Effects and Mitigations and Residual Effects

The construction phase is made up various distinct activities which may have effects on air quality. On a longer timescale operation and maintenance activities may pose different effects on air quality than the construction phase. The project activities along with effects expected and the proposed mitigations from each phase as well as the residual effects expected after mitigation are presented in **Table 5-20.** Only those project activities which are expected to have an impact on Air quality are noted below. For a full evaluation of effects on air refer to *Air Quality and Greenhouse Gas Technical Support Document [Appendix S].*.

Table 5-20: Operations Phase – with 80% dust Mitigation

Parameter	Averaging Period	Guidelines[(a)]	Effect	Modeled Maximum at Point of Impingement (µg / m^3)	Mitigated Maximum at Point of Impingement (µg / m^3)	Modeled Distance to Point of Compliance (m)	Modeled Project plus background Distance to Point of Compliance (m)	Mitigated Distance to Point of Compliance (m)	Mitigated Project plus background Distance to Point of Compliance (m)
NORTH / SOUTH									
PM10	24 hr	50	Health	656	131.2	NC	NC	NC	NC
TSP	24 hr	120	Visibility	2293	458.7	>3000	>3000	226	2298
TSP	annual	60	Visibility	345	187.8	899	>3000	135	2336
EAST / WEST									
PM10	24 hr	50	Health	94	18.8	**NC**	**NC**	**NC**	**NC**
TSP	24 hr	120	Visibility	329	65.8	119	1001	NA	65
TSP	annual	60	Visibility	40	22	NA	639	NA	319

Notes: NA – not provided as maximum is very close to standard or guideline.
NC – not calculated as part of Air Quality Technical Study
(a) When multiple guidelines (Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria) were available for a parameter, the lowest one was selected.
^-exceeds when background is included only

Table 5-21: Potential Effects and Mitigations (Air Quality)

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Air Quality**	• Quarry Blasing	• Construction	• Nitrogen dioxide - Quarry Blasting	• Development of a construction best management practice plan as well as a fugitive dust management plan prior to construction. Examples of best management practices that may be included are: – Implement watering during fugitive dust-generating activities such as drilling and material handling. – Limit vehicle speed, where feasible. – Strategic haul planning to reduce overall number of haul trips required for aggregate material demands. Consider sourcing material from the closest available material transfer points. – Where possible, reduce the quantity of material that is either burned or chipped (in other words, consider salvageable material such as salable lumber). – When burning is required, consider avoiding periods where meteorological conditions (for example wind speed) that may result in smoke impacting sensitive receptor locations. – Maintain equipment as per manufacturing specifications. – Implement anti-idling policies or procedures to reduce total vehicle idling times. – Implement blasting mitigation (for example charge size) in quarries to minimize potential effects. – Use explosives only if alternate methods of excavation to remove materials for foundation systems and roads are not feasible. – Prepare a Blasting and Communication Management Plan that is in accordance with *Ontario Provincial Standard Specification General Specifications for the Use of Explosives* (Ontario Provincial Standard Specifications, 2014) and describes specific measures that would be implemented if blasting is required. • Development of a construction monitoring plan. This plan may be used to validate that best management practices are being implemented and that mitigation actions taken are effective. Where mitigation is not providing a reduction to overall impacts, mitigation options should be re-assessed. • Evaluate blast formulas to limit NO_2 and SO_2 emissions	• Context: Nitrogen dioxide - 1-hour - Canadian Ambient Air Quality Standards • Geographic Extent: 5700 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Quarry Burning	• Construction	• Nitrogen dioxide - Burning / Clearing	• Same as above	• Context: Nitrogen dioxide - 1-hour - Canadian Ambient Air Quality Standards • Geographic Extent: 2733 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Bridge Building	• Construction	• Nitrogen Dioxide – Bridge Building	• Same as above	• Context: Nitrogen dioxide - 1-hour - Canadian Ambient Air Quality Standards • Geographic Extent: 919 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Bridge Building	• Construction	• Nitrogen Dioxide – Bridge Building	• Same as above	• Context: Nitrogen dioxide - 24-hour - Ambient Air Quality Criteria • Geographic Extent: 52 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• urning	• Construction	• Particulate Mater 2.5 - Burning	• Same as above	• Context: –Particulate Matter 2.5 24 hour- Ambient Air Quality Criteria • Geographic Extent: 1030 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Road Construction,	• Construction	• Particulate Matter 2.5, Road Construction,	• Same as above	• Context: Particulate Matter 2.5 - 24 hour - Ambient Air Quality Criteria • Geographic Extent: 440 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Burning	• Construction	• Particulate Matter 10 - Burning	• Same as above	• Context: –Particulate Matter 10 - 24 hour- Ambient Air Quality Criteria • Geographic Extent: 1099 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Road Construction	• Construction	• Particulate Matter 10 – Road Construction	• Same as above	• Context: –Particulate Matter 10 - 24 hour- Ambient Air Quality Criteria • Geographic Extent: 439 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Access Road	• Construction	• Particulate Matter 10 – Access Road	• Same as above	• Context: –Particulate Matter 10 - 24 hour- Ambient Air Quality Criteria • Geographic Extent: 461 metres • Duration: Short-Term • Frequency: Continuous

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Air Quality**	• Burning	• Construction	• Total Suspended Particulates - Burning	• Same as above	• Context: Total suspended particulates - 24-hour - Ambient Air Quality Criteria • Geographic Extent: 709 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Road Construction	• Construction	• Total Suspended Particulates - Road Construction	• Same as above	• Context: Total suspended particulates - 24-hour - Ambient Air Quality Criteria • Geographic Extent: 355 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Access Road	• Construction	• Total Suspended Particulates - Access Road	• Same as above	• Context: Total suspended particulates - 24 hour - Ambient Air Quality Criteria • Geographic Extent: 434 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Access Road o	• Construction	• Total Suspended Particulates -, Access Road	• Same as above	• Context: Total suspended particulates - Annual - Ambient Air Quality Criteria • Geographic Extent: 174 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Quarry Blasting	• Construction	• Sulphur Dioxide - Quarry Blasting	• Same as above	• Context: Sulphur dioxide – 10 min - Ambient Air Quality Criteria • Geographic Extent: Exceeds Model Domain • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Road Blasting	• Construction	• Sulphur Dioxide - Road Blasting	• Same as above	• Context: Sulphur dioxide – 10 min - Ambient Air Quality Criteria • Geographic Extent: 766 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Quarry Blasting	• Construction	• Sulphur Dioxide – Quarry Blasting	• Same as above	• Context: Sulphur dioxide - 1-hour - Ambient Air Quality Criteria • Geographic Extent: Exceeds Model Domain • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Road Blasting	• Construction	• Sulphur Dioxide - Road Blasting	• Same as above	• Context: Sulphur dioxide - 1-hour - Ambient Air Quality Criteria • Geographic Extent: 764 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Quarry Blasting	• Construction	• Carbon Monoxide – Quarry Blasting	• Same as above	• Context: Carbon Monoxide – 1 hour - Ambient Air Quality Criteria • Geographic Extent: 1,458 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Quarry Blasting	• Construction	• Carbon Monoxide - Blasting	• Same as above	• Context: Carbon Monoxide – 8 hour - Ambient Air Quality Criteria • Geographic Extent: 699 metres • Duration: Short-Term • Frequency: Infrequent
• **Air Quality**	• Bridge Building	• Construction	• Acrolein - Bridge Building	• Same as above	• Context: Acrolein – 24 hour - Ambient Air Quality Criteria • Geographic Extent: 10 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Bridge Building	• Construction	• Benzo(a)Pyrene - Bridge Building	• Same as above	• Context: Benzo(a)Pyrene - 24 hours - Ambient Air Quality Criteria • Geographic Extent: 74 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Bridge Building	• Construction	• Benzo(a)Pyrene - Bridge Building	• Same as above	• Context: Benzo(a)Pyrene - annual - Ambient Air Quality Criteria • Geographic Extent: background exceeds criteria • Duration: Short-Term • Frequency: Continuous

Valued Component	Project Activities	Project Phase	Description of Potential Effect	Mitigation and Enhancement Measures	Predicted Residual Effect
• **Air Quality**	• Tailpipe emissions of diesel-powered equipment	• Construction	• Diesel Emissions and Diesel Particulate Matter	• Same as above	• Context: Diesel Particulate – 2 hour - Ambient Air Quality Criteria • Geographic Extent: not calculated • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• All activities combined	• Construction	• Dust Deposition – all activities combined	• Same as above	• Context: Dust Deposition – annual - Ambient Air Quality Criteria • Geographic Extent: 500 metres • Duration: Short-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Particulate Matter 2.5	• Development of a Best Management Plan for fugitive dust prior to operations. Examples of best management practices that may be included are: – Application of Ontario Ministry of Transportation approved dust suppressants that are environmentally friendly. – Keep vegetation such as grasses shrubs and trees along the highway to enhance gravitational deposition of particles and natural windbreaks. Specifics to this are documented in the Revegetation Plan. • Consideration of input gathered through other technical monitoring programs specific to potential air quality concerns (in other words, potential dust deposition on vegetation) is completed and evaluated for consideration of future mitigation or monitoring options.	• Context: Particulate Matter 2.5 – 24 hour - Ambient Air Quality Criteria • Geographic Extent: 207 metres • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Particulate Matter 2.5	• Same as above	• Context: Particulate Matter 2.5 – annual - Ambient Air Quality Criteria • Geographic Extent: 414 metres • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Particulate Matter 10	• Same as above	• Context: Particulate Matter 10 – 24 hour - Ambient Air Quality Criteria • Geographic Extent: 2978 metres • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Total Suspended Particulate	• Same as above	• Context: Total Suspended Particulate – 24 hour - Ambient Air Quality Criteria • Geographic Extent: Exceeds Model Domain • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Total Suspended Particulate	• Same as above	• Context: Total Suspended Particulate – annual - Ambient Air Quality Criteria • Geographic Extent: Exceeds Model Domain • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Benzo(a)pyrene	• Same as above	• Context: Benzo(a)pyrene – annual - Ambient Air Quality Criteria • Geographic Extent: background exceeds criteria • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Dust Deposition	• Same as above	• Context: Dust Deposition – 30 day - Ambient Air Quality Criteria • Geographic Extent: 174 metres • Duration: Long-Term • Frequency: Continuous
• **Air Quality**	• Road Traffic	• Operations and Maintenance	• Dust Deposition	• Same as above	• Context: Dust Deposition – annual - Ambient Air Quality Criteria • Geographic Extent: 1280 metres • Duration: Long-Term • Frequency: Continuous

Notes: -Geographic extent listed is specific to the highest magnitude rating, lower magnitude of residual effects may be experienced at distances that surpass the listed geographic extent (in other words, less than 50 percent of criteria but greater than 50 percent of existing ambient).

5.4.5.4 Residual Effects in Relation to Human Health

Through the *Air Quality and Greenhouse Gas Technical Support Document: Existing Conditions & Effects Assessment, Volume 1 – Air Quality [Appendix I]* significance assessment, it was found that **no significant** residual effects in the context of air quality are anticipated through the construction phase. This finding was largely driven by the reversibility of air quality effects from construction activity.

Residual effects from operations indicates the potential for a significant predicted impact from particulate emissions generated from fugitive road dust on air quality. High magnitude impacts are predicted for the following indicator compounds, and their respective averaging periods are shown in Table 5-22. These concentrations could have potential negative effects on human health for receptors withing the impacted areas during these durations.

Table 5-22: Significant Air Impacts

Parameter	Duration	Location	Extent
Particulate Matter Less than 2.5 Micrometres	24-hour	North-south road segment	207 metres from roadway
Particulate Matter Less than 2.5 Micrometres	Annual	North-south road segment	414 metres from roadway
Particulate Matter Less than 10 Micrometres	24-hour	North-south road segment	2987 metres from roadway
Particulate Matter Less than 10 Micrometres	24-hour	Community road segment	374 metres from roadway
Total Suspended Particulate	24-hour	North-south road segment	Local Study Area
Total Suspended Particulate	24-hour	Community Access Road segment	1001 metres from roadway
Total Suspended Particulate	Annual	North-south road segment	Local Study Area
Dust deposition	30 day	North-south road segment	45 metres from roadway
Dust Deposition	annual	North-south road segment	681 metres from roadway
Dust Deposition	annual	Community Access Road segment	28 metres from roadway

Land use in the vicinity of the Community Access Road includes a combination of traditional activities, such as hunting, fishing, and trapping, as well as recreational pursuits, resource development, and outfitting operations. These uses reflect the cultural and economic importance of the land to Marten Falls First Nation and other stakeholders. However, specific details about the location and intensity of these activities cannot be provided, as much of this information is based on confidential Indigenous Knowledge. For this reason, the assessment relies on general patterns and assumptions drawn from the Land and Resource Use Report rather than precise site-specific data.

An assessment of the extent of the predicted dust impacts in relation to the location, extent and duration of land use has not been completed to evaluate the potential impacts on human health from exposure to the dust levels noted above. Additionally, soil sampling indicated exceedances of human health based criteria for arsenic, chromium, molybdenum

and nickel in soils. As this material is slated to be used for road construction materials, the dust generated from the road may also contain elevated airborne concentrations of metals derived from soil.

5.4.5.5 Atmospheric Cumulative Effects

It is noted that there is potential for cumulative effects from the projects / activities listed in Dillon (2025); however, the extent of a cumulative effect is not readily quantifiable with the limited information available. While air quality residual effects cannot be screened out, only a qualitative review of the potential for cumulative effects can be completed. Projects considered for cumulative effects are shown in **Table 5-23**.

Table 5-23: Additional Projects to be Considered under the Cumulative Effect Scenario

Past, Existing and Future Physical Activities / Projects	Valued Component Carried Forward Air Quality	Description
Northern Road Link	Yes	The projects / activities noted are located within the spatial and temporal boundaries identified for the cumulative effects assessment. There exists the potential for cumulative effects.
Rapid Lynx Broadband Project – Phase 1		
Anaconda and Painter Lake Forestry Access Road Upgrades		
Ogoki-Armstrong Primary Roads		

It is expected that when the spatial and temporal boundaries of the projects listed in **Table 5-23** overlap, there exists the potential for cumulative effects with respect to air quality. The extent of the potential impact will vary depending on the type of activity and location compared to the cumulative effects study area.

The cumulative effects assessment builds on the results of the residual effects assessment and provides the incremental changes that are predicted to have a likely residual adverse effect on air quality. Detailed operational information (equipment, operating schedules, and location of activities) is required to estimate emissions from these project activities listed. As this information was not available at the time of this assessment, a quantitative analysis of these projects to determine the potential for cumulative effects was not completed. However, it can be reasonably understood that there exists the potential for additional project activity to increase the magnitude, frequency, irreversibility, and likelihood of the project's residual effects.

5.4.6 Traditional Foods

Country or traditional foods refer to the diets that have been passed down through generations within a particular culture or community. These foods are often prepared using traditional methods and ingredients, reflecting the cultural heritage and practices of a

Nation. Harvesting is done for a variety of consumption, medicinal and cultural purposes (e.g., skunk oil, extracted from the animal's fat, is harvested to treat respiratory infections).

For Marten Falls First Nation and Aroland First Nation, traditional harvesting includes (Marten Falls First Nation, 2023a; Teach for Canada, 2024).:

- Hunting: Moose, caribou, black bear, deer, geese, partridge, and ptarmigan.
- Trapping: Beaver, muskrat, and rabbit.
- Fishing: Pickerel (walleye), trout, pike, whitefish, and sturgeon.
- Plant Gathering: Wild blueberries, strawberries, gooseberries, and medicinal plants such as cedar, sweet grass, Labrador tea, and tamarack.

The quality of traditional or country foods is dependent on the health of the environment. For example, fish thrive in clean, unpolluted waters, and their health directly impacts the safety and nutritional value of the fish consumed by humans. Similarly, berries and other wild fruits rely on clean air and soil to grow without accumulating potentially harmful contaminants. Wildlife, which is often a source of traditional meats, needs a suitable supporting or healthy habitat to flourish; polluted environments can lead to diseases and reduced populations. Country foods harvested from contaminated environments may accumulate some types of contaminants creating a potential risk to the consumers.

For the purpose of this assessment, changes to the quality of the environment where country foods are harvested will be used to determine if there is a potential residual effect that may effect the quality of the associated country food. Human health may be effected by chemical exposures through the consumption of contaminated country foods, and depending on the type of contaminant, the amount and the frequency of contaminant exposure.

Table 5-24 relates the environmental quality indicators to the mechanism for contamination of county foods.

Table 5-24: Potential Contamination Mechanisms of Country Foods

Source	Country Food Contamination Mechanism
Surface Water and Sediment	**Discharges and runoff of contaminants to surface water may be absorbed or consumed by fish and aquatic organisms.** Consumed by Wildlife, birds and Ungulates Uptake by plants and soil invertebrates
Soils	**Contaminants from spills on land may be absorbed by wildlife including birds and mammals such as geese, moose, and beaver.** Consumed directly by wildlife, through eating food items, during grooming and preening, as well as during activities such as burrowing and nest building.
Dust	**Deposition of contaminants in dust may be** consumed directly by wildlife through ingestion of dust on berries and plants, and prey, and through grooming and preening activities (e.g., ingestion of dust and soil on fur, feathers, feet)

The air quality pathway for impacts on traditional foods is only assessed for dust deposition of contaminants because reliable models are not available for assessing the inhalation of volatile chemicals (i.e. petroleum hydrocarbon emissions) by wildlife, birds and mammals.

Food web exposure for wildlife would include the consumption of plants and by larger organisms through the food chain to also include human consumption of country foods. Error! Reference source not found. shows harvest areas for traditional foods in the Construction Disturbance Area.

Marten Falls First Nation

Moose, fish species such as walleye, sturgeon, and trout, and seasonal berries form the foundation of local diets. Hunting and trapping occur along the Construction Disturbance Area, creating concerns about habitat disturbance and contamination. Harvesting follows seasonal cycles: moose hunting peaks in fall and winter, fishing continues year-round with ice fishing in winter, trapping of furbearers occurs primarily in winter, and berry gathering occurs in summer and fall. Food security depends on access to traditional harvesting areas. Cultural practices—including drying fish, preparing pemmican, and teaching youth land-based skills—remain central to community identity and continuity.

(Source: Marten Falls First Nation Indigenous Knowledge Program; see **Table 3-1**)

Aroland First Nation

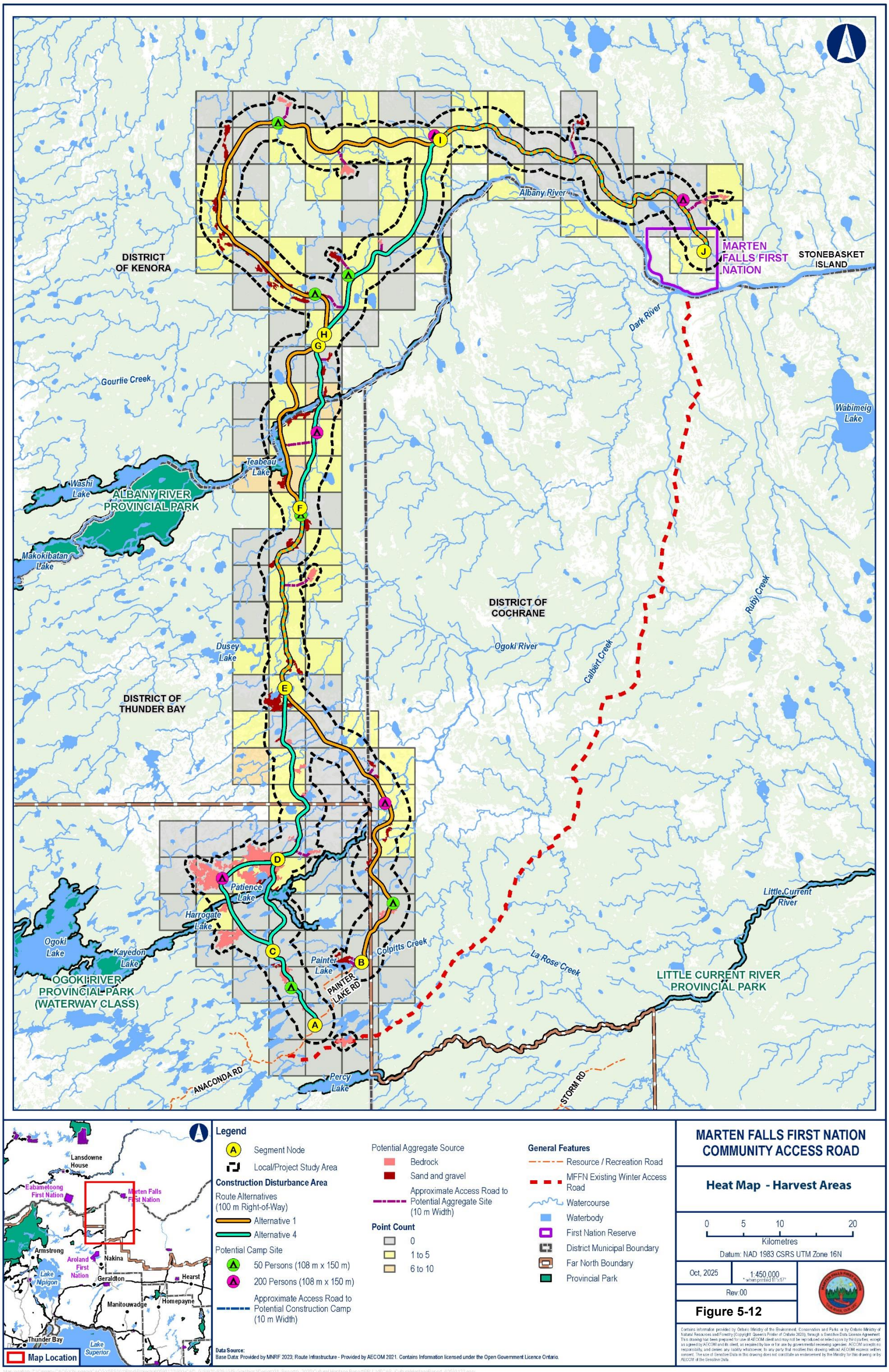
Traditional diets include caribou, fish species such as walleye and trout, and berries harvested near the Construction Disturbance Area. Hunting and trapping activities occur close to planned construction zones, raising concerns about contamination and habitat fragmentation. Seasonal patterns mirror those of Marten Falls, with moose hunting concentrated in fall and winter, fishing year-round, and berry harvesting in summer and fall. Cultural continuity is supported through practices such as fish drying and knowledge transfer to younger generations.

(Source: Marten Falls First Nation Indigenous Knowledge Program; see **Table 5-25**).

5.4.6.1 Country Foods Sampling

A Country Foods and Water Use study was completed to supplement the technical discipline data, and to determine the concentration of chemical compounds in frequently consumed Country Foods in existing conditions. As the samples of the country foods submitted to the analytical lab for chemical analyses were provided by the members of the Marten Falls and Aroland First Nations, the results obtained are treated as Indigenous Knowledge and subject to confidentially agreements. Detailed analytical results of the Country Foods assessment has been compiled in the Country Foods and Water Use Assessment report (AECOM 2026) and will be provided to the Marten Falls and Aroland First Nation.

Figure 5-12: Heat Map – Harvest Areas



5.4.6.1.1 Methods

The Country Foods Sampling program included:

- Advance notification to the community of the plan to collect samples of previously harvested country foods for analysis during an In Community Meeting. Information included the quantity of sample required, preferred harvesting areas, and type of country food samples
- Received country foods from community members of the following types of country foods: Canada Goose, Beaver, Moose, Walleye fish, Blueberries during an In Community Meeting.
- The goal was to collect at least 5 to 10 tissue samples for each species of interest (fowl, fish, ungulates (i.e., deer, moose), small game, berries).
- Samples received indicating the approximate area of harvest be placed on a regional map.
- Submission and processing in a certified laboratory for chemical analysis of the identified contaminants of potential concern.

Community members providing samples were compensated for each sample provided. Number of sample collected from each community are detailed in **Table 5-25**.

Table 5-25: Number of Samples Collected for Each Category of Traditional Foods

Category	Species	Marten Falls First Nation	Aroland First Nation
Large Game	Moose	5	4
Small Game	Beaver	0	0
Avian	Canada Goose	2	2
Fish	Walleye	5	4
Plant	Blueberries	5	9

5.4.6.1.2 Results

Of the analytes measured in animal and plant tissue, the following were found at detectable concentrations in at least one species sampled: acetone, antimony, arsenic, barium, bismuth, boron, calcium, cesium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury/methylmercury, molybdenum, nickel, phosphorus, potassium, selenium, sodium, tin, thallium, titanium, and zinc. All of these substances are naturally occurring. Concentrations for all substances are presented on a wet weight (ww) basis.

5.4.6.1.3 Discussion

Of these substances, many are associated with benefits to human health as they are nutrients. the following are identified as essential micronutrients by Health Canada (2022):

calcium, chromium, copper, iron, magnesium, manganese, molybdenum, phosphorus, potassium, selenium, sodium, and zinc. Cobalt is also identified as an essential micronutrient for animals by Environment and Climate Change Canada (ECCC) & Health Canada (2017). Furthermore, detectable hydrocarbons in animal and plant tissue were interpreted by the lab to be triglycerides and saturated fats, which are macronutrients. Although boron is not classified as an essential nutrient, it may be beneficial to human health (e.g. on reproduction and development, bone health, energy metabolism, immune function) and is available as a dietary supplement (U.S. Department of Health and Human Services 2022).

Of the remaining substances that were detectable and which do not have any known nutritional benefit, many were at levels in traditional foods that are comparable to those typically found in plants and animals (**Table 5-26**). Arsenic and thallium had levels generally comparable to those typically found in Canadian foods reported by the Canadian Total Diet Study (CTDS) (Health Canada 2025). Nickel and barium levels were within the range typically found in Canadian foods except in a single outlier measurement for each substance (Health Canada 2025). Tin levels were generally comparable to those reported by the ATSDR (2005) in fresh foods and were much lower than in most canned foods. Cesium was within the range typically found in plants and animals (ATSDR 2004). Titanium was within the range found in traditional foods analyzed in six indigenous communities in northern Saskatchewan (ECCC & Health Canada 2023). Bismuth and antimony were each associated with a single outlier measurement above levels typically found in Canadian foods (Health Canada 2025); all other measurements were below detection limits. However, these detection limits were too high to provide a meaningful comparison to levels typically found in Canadian foods. The outlier antimony measurement is well above the typical range in Canadian foods. Since this measurement coincides with the highest measured lead concentration and lead-containing ammunition can contain antimony (Jonhson *et al.* 2005), it is suspected that ammunition contaminated the game meat during hunting activities.

It should be noted that a substance being outside of the reference ranges is not an indication of potential human health effects. Instead, local geology, species sampled, and natural population variation can also contribute to discrepancies between levels found in traditional foods sampled from the Local Study Area and those reported in literature sources consulted.

Table 5-26: Concentration Range of Substances Analyzed in Traditional Foods Relative to Reference Ranges in Literature

Substance	Tissue Type	Measured Concentration Range (mg/kg ww)	Reference Concentrations in Animals and Plants[c]	
			Concentration (mg/kg ww)	Citation(s)
Antimony	Animal	<0.05 – 0.24[a]	0.000275 – 0.002	Health Canada (2025) [b]
	Plant	<0.05	<0.00021 – 0.00182	Health Canada (2025) [b]
Arsenic	Animal	<0.1 – 0.1	<0.007 – 8.49	Health Canada (2025) [b]
	Plant	<0.1	<0.00069 – 0.0223	Health Canada (2025) [b]
Barium	Animal	<0.3 – 0.6[a]	<0.00289 – 0.212	Health Canada (2025) [b]
	Plant	1 – 2.8	<0.018 – 3.75	Health Canada (2025) [b]
Bismuth	Animal	<0.05 – 0.08[a]	<0.00001 – 0.013	Health Canada (2025) [b]
	Plant	<0.05	<0.00001 – 0.0008	Health Canada (2025) [b]
Cesium	Animals/Plants	<0.005 – 0.19	0.001 – 0.3	ATSDR (2004)
Lead	Animal	<0.03 – 5.9	<0.00103 – 0.035	Health Canada (2025) [b]
			1.19 (max) [f]	Chan *et al.* (2014)
	Plant	<0.03 – 0.86[a]	<0.00018 – 0.0834	Health Canada (2025) [b]
			0.024 (max) [e]	Chan *et al.* (2014)
Methylmercury	Animal	<0.005 – 0.8	1.33 (max) [d]	Chan *et al.* (2014)
	Plant	<0.01	-- [g]	Chan *et al.* (2014)
Mercury	Animal	<0.01 – 0.88	0.823 (max) [d]	Chan *et al.* (2014)
	Plant	<0.01	<0.002 (max) [e]	Chan *et al.* (2014)
Nickel	Animal	<0.05	<0.021 – 2.28	Health Canada (2025) [b]
	Plant	<0.05 – 3.3[a]	<0.033 – 0.772	Health Canada (2025) [b]
Tin	Animals/Plants	<0.3 – 0.9[a]	Fresh foods: <0.003 – 0.2 Canned foods: 0.3 – 156	ATSDR (2005)
Thallium	Animal	<0.003 – 0.007	<0.00002 – 0.0113	Health Canada (2025) [b]
	Plant	<0.003	<0.00002 – 0.00485	Health Canada (2025) [b]
Titanium	Animals/Plants	0.8 – 1.3	0.01 – 1.2	ECCC & Health Canada (2023)

Notes: *(a) maximum is single outlier measurement above reference range*
(b) The food group categories in the CTDS database pertaining to animal tissues were "fresh meat, poultry, and game, comminuted" and "fresh fish"; and those pertaining to plant tissue were "untreated fresh fruit", "surface-treated fresh fruit", and "remaining fresh fruit".
(c) concentrations outside of the reference range is not an indication of potential human effects.
(d) Maximum measured in walleye (pickerel), corresponding to the only traditional food species collected associated with detected concentrations
(e) Maximum measured in blueberries
(f) Maximum measured in Canada Goose, corresponding to the only traditional food species collected associated with highest concentration of lead
(g) not measured in Chan et al. (2014)
mg/kg ww: milligrams per kilogram wet weight of tissue

Certain detected substances in traditional food samples are also used in medicine and are generally well-tolerated by humans in this context. These substances and their applications in medicine are as follows:

- **Barium**: used in contrast media in medical imaging (ATSDR 2007).
- **Bismuth**: used in pharmaceuticals including Pepto-Bismol (Zacchini 2024).
- **Titanium**: commonly used as a biomaterial in orthopedic medicine exhibiting lower toxicity than other metals (e.g. nickel, aluminum) (Quinn et al. 2020)

Acetone is not a concern at the low levels observed as it is generated within animals and plants as a byproduct of metabolism and readily volatilizes in the environment making it unlikely to persist (ATSDR 2022).

Lead and mercury warrant further attention from a human health perspective based on the information provided below:

- **Lead**: two outlier measurements (one in Canada Goose tissue, the other in blueberry tissue) were significantly above (e.g. 10 to 100-times greater) levels typically be found in Canadian foods (Health Canada 2025). It is suspected that the Canada Goose sample was contaminated with lead shot, and the blueberry sample could have been contaminated from a metal alloy or dust from ammunition, exhaust, or soil.
- **Mercury**: although concentrations are comparable to those reported in Chan *et al.* (2014), the maximum concentrations of mercury and methylmercury measured in Walleye during the Sampling Program exceed Health Canada's maximum level in retail fish (0.5 mg/kg), indicating a potential for human health concern. Additionally, the Ontario Ministry of the Environment, Conservation, and Parks (MECP) (2021) published a fish consumption advisory for the Albany River, indicating consumption of fish requires careful consideration from a human health standpoint.

5.4.6.1.4 Conclusions

Substances of potential concern found at detectable levels in traditional foods include lead, mercury, and methyl mercury. Additional details for these substances are found by traditional food types below.

Full tables of all traditional foods results are presented in **Attachment B**.

5.4.6.2 Fish

5.4.6.2.1 Existing Conditions

Six species of fish of interest were identified in the area: Lake Sturgeon / Nameh (*Acipenser fulvescens*), Lake Whitefish / Atikameg (*Coregonus clupeaformis*), Brook Trout / Masamekos (*Salvelinus fontinalis*), Walleye / Okaas (*Sander vitreus*), Northern Pike / Naiwabe (*Esox lucius*), and Burbot / Mihzhash (*Lota lota*) (Marten Falls First Nation, 2023b). Lake Sturgeon (Southern Hudson Bay- James Bay populations) are listed as special concern under the Canadian *Species at Risk Act* (Government of Canada, 2019).

Both Aroland First Nation and Marten Falls First Nation have highlighted the importance of species including Brook Trout, Lake Sturgeon, Northern Pike, Sucker species / Namebin (*Catostomus sp*), Walleye (Pickerel), and Lake Whitefish (WSP, 2024a).

Walleye and Lake Whitefish were identified as dietary staples of Aroland First Nation. These are also the most commonly caught fish (LeBlanc, 2014).

Country Foods Assessment Results

Five Walleye Samples were obtained from the Marten Falls First Nation and four samples were obtained from Aroland First Nation.

Measured concentration ranges, number of samples analyzed, and detection frequency for each substances of potential concern in Walleye samples collected are shown in **Table 5-27**.

Table 5-27: Concentrations of Substances of Potential Concern in Fish

Substance	Samples Analyzed	Number of Detections	Measured Concentration Range (mg/kg ww)	Maximum Concentration Reported for Walleye in Chan *et al.* (2014) (mg/kg ww)
Mercury	9	9	0.12-0.8	0.823
Methyl Mercury	9	9	0.049-0.88	1.33
Lead	9	0	<0.03	0.013

Notes: mg/kg ww - milligrams per kilogram wet weight of tissue.

Mercury, and its more toxic organic form, methylmercury, were detected at levels that are similar to those reported in the First Nations Food, Nutrition and Environment Study for Ontario (Chan *et al.* 2014). However, maximum concentrations exceed Health Canada's maximum level in retail fish of 0.5 mg/kg (Health Canada 2020).

Even at naturally occurring levels, dietary intake of methylmercury can be harmful to human health, especially sensitive populations like pregnant women. Chan et al. (2014) recommended that children, teenagers and pregnant women limit consumption of predatory fish to no more than 1 cup (227 grams) per week. Additionally, The Ontario Ministry of the Environment, Conservation, and Parks (MECP) (2021) has published a fish consumption advisory for the Albany River stating the maximum recommended meals (defined as approximately 227 grams fish by MECP 2025) per month of different specimen size classes of various species. For example, the most stringent restrictions pertain to the consumption of Walleye, for which it is recommended that the general population consume a maximum of 12 meals per month of walleye that are between 25-30 cm but only 4 meals per month for sensitive populations. Larger fish (e.g. > 75 cm) should not be consumed by the general population, and fish > 30 cm should not be consumed by sensitive populations. Sensitive populations are defined as children under 15 years of age and people who are pregnant or may become pregnant.

Lead was undetectable in all samples, with a detection limit is slightly above the maximum measured concentration in Chan *et al.* (2014). If lead is present in sampled fish below the detection limit, it would be at trace levels. As such, lead in Walleye sampled in the Local Study Area do not appear to pose a human health concern.

5.4.6.2.2 Potential Effects and Mitigation and Residual Effects

The quality of Fish as a traditional food is dependent on the quality of their habitat or namely the surface water and sediment quality to which they are exposed. The actions which are expected to potentially impact the quality of fish as traditional foods is included in Section 5.4.1.1 - Water.

Residual Effects in Relation to Human Health

Changes in fish habitat quality as a result of surface water runoff and release of sediment at water body crossings during construction and operation and maintenance is expected to have a residual effect on fish quality. Measurable changes to surface water quality in the form of increases in the concentration of chemical constituents in receiving bodies can occur in the event of run-off from accidental spills or leaks to nearby waterbodies.

Effects from soil contamination leaching, emissions of criteria air contaminants and deposition to surface water, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to fish have the potential to effect the quality of fish as country foods and potentially effect human health.

5.4.6.2.3 Fish Cumulative Effects

Residual changes to fish habitat quantity and quality are expected through physical alteration of waterbodies where work is below the high-water mark was considered in cumulative effects assessment.

The characterization of cumulative effects was considered to be the same as the residual effects characterization.

5.4.6.3 Vegetation

5.4.6.3.1 Existing Conditions

Traditional use plants and plants of importance to Indigenous communities include plants that are historically used by Indigenous Peoples for food, materials, medicinal or spiritual purposes and these plants are of particular interest to Indigenous communities within the region. These species are generally well distributed across the region; however, most of the plant harvesting occurs close to access routes like large waterbodies, watercourses or existing roads.

A list of 43 traditional use plant species was initially generated based on a review of desktop resources and Indigenous Knowledge provided within the Eabametoong First Nation Biodiversity Atlas (n.d.). This list includes plants used for medicinal or spiritual purposes, food, and / or home uses.

After the completion of the Traditional Use Plant Habitat Suitability and Accessibility mapping exercise, additional traditional use plant species were identified by Marten Falls First Nation and Aroland First Nation through communications with Marten Falls First Nation (see *Draft Vegetation Technical Support Document: Existing Conditions & Effects Assessment* (WSP, 2024d)). The information provided by Marten Falls First Nation and Aroland First Nation included an additional thirteen traditional use plant species including Arrowhead (*Sagittaria sp*.), Aspen (*Populus sp.),* Bear Root (*Ligusticum porteri*), Cottongrass (*Eriophorum angustifolium*), Gooseberry (*Ribes uva-crispa),* Lowbush Cranberry (*Vaccinium vitis-idaea*), Muskrat Root (Sweet Flag) (Oji-Cree translation, wiikenh) (Acorus calamus), Rock Tripe Lichen (*Umbilicaria sp.),* Rosehip (*Rosa sp.),* Sage (*Salvia sp*.), Tobacco (*Nicotiana sp*.), Wild Celery (*Vallisneria americana*), and Wild Onion (*Allium canadense*).Potential Effects and Mitigations can be found in *Vegetation Technical Support Document: Existing Conditions & Effects Assessment* (WSP, 2024d).

During the Indigenous knowledge literature review, cattail roots, cranberries, blueberries, chokecherries, strawberries, seeds, rose hips, edible flowers, wild rice and teas were identified as traditional foods (LeBlanc, 2014).

Country Foods Assessment Results

A total of five blueberry samples were collected from the Marten Falls First Nation and nine from Aroland First Nation.

Measured concentration ranges, number of samples analyzed, and detection frequency of substances of potential concern in the blueberry samples collected are shown in **Table 5-28**.

Table 5-28: Concentrations of Substances of Potential Concern in Blueberries

Substance	Sample Size	Number of Detections	Measured Concentration Range (mg/kg ww)	Maximum Concentration Reported for Blueberries in Chan *et al.* (2014) (mg/kg ww)
Mercury	14	0	<0.01	<0.002
Methyl Mercury	14	0	<0.001 - <0.01	Not measured
Lead	14	2	<0.03 – 0.86	0.024

Notes: mg/kg ww - milligrams per kilogram wet weight of tissue.

Lead was detectable in two blueberry samples at 0.86 mg/kg and 0.05 mg/kg, with lead being below the detection limit (<0.03 mg/kg) in all other samples. The maximum measured concentration (0.86 mg/kg) is approximately 35-fold above the maximum concentration reported for blueberries in Chan *et al.* (2014). This concentration is anomalously elevated compared to those in other samples. Since it also coincides with anomalously high measurements other metals (chromium, cobalt, copper, iron, nickel, tin, and zinc) it is possible the sample was contaminated with a metal alloy and/or dust from ammunition or exhaust (e.g. transfer during harvesting, cleaning, or storage). In contrast, the second highest concentration (0.05 mg/kg) is slightly above than the maximum

concentration reported for blueberries in Chan *et al.* (2014) and could simply reflect differing local conditions (e.g. geology) than those present in the Chan *et al.* (2014) study.

Given that lead is a known neurodevelopmental toxin/toxicant (CCME 2025), it is recommended to wash hands and fruit prior to harvesting, food preparation and eating to reduce lead potential exposure.

Mercury and methylmercury were undetectable in all samples. Similarly, in Chan et al. (2014) mercury was undetectable in all samples, whereas methylmercury was not measured in their study. If undetected trace levels of mercury and methylmercury exist in blueberries sampled in the Local Study Area, they are unlikely to pose a human health concern.

5.4.6.3.2 Potential Effects and Mitigations and Residual Effects

The quality of vegetation as a traditional food is dependent on the quality of the habitat or namely the soil and groundwater as well as precipitation, humidity, sunlight and seasonal temperature to which vegetation relies on for growth and the contaminants in air (deposition of fugitive dust) to which vegetation is exposed. The actions which are expected to potentially effect the quality of vegetation as traditional foods are included in Section 5.4.1.2 - Groundwater, Section 5.4.3 - Soils, and Section 5.4.5 – Air. Long-term dust deposition is anticipated during Operations could effect groundwater quality in an area. Contaminants would leach from soil surface to groundwater and be absorbed into plant tissue.

5.4.6.3.3 Residual Effects in Relation to Human Health

Effects from soil contamination, emissions of criteria air contaminants and deposition, changes to erosion and sedimentation, changes to groundwater and surface water quality, dust deposition, and increased public access to vegetation have the potential to effect the quality of vegetation as country foods and potentially effect human health.

5.4.6.3.4 Vegetation Cumulative Effects

Residual changes to vegetation through changes to groundwater and through fugitive dust emissions were considered. Residual cumulative effects are deemed to be the same as Residual Effects on vegetation discussed.

5.4.6.4 Wildlife

5.4.6.4.1 Existing Conditions

The focus of the Wildlife Technical Studies included:

- Bats (little Brown Myotis and Northern Myotis);
- Furbearers;

- Wolverine;
- American Marten;
- Beaver;
- Reptiles and Amphibians; and
- Pollinating Insects.

Although the listed wildlife are important to the region and to Marten Falls First Nation and Aroland First Nation, they were not evaluated as traditional foods. Rabbit, bear, beaver, and snowshoe hare are traditional food sources (LeBlanc, 2014) Small game is used as food (Marten Falls First Nation, 2023c).

Country Foods Assessment Results

Although the work plan for the Country Foods assessment included beaver as a potential wildlife species for country foods sampling, no community members in either Marten Falls or Aroland First Nations provided beaver samples for analysis.

5.4.6.4.2 Potential Effects and Mitigations and Residual Effects

The quality of wildlife as a traditional food is dependent on the quality of their habitat or namely the surface water, air and soil quality to which they are exposed. The actions which are expected to potentially impact the quality of wildlife as traditional foods are included in Section 5.4.1.1 - Surface Water, Section 5.4.3 - Soil, and Section 5.4.5 - Air. Other effects to wildlife would result from their consumption of impacted vegetation or other impacted wildlife.

5.4.6.4.3 Residual Effects in Relation to Human Health

Effects from soil contamination, emissions of criteria air contaminants, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to wildlife have the potential to effect the quality of wildlife as country foods and potentially effect human health.

5.4.6.4.4 Wildlife Cumulative Effects

For all wildlife valued components except wolverine, the *Draft Wildlife Technical Support Document: Existing Conditions & Effects Assessment* cumulative effects assessment considered the effects of three reasonably foreseeable developments in addition to the project in the wildlife effects assessment Regional Study Area. For wolverine, the cumulative effects assessment considered the effects of nine reasonably foreseeable developments in addition to the project in the wolverine effects assessment Regional Study Area.

Cumulative residual effects area expected to be similar to residual effects of the project.

5.4.6.5 Birds

5.4.6.5.1 Existing Conditions

Aroland First Nation noted that traditional food sources include goose and ruffed grouse (partridge) (Oji-Cree translation, papashki) (LeBlanc, 2014).

First Nation and involves waterfowl hunting for food, feathers, and cultural celebrations (Dillon Consulting Limited, 2021).

Traditional food sources for Indigenous communities include Canada goose, snow goose, blue goose, brant, black duck, northern pintail, common loon, red-throated loon, and swan.

Country Foods Assessment Results

Two Canada Goose samples were provided by the Marten Falls First Nation and two Canada Goose samples were provided by members of the Aroland First Nation. It was noted during the collection of the Canada Goose samples that the traditional means of removing feathers from the animal during preparation involves singeing the feathers with fire.

Measured concentration ranges, number of samples analyzed, and detection frequency of substances of potential concern in the Canada Goose samples collected are shown in **Table 5-29**.

Table 5-29: Concentrations of Substances of Potential Concern in Canada Goose

Substance	Sample Size	Number of Detections	Measured Concentration Range (mg/kg ww)	Maximum Concentration Reported for Goose Meat in Chan *et al.* (2014) (mg/kg ww)
Mercury	4	0	<0.005	0.006
Methyl Mercury	4	0	<0.01	0.003
Lead	4	1	<0.03 – 5.9	1.19

Notes: mg/kg ww - milligrams per kilogram wet weight of tissue.

Lead was detected at an anomalously high concentration in a single Canada Goose tissue sample, exceeding the maximum reported concentration for goose meat in Chan *et al.* (2014). The other three Canada Goose samples collected from the Local Study Area were below the detection limit (<0.03 mg/kg ww). The anomalously high measurement in the Canada Goose sample was suspected to originate from lead-containing ammunition; this was also noted by Chan et al. (2014) to be a contributor to elevated lead levels in samples collected in their study which found concentrations as high as 49.5 mg/kg ww, measured in beaver meat. This is also further corroborated by the presence of unusually high antimony in the same sample, since antimony is found in lead-containing ammunition (Johnson *et al.* 2005).

The use of lead shot is prohibited in Ontario for hunting migratory game birds (except woodcock) and for hunting in National Wildlife Areas (NWA) (Government of Canada 2025). As such, lead shot for hunting is not prohibited in all circumstances and remains available for purchase in Canada. Regardless of these restrictions, it is recommended that community members should avoid using lead-containing ammunition (e.g. use steel shot instead) on game intended for human consumption, as this can contaminate the meat. Additional recommendations include discarding tissue at point of bullet entry to reduce lead ingestion and washing hands prior to harvesting, food preparation, and eating.

Mercury and methylmercury were undetectable in all Canada Goose tissue samples. Mercury levels were below the maximum reported concentration in goose meat in Chan et al. (2014). The detection limit for methylmercury was not too high to know if concentrations were in the range reported in Chan *et al.* (2014). If undetected trace levels of mercury and methylmercury exist in Canada Goose sampled in the project area, they are unlikely to pose a human health concern.

5.4.6.5.2 Potential Effects and Mitigations and Residual Effects

The quality of birds as a traditional food is dependent on the quality of their habitat or namely the surface water, air and soil quality to which they are exposed. The actions which are expected to potentially impact the quality of birds as traditional foods are included in Section 5.4.1.1 - Surface Water, Section 5.4.3 - Soil, and Section 5.4.5 - Air. Other effects to birds would result form their consumption of impacted vegetation or other impacted wildlife.

5.4.6.5.3 Residual Effects in Relation to Human Health

Effects from soil contamination, emissions of criteria air contaminants, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to birds have the potential to effect the quality of birds as country foods and potentially effect human health.

5.4.6.5.4 Bird Cumulative Effects

For all bird valued components, the *Birds Technical Support Document: Existing Conditions & Effects Assessment* cumulative effects assessment considered the effects of the three reasonably foreseeable developments in addition to the project in the bird effects assessment Regional Study Area. Cumulative residual effects area expected to be similar to residual effects of the project.

5.4.6.6 Ungulates

5.4.6.6.1 Existing Conditions

Moose is utilized for various purposes including for food and craft (Dillon Consulting Limited, 2021).

Deer, caribou and moose are used a traditional food (LeBlanc, 2014).

Country Foods Assessment Results

Five moose samples were provided by the Marten Falls First Nation and Four Moose samples were provided by members of the Aroland First Nation.

Measured concentration ranges, number of samples analyzed and detections of substances of potential concern in the moose samples collected are shown in **Table 5-30**.

Table 5-30: Concentrations of Substances of Potential Concern in Moose

Substance	Sample Size	Number of Detections	Measured Concentration Range (mg/kg ww)	Maximum Concentration Reported for Moose Meat in Chan *et al.* (2014) (mg/kg ww)
Mercury	9	0	<0.005	0.0137
Methyl Mercury	9	0	<0.01	<0.004
Lead	9	1	<0.03 – 0.2	12.9

Notes: mg/kg ww - milligrams per kilogram wet weight of tissue.

Lead was detected in one sample in moose tissue, at 0.2 mg/kg ww, which was lower than the maximum concentration reported in Chan *et al.* (2014). This moose sample was an outlier relative to others collected which all had undetectable concentrations of lead (<0.03 mg/kg ww). Although lead in this sample was lower than in Chan *et al.* (2014), it is approximately 10-fold higher than the maximum reported concentration in fresh meats consumed in Canada. It was noted that the elevated lead concentrations in traditional foods sampled in Chan *et al.* (2014) may be attributed to the use of lead-containing ammunition. As such, it is suspected the use of lead-containing ammunition explains why the maximum measured concentration in the Local Study Area is anomalously high relative to other samples and concentrations typically found in Canadian foods (refer to **Section 5.4.6.1.3**).

Recommendations to minimize lead exposure when hunting game are previously discussed in **Section 5.4.6.5.1**; these recommendations include avoiding use of lead-containing ammunition, discarding tissue at point of bullet entry, and washing hands prior to harvesting, food preparation, and eating.

Mercury and methylmercury were undetectable in all Canada Goose tissue samples. Mercury levels were below the maximum reported concentration in goose meat in Chan et al. (2014). The detection limit for methylmercury was not too high to determine whether

concentrations were in the range reported in Chan et al. (2014). If undetected trace levels of mercury and methylmercury exist in moose sampled in the Local Study Area, they are unlikely to pose a human health concern.

5.4.6.6.2 Potential Effects and Mitigations and Residual Effects

The quality of ungulates as a traditional food is dependent on the quality of their habitat or namely the surface water, air and soil quality to which they are exposed. The actions which are expected to potentially impact the quality of ungulates as traditional foods are included in Section 5.4.1.1 - Surface Water, Section 5.4.3 - Soil, and Section 5.4.5 - Air. Other effects to ungulates (i.e., hooved animals such as deer and moose) would result from their potential exposure to contaminants through the consumption of impacted vegetation.

5.4.6.6.3 Residual Effects in Relation to Human Health

Effects from soil contamination, emissions of criteria air contaminants, changes to erosion and sedimentation, changes to surface water quality, dust deposition, and increased public access to ungulates have the potential to effect the quality of ungulates as country foods and potentially effect human health.

5.4.6.6.4 Ungulate Cumulative Effects

Cumulative residual effects area expected to be similar to residual effects of the project.

5.5 Identification of Human Receptors

Human users of water, land, and air are present throughout the Construction Disturbance Area, Local Study Area and Regional Study Area. The users include residents, workers at mines, workers at construction camps, remote outfitters, and visitors who come to hunt, harvest, gather, fish and engage in recreational activities such as backcountry camping and canoeing. Some individuals participate in all of these activities. These activities are description in the Final Land and Resource Use Technical Support Document or Appendix U of the Environmental Assessment / Impact Statement. The Air Quality Technical Study Document included an assessment of locations of:

- Cabins (commercial outpost camps) and campsites (backcountry sites);
- Places of dwelling;
- Spiritual and sacred sites;
- Traditional gathering and meeting places; and
- Burial sites and areas.

These locations are shown on **Figure 5-13**.

Figure 5-13: Air Quality Sensitive Receptor Locations

CONFIDENTIAL

5.5.1 Residents

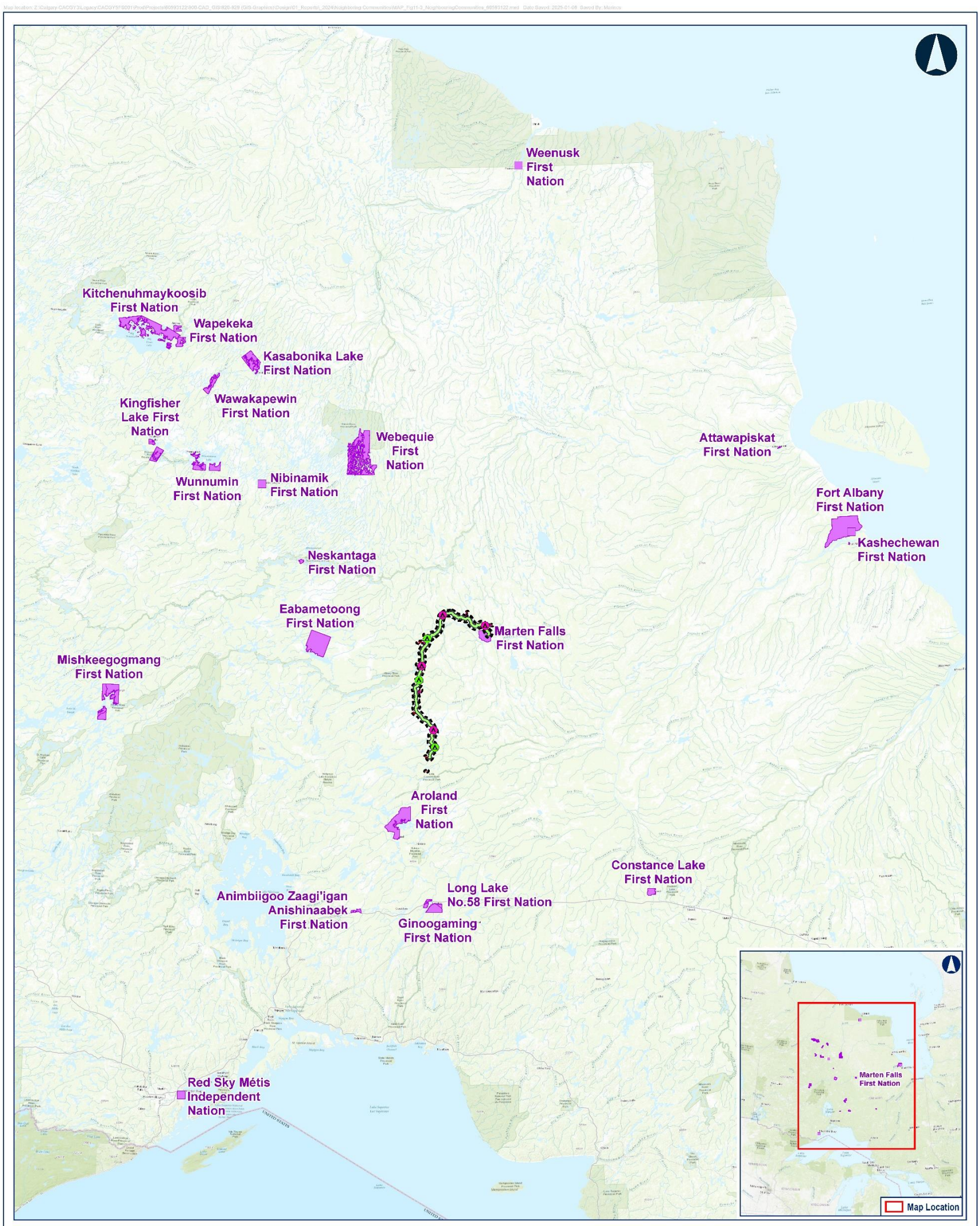
The current registered on-reserve population is 358 First Nations Profiles (Government of Canada, 2025b). There are 541 members of Marten Falls First Nation that live off-reserve. Aroland First Nation has a total registered population of 763 people with 42 residing on-reserve (Government of Canada, 2025a).

For human health risk assessment purposes, residents are expected to spend 24-hours per day, seven days per week in the community.

Local and Regional Study Area First Nation communities are shown on **Figure 5-14**.

Other residential use also occurs along the project. Habitation areas are shown on **Figure 5-15**.

Figure 5-14: Location of Neighbouring Indigenous Communities



Legend

- First Nation Reserve
- Project Study Area

Construction Disturbance Area

- Preferred Route (100 m Right-of-Way)

Potential Camp Site

- 50 Persons (108 m x 150 m)
- 200 Persons (108 m x 150 m)
- Approximate Access Road to Potential Construction Camp (10 m Width)

Potential Aggregate Source

- Bedrock
- Sand and gravel
- Approximate Access Road to Potential Aggregate Site (10 m Width)

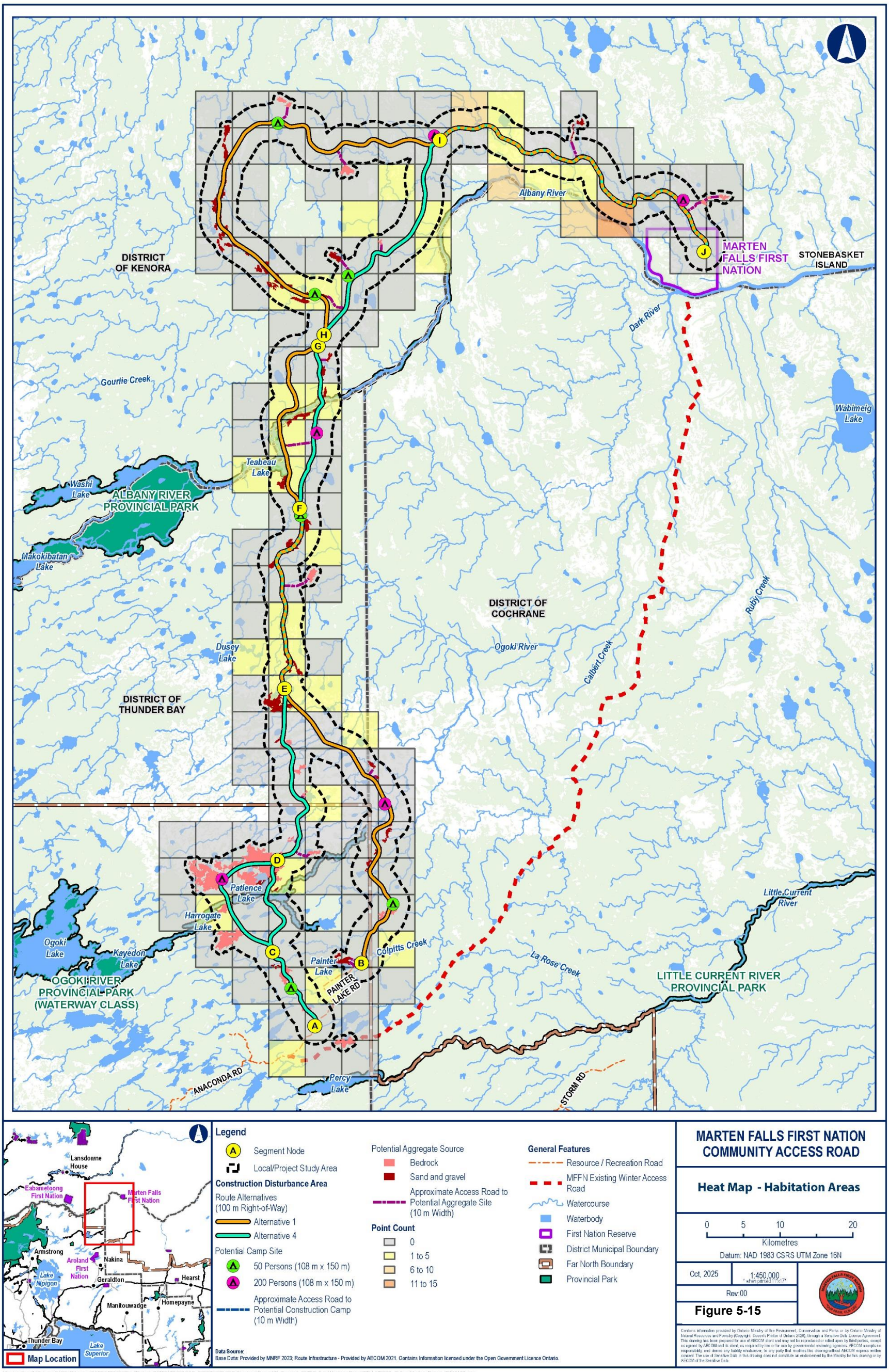
MARTEN FALLS FIRST NATION COMMUNITY ACCESS ROAD

LOCATION OF NEIGHBOURING INDIGENOUS COMMUNITIES

0 50 100 200
Kilometres
1:1,100,000
Datum: NAD 1983 CSRS UTM Zone 16N

FIGURE 5-14

Figure 5-15: Heat Map – Habitation Areas



5.5.2 Workers

5.5.2.1 Remote Outfitters

Workers in the region include those that work at remote outfitters. These are often seasonal operations. 297 outfitters were identified with only 10 having more than 20 employees (Dillon Consulting Limited, 2024a). Within the Local Study Area, nine remote tourism outfitter operations were identified. Tourism outfitters operate between early June and late October, shifting their service offerings throughout the season to align with the game and fish available to hunt and catch (Geraldton Area Natural Resources Advisory Committee, personal communication, February 9, 2022).

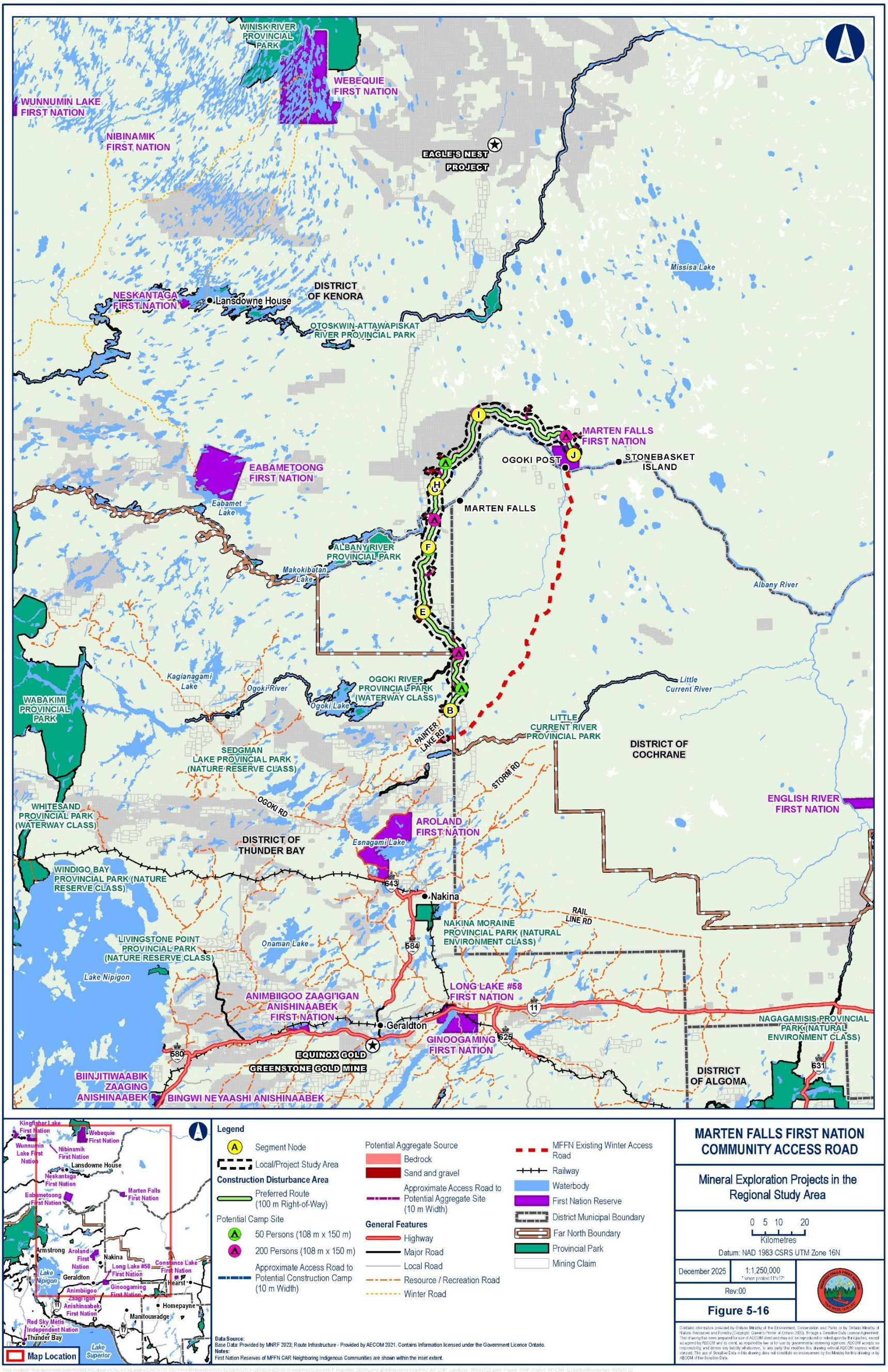
5.5.2.2 Mining

There are no mines currently operating in the region; however, four mining operations are in stages of development. These include Wyloo Metals' Eagle's Nest, Greenstone Gold Mines' Hardrock and Brookbank, and Zenyatta's Albany Graphite mines. The Greenstone Gold Mine is in the construction phase. These projects are expected to house workers in remote camps and operate 365 days per year.

Extraction exploration activities in the Local Study Area include exploration of claims held by Wabassi Resources approximately 700 km^2 in area and, outside of the Ring of Fire, may be one of the biggest claims in the area. **Figure 5-16** shows mining areas.

See *Final Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment [Appendix U]*.

Figure 5-16: Mineral Exploration Projects in the Regional Study Area



5.5.2.3 Forestry

There are no active logging activity within the Construction Disturbance Area.

See *Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment [Appendix U]*.

5.5.2.4 Energy and Linear Industry

There are no energy and linear infrastructure facilities or projects in development in the Construction Disturbance Area.

See *Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment [Appendix U]*.

5.5.3 Cultural and Recreational Use

5.5.3.1 Cultural

Residents also use the land for cultural and spiritual purposes. Potato Island, Blueberry Hill, and Moose River were identified as places with significance (LeBlanc, 2014). Pym Island is used as a fasting and gathering location, Drowning River is a Sun Dance ceremony site, and an area only referred to as 3018-03 is also used. Sites of cultural heritage are shown on **Figure 5-17** and sites with cultural spiritual significance are shown on **Figure 5-18**.

Indigenous community members in the Local Study Area emphasized ongoing cultural use north of the airport, including locations used by children, cemetery areas, and ceremonial spaces, with concerns that project activities could interfere with outings, firewood gathering, and socializing (PIC #3, June 2022). Concerns were raised about preserving medicines and the “medicine of the land”, and about traplines near the study area and their relationship to land, animals, lakes, and rivers. The Indigenous Knowledge program inputs highlight the importance of seasonal camps, harvest areas, and knowledge transmission on the land, including fish drying, berry processing, and ceremonial plant gathering.

5.5.3.2 Recreation

Tourism and recreation activities in the Regional Study Area are largely outdoor related, including canoeing / kayaking, boating, snowmobiling, sport fishing, hunting, camping, hiking, and wildlife viewing. The area also includes many private cabins / recreation properties and tourism camps (remote and road accessible) (Geraldton Area Natural Resources Advisory Committee, personal communication, February 9, 2022).

Figure 5-17: Heat Map – All Cultural Heritage Categories

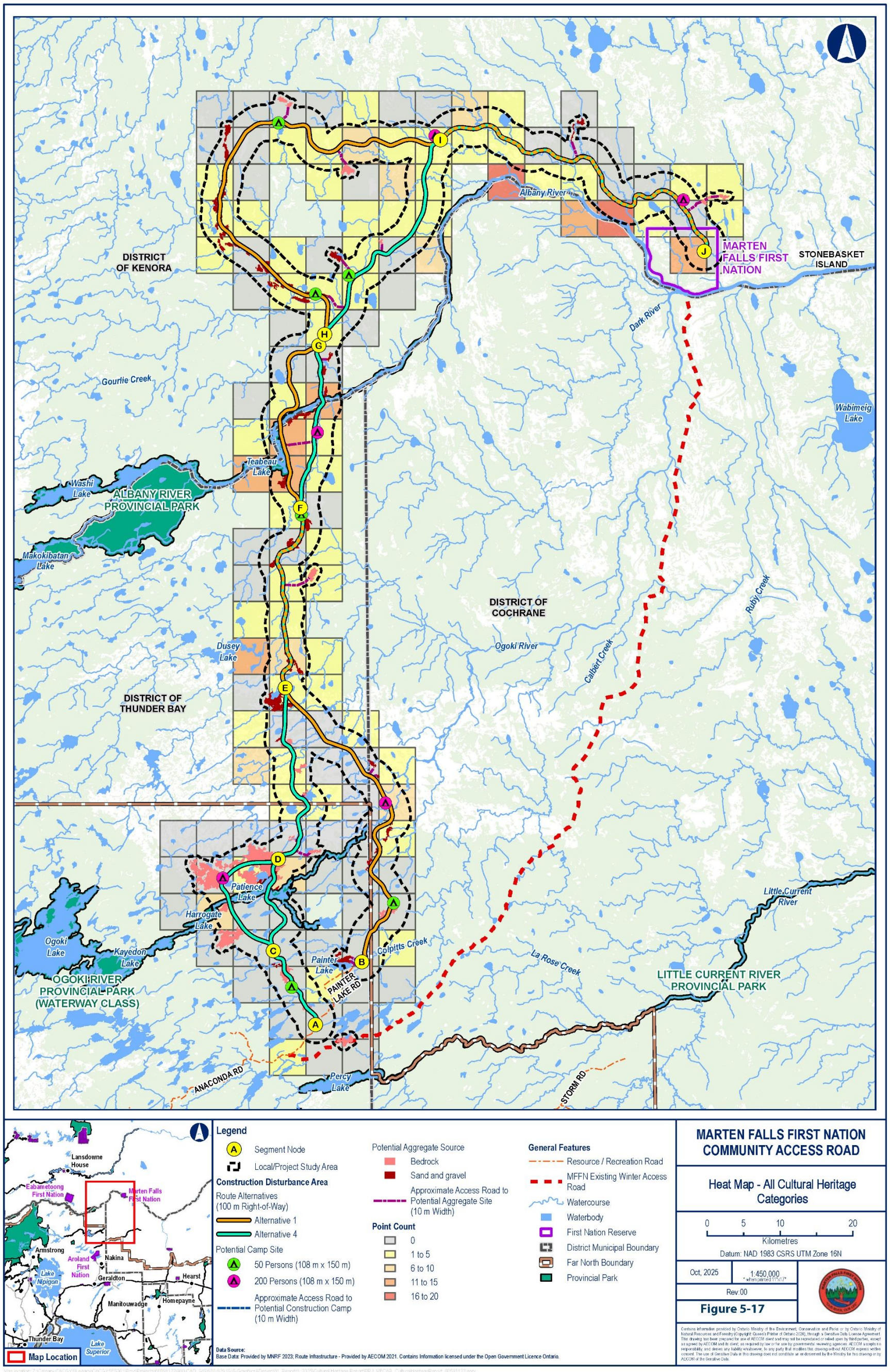
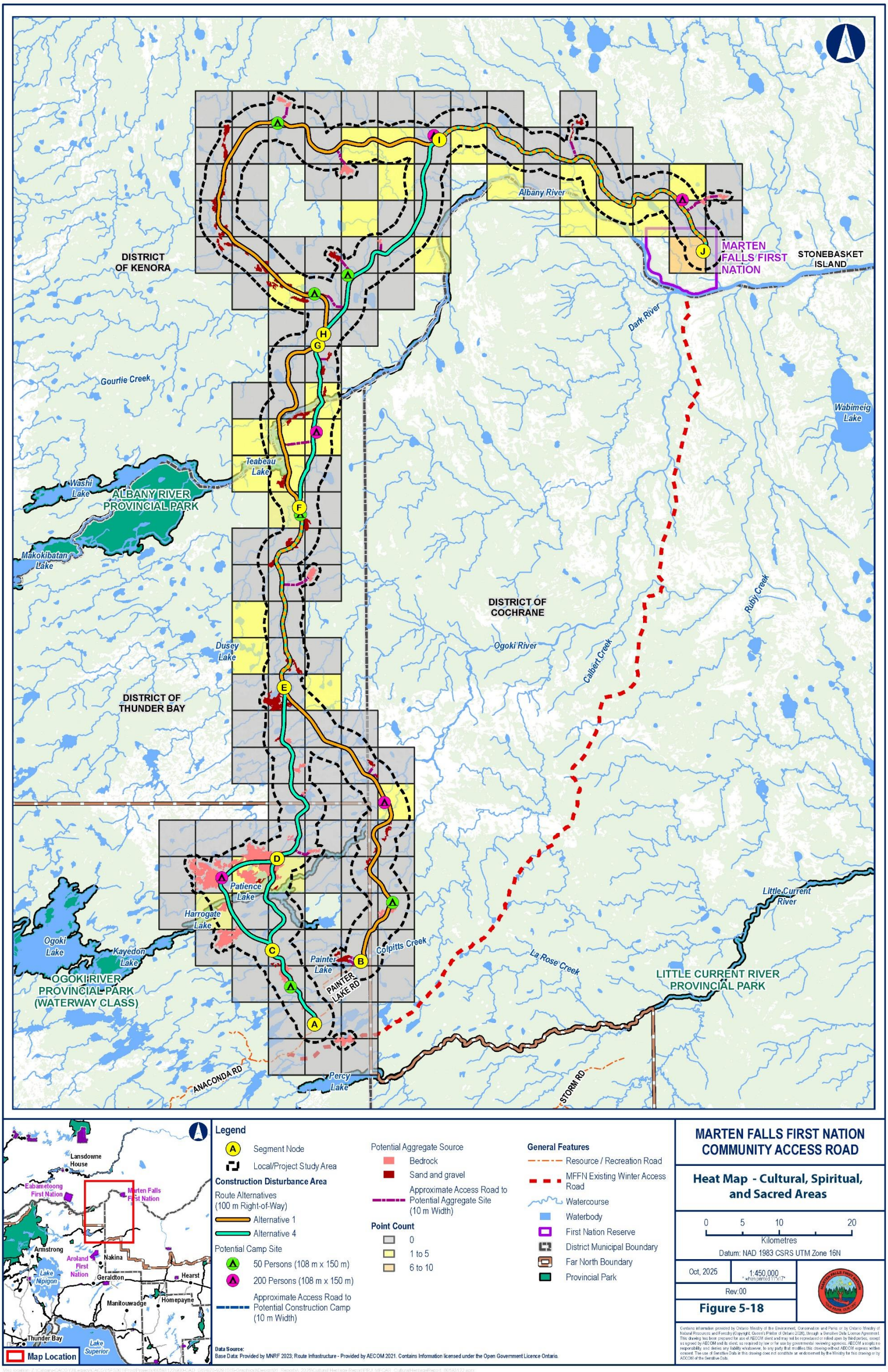


Figure 5-18: Heat Map – Cultural, Spiritual and Sacred Areas



Currently, there are no recognized or maintained snowmobiling trails in the Local Study Area, according to a representative of the Ontario Federation of Snowmobiling Club (Ontario Federation of Snowmobiling Clubs, personal communication, May 2022). Snowmobile trails known to the Indigenous communities are present.

There are two Provincial Parks in the Local Study Area, including the Ogoki River Provincial Park and the Albany River Provincial Park. These parks, and surrounding areas, are used for backcountry camping, canoeing and kayaking activities, though there are no visitor facilities provided on site (Geraldton Area Natural Resources Advisory Committee, personal communication, February 9, 2022). There are no formal campgrounds, however, Albany River Provincial Park promotes the use of 69 backcountry camp sites (Ontario Parks, 2025). There are Indigenous camp sites used throughout the Local Study Area.

Remote tourism operators in the Local Study Area primarily focus on offering exclusive hunting and fishing experiences in remote wilderness settings. These outfitters value the remoteness of the land, which allows them to provide unique, fly-in/fly-out expeditions that emphasize privacy and access to pristine natural environments. Their business model relies on the exclusivity of hunting and fishing areas, attracting clients seeking high-quality outdoor experiences far from developed regions (personal communication, 2022).

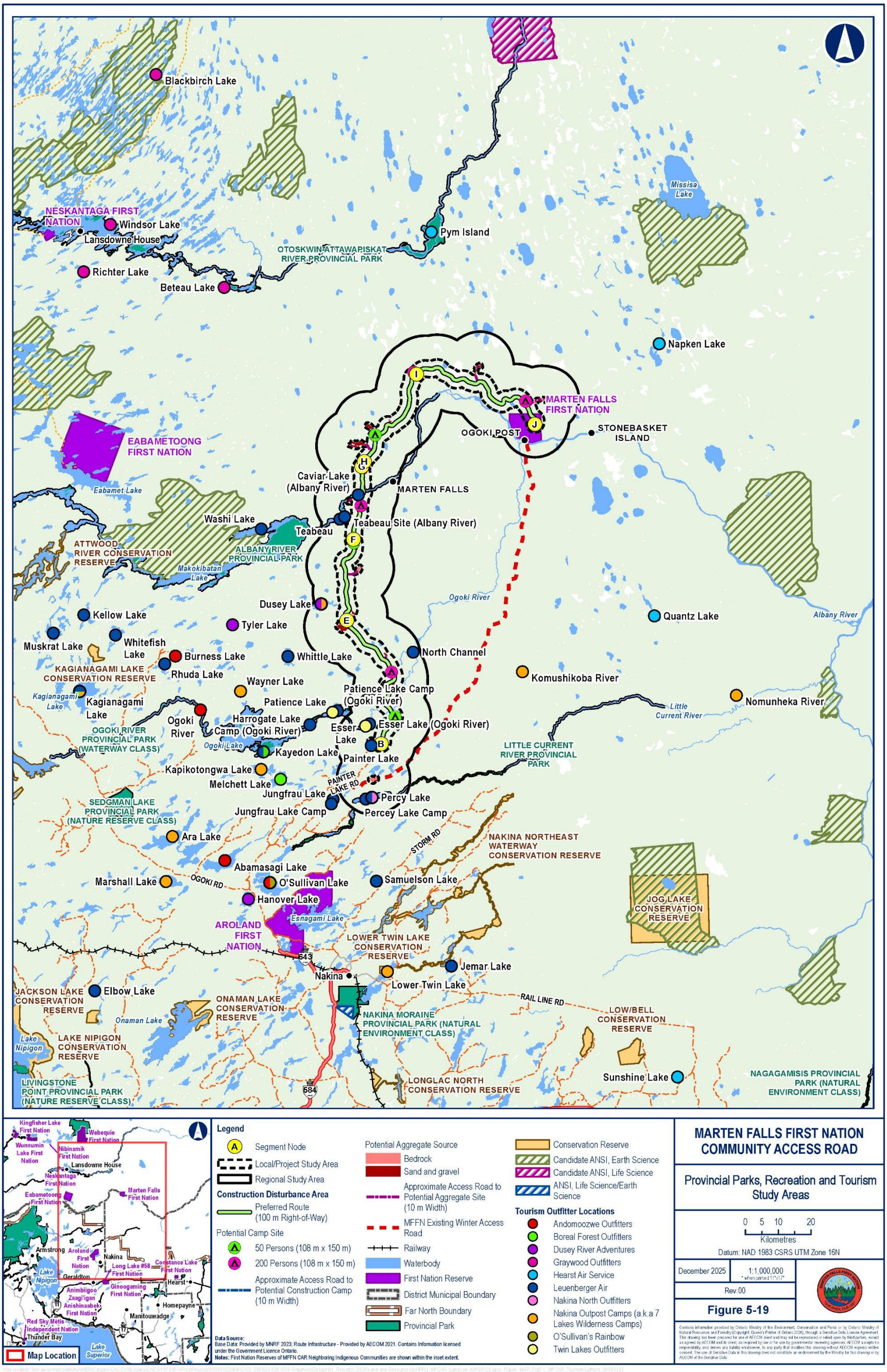
Within the Local Study Area, nine remote tourism outfitter operations were identified, including Andomoozwe Outfitters, Boreal Outfitters, Dusey River Outfitters, Gray Wood Outfitters, Tom's Outpost Camps, O'Sullivans Rainbow, Wilderness North, Nakina North Outfitters, Hearst Air, and Leuenberger Air Service. These operators typically offer lodge accommodations and outpost camps, catering to hunters and anglers targeting species such as moose and bear for hunting, and walleye and pike for fishing. Interviews with twelve operators revealed that their services include transportation (often by air), guided expeditions, and hospitality amenities designed to enhance the remote wilderness experience (personal communication, 2022).

In addition to fishing and hunting by paying customers of the outfitter camps, some hunting and fishing also occurs in the Local Study Area by non-Indigenous people, including people that live in the Greenstone area. It is anticipated that most of this activity occurs in the southern portion of the Local Study Area where there is some road / trail access. It is also assumed that some of the lakes are accessed by private individuals with access to float planes (Geraldton Area Natural Resources Advisory Committee, personal communication, February 9, 2022).

For more information about recreational uses in the Local Study Area, refer to the *Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment [Appendix U]*.

Figure 5-19 shows parks and recreation areas in the vicinity of the Community Access Road.

Figure 5-19: Provincial Parks, Recreation and Tourism Study Areas



5.5.3.3 Hunting

Forty-three Ministry of Natural Resources wildlife management units fall within the Regional Study Area, and three wildlife management units fall within the Local Study Area (wildlife management units 1D, 17, and 18A). Each wildlife management unit has restrictions on the types of game that can be harvested, the open season dates, and permitted hunting methods.

Fall/ winter moose hunting was reported as a key seasonal activity for local communities. Caribou hunting occurs less frequently and is culturally significant where present. Aroland First Nation has noted caribou as a species of concern. Outfitters operate seasonally (early June–late October), aligning offerings with available game and fish; workers are present during these periods and overlap with local traditional use.

For additional information related to hunting in the Local Study Area, see *Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment [Appendix U]*

5.5.3.4 Fishing

Nine Fisheries Management Zones fall within the Regional Study Area, and one falls within the Local Study Area (Fisheries Management Zone 2).

Species identified for harvest within the Local Study Area include walleye, whitefish, trout, pike, and sturgeon. Fishing typically peaks in the Spring and Fall but is harvested year-round.

For additional information related to fishing in the Local Study Area, see *Land and Resource Use Technical Support Document [Appendix U].*

5.5.3.5 Trapping

Within the Local Study Area, there are seven traplines that intersect the Marten Falls First Nation Community Access Road centreline, out of a total of ten traplines intersecting the Local Study Area. All the trap line holders in the Local Study Area are understood to be Indigenous. At the time of writing this report, two responses related to traplines were received from Aroland First Nation and Ginoogaming First Nation.

Aroland First Nation reported five of their traplines intersect with the Regional Study Area. Aroland First Nation provided information via their Indigenous Knowledge and Land Use Study for the Marten Falls First Nation Community Access Road and indicated that their commercial trapping areas intersect with 47.4 km of the Preferred Route. Aroland First Nation's commercial trapping areas overlap 1,650.6 hectares of the Construction Disturbance Area.

Ginoogaming First Nation reported four traplines within the project area significant to members of Ginoogaming First Nation: GE 210, GE 138, GE 150, and GE 153. GE 138 and GE 153 overlap with the Construction Disturbance Area. Additional information has been requested by the Project Team to determine the types of species trapped in this area, the frequency of trapline use, and any other relevant information.

Additionally, 13 commercial harvesting sites and areas are present within the Study Area, which cover a large geographic area and extend about 30 km on either side of the Albany River. Participants also noted that their traplines have been underutilized in the past ten years for commercial use due to the decline in demand for furs. **Figure 5-20** and **Figure 5-21** show the trails and traplines in the area respectively.

For additional information related to trapping uses in the Local Study Area, see *Land and Resource Use Technical Support Document [Appendix U]*.

5.5.4 Gender Based Analysis Plus

Gender-Based Analysis Plus is an approach to assess inequalities and impacts of policies, programs, projects on diverse groups and identities. These identities could include (but are not limited to): gender, sexual orientation, age, race, ethnicity, class, religion, and mental or physical disability (Women and Gender Equality Canada, 2022). These identities can also intersect or overlap; for example, where an individual identifies as being both Indigenous and an Elder or youth.

Residents of these communities, workers and recreational users include members of vulnerable populations including:

- Indigenous peoples;
- Visible minorities;
- Women;
- Youth;
- Elders;
- Members of the Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, and Asexual plus community; and
- People with disabilities.

Other people that may be more susceptible to effects of the project include people with respiratory issues which might make them more susceptible to dust concentrations in air, people who consume more than average daily intakes for traditional foods, children and pregnant persons.

Figure 5-20: Historical Indigenous Routes

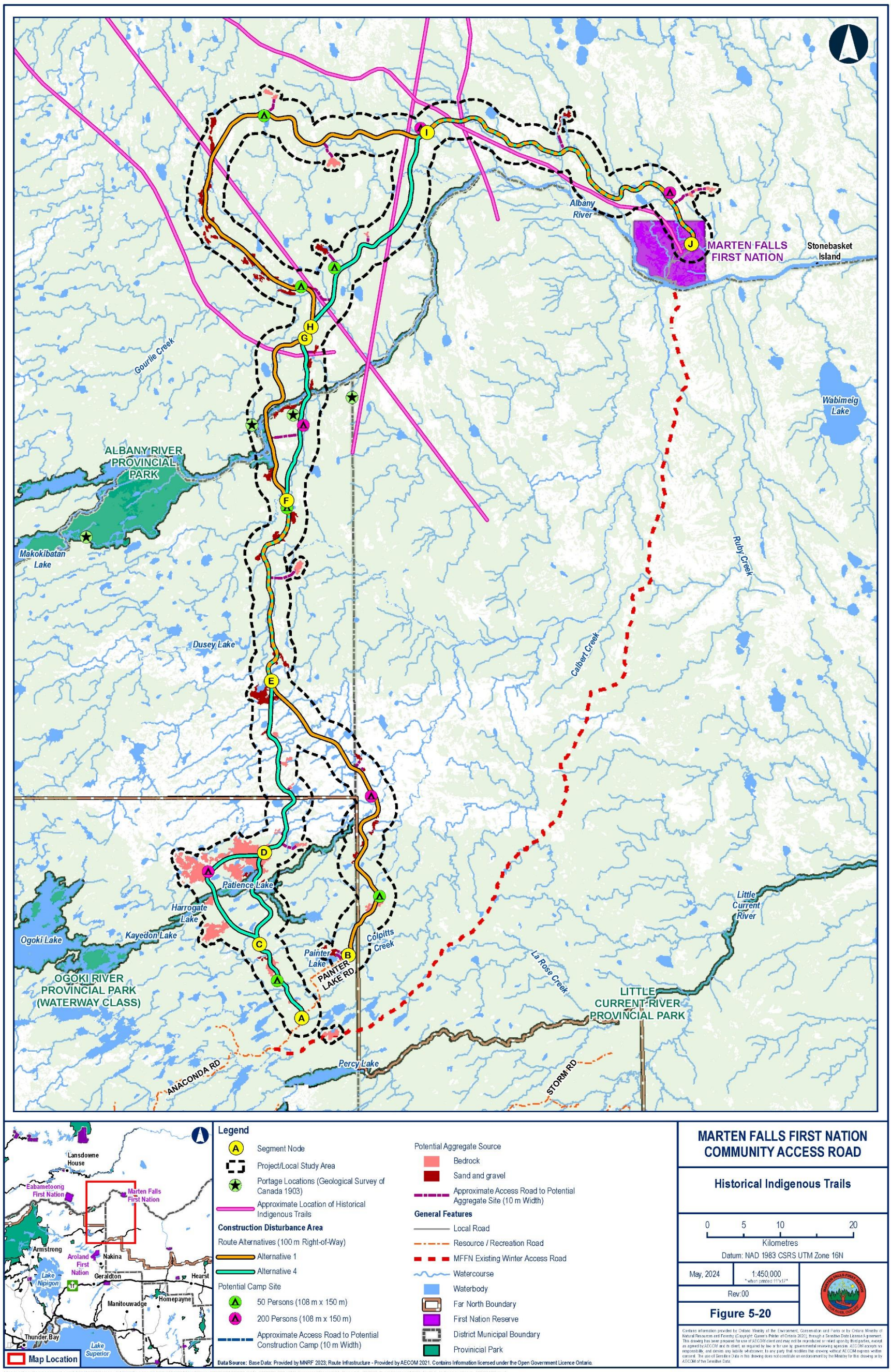
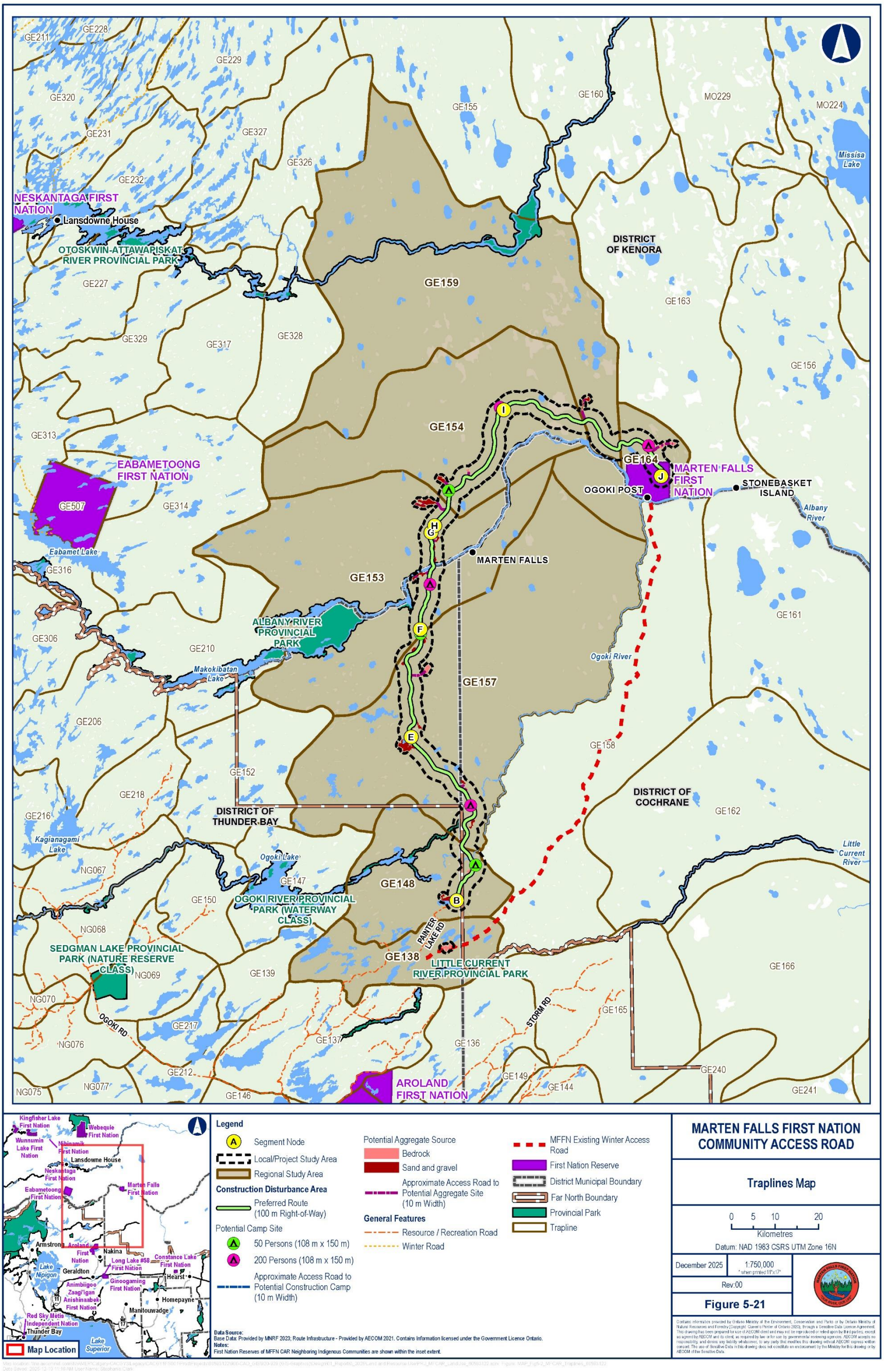


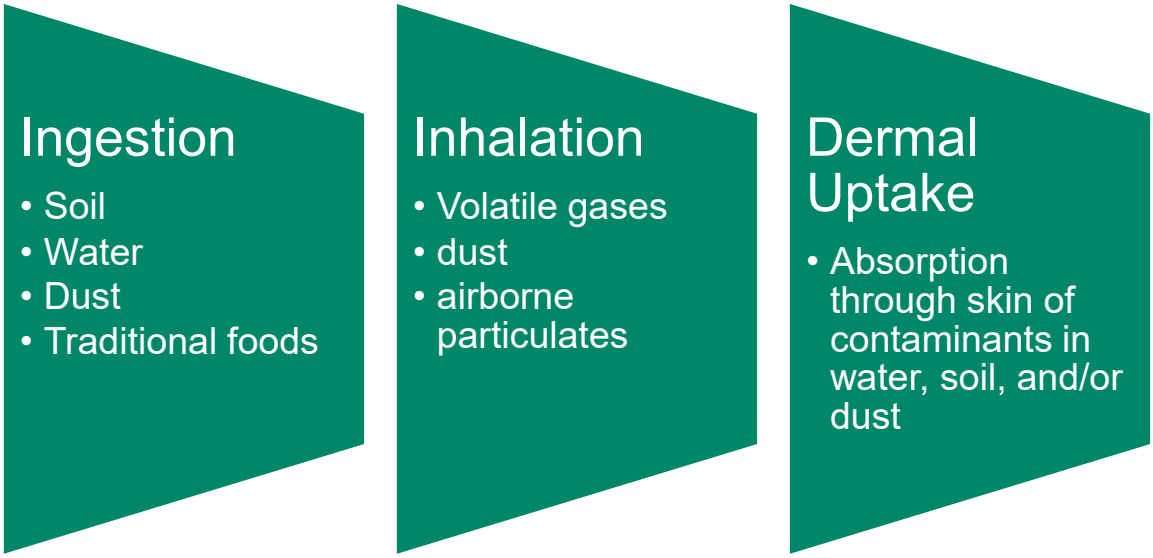
Figure 5-21: Traplines Map



5.6 Identification of Exposure Pathways

Potential exposure pathways are similar for all projects. The main routes of human exposure to a contaminant of potential concern are shown on **Figure 5-22.**

Figure 5-22: Potential Human Exposure Pathways



If a potential contaminant of concern is present in an environmental media and there is access for a human to the environmental media where the contaminant is present, then an exposure pathway is deemed to be complete.

Table 5-31 includes a listing of the potential exposure pathways for each exposure media.

The existing conditions assessment identified exceedances of applicable human health based standards for exposure pathways relevant to contaminants in soils, surface water, groundwater, and air. Project construction, operation and maintenances is expected to have potential residual effects on contaminant concentrations in surface water, sediment, soils, and groundwater although no modelling was completed to determine the magnitude of the effects.

Table 5-31: Exposure Pathways-Residents, Recreational Users, Workers

Environmental Media	Exposure Pathway	Comment	Complete
Soil	• Incidental soil ingestion • Dermal absorption of contaminants of potential concern from soil adhering to skin • Inhalation of suspended soil particulates • Inhalation of vapours migrating from soil to air	• Concentrations of arsenic, chromium, cobalt, manganese, nickel and vanadium in soil exceed human health based standards / guidelines • no laboratory analysis of volatile compounds in soils has been completed	• Yes Yes Yes • Unknown
Sediment	• Incidental sediment ingestion • Dermal absorption of contaminants of potential concern from sediment adhering to skin	• no concentrations in sediment exceed applicable standards / guideline	• No No
Surface Water	• Incidental surface water ingestion during recreational activities • Ingestion of surface water if used as water for drinking / cooking • Dermal contact with surface water during recreational activities or bathing / showering • Inhalation of vapour if used for showering / cooking	• Escherichia coli and total coliform levels in surface water exceed drinking water standards / guidelines	• No Yes No No
Groundwater	• Ingestion of groundwater if used as water for drinking / cooking • Inhalation of vapour if used for showering / cooking • Inhalation of vapour migrating from subsurface contaminated groundwater to air • Dermal contact with groundwater if used for bathing / showering	• Concentrations of aluminum, arsenic, barium, beryllium, chromium, cobalt, lead, molybdenum, nickel, thallium, uranium and vanadium in groundwater exceed drinking water standards / guidelines • Groundwater is not currently used or planned to be used for potable water.	• No No No No
Air	• Inhalation of suspended particulates or vapours in air	• Concentrations in air exceed standards for nitrogen dioxide, particulate matter 2.5, particulate matter 10, total suspended particulate, sulfur dioxide, carbon monoxide acrolein, benzo(a)pyrene and dust during construction • Concentrations in air exceed standards for particulate matter 2.5, particulate matter 10, total suspended particulate, benzo(a)pyrene and dust during operation. • Dust may contain elevated levels of metals	• Yes
Traditional Foods	• Vegetation: ingestion of vegetation (berries and plants) grown on impacted soil or effected by aerial deposition of contaminants of potential concern • Fish and shellfish: ingestion of fish and shellfish harvested from impacted surface water bodies and / or surface water bodies with impacted sediment • Wild game: ingestion of wild game that may be impacted via consumption of impacted soil, vegetation, sediment, surface water, and / or prey items	• Background levels of mercury, and methyl mercury were elevated in walleye fish samples consistent with results measured by others • Elevated Lead levels in blueberry, goose and moose samples were identified • Impacts measured in soil and introduced from dust deposition onto soil or surface water may effect traditional foods	• Yes Yes Yes

Source: (Government of Canada, 2024c)

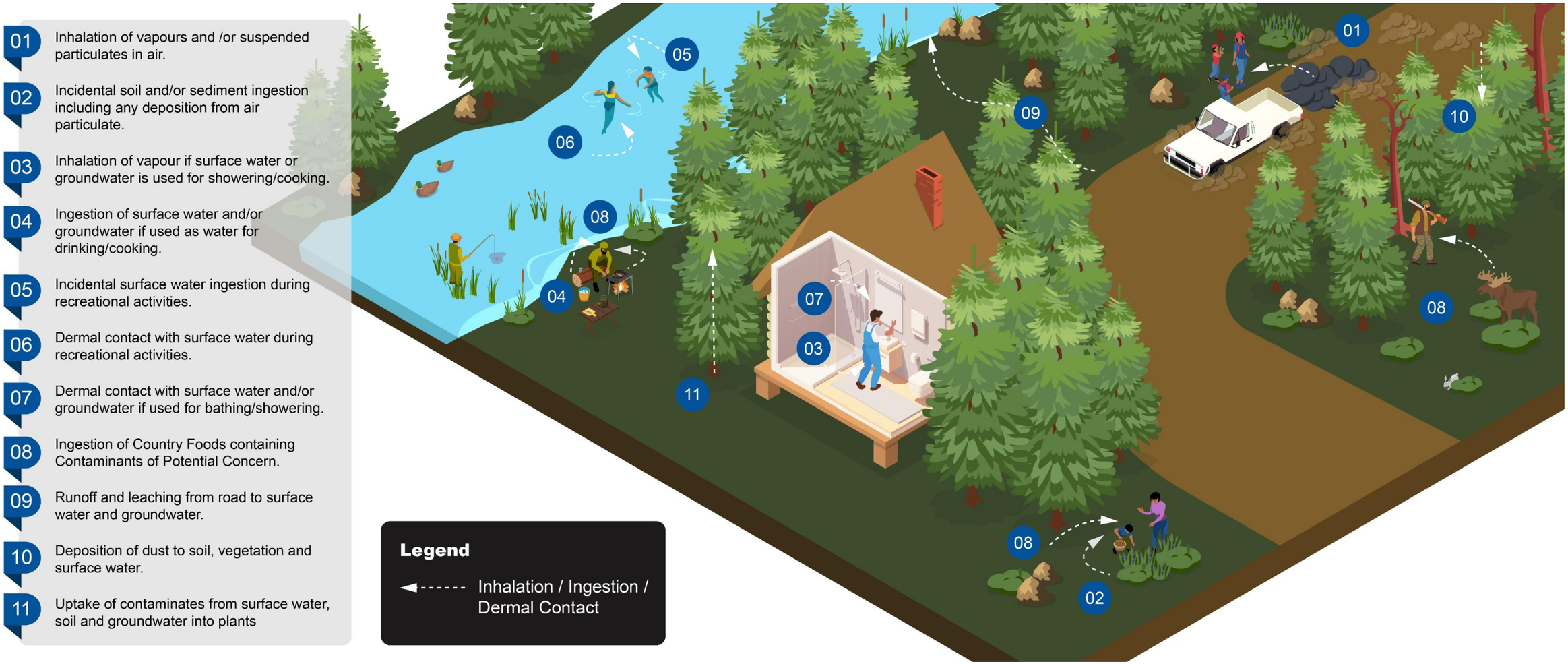
The residual effects assessment for air predicted concentrations in air exceed standards for nitrogen dioxide, particulate matter 2.5, particulate matter 10, total suspended particulate, sulfur dioxide, carbon monoxide acrolein, benzo(a)pyrene diesel particulate and dust during construction. Concentrations in air exceed standards for particulate matter 2.5, particulate matter 10, total suspended particulate, benzo(a)pyrene and dust during operation. Dust may contain elevated levels of metals Based on these measured or predicted exceedances, the following pathways of exposure are complete or potentially complete:

- Inhalation of suspended particulates in air
- Incidental soil ingestion;
- Dermal absorption of contaminants of potential concern from soil adhering to skin;
- Inhalation of air emissions;
- Ingestion of surface water if used as water for drinking / cooking;
- Ingestion of country foods containing contaminants of potential concern.

5.7 Conceptual Site Model

During construction, additional paths include emissions from construction vehicles, dust generated from quarry blasting and construction activities, and leaks and spills from equipment (**Figure 5-23**).

Figure 5-23: Conceptual Site Model



6. Monitoring Programs

Commitments as they relate to biophysical human health as part of mitigation measures in the various technical support documents are included in **Table 6-1**.

Table 6-1: Monitoring Commitments

Biophysical Factor	Technical Support Documents Monitoring Commitments
Soils	• During detailed design, develop and implement a geochemical testing and monitoring program to assess the concentration of metals in materials to be used for road base and surfacing and for the potential for metals contamination and acid rock drainage from any soils or bedrock that would be exposed during aggregate extraction. This could be done in coordination with quarry geotechnical investigations.
Surface Water	• During Construction, monitoring of one or more surface water quality parameters (including but not limited to water taking and discharge rates, pH, total suspended solids, turbidity, temperature, dissolved oxygen, biochemical oxygen demand, and other contaminants of concerns as required). Monitoring of total suspended solids and / or turbidity instrumented measurements and / or visual observations), as well as visual inspections to confirm the presence or absence of oil or sheen • During operations, monitoring of water quality, sediment quality, and streamflow conditions at waterbodies that include greater sensitivity or implication to change from the standpoint of fish habitat, species at risk, channel stability, drainage pattern, or other environmental considerations. The specific monitoring locations will be determined during the permitting and design stages of the project; however, it is expected that waterbodies of varying size (small, medium, large) would be captured, recognizing that this would allow the performance / effectiveness of mitigation and enhancement measures to be evaluated. Monitoring for aluminum, arsenic, chromium, lead and vanadium, as well as mercury should be conducted. Additional parameters of concern should also be sampled for where identified.
Groundwater	• A pre-construction geochemical testing and monitoring program to assess the potential for acid rock drainage from any soils or bedrock that will be exposed during project construction or will be used to create road base in construction. The groundwater quality samples should be analyzed for general water quality parameters at minimum (i.e., pH, temperature, conductivity, hardness, alkalinity, chloride, nitrate, nitrite, sulphate, phosphate, ammonia, total dissolved solids, dissolved organic carbon, and metals such as aluminum, arsenic, barium, beryllium, chromium, cobalt, lead, molybdenum, nickel, thallium, uranium, and , vanadium. Additional parameters of concern should also be sampled for where identified. • A construction groundwater monitoring program to continue the pre-construction monitoring through construction activities to identify and quantify any impacts to groundwater levels or quality resulting from construction activities. Groundwater quality should be sampled at the monitoring stations for the same parameters as the pre-construction monitoring and other contaminants corresponding to the substances in use fuels and products – such as benzene, toluene, ethylbenzene, xylenes, petroleum hydrocarbons, pesticides, and volatile organic compounds. • At sites where impacts on groundwater levels or quality have been identified, the groundwater monitoring programs should continue, as per the construction monitoring program, until a return to baseline equivalent conditions is observed or a site-specific remediation monitoring plan is implemented as determined by the qualified person retained for environmental monitoring of the Project; and • For sites that will continue to be used during Project operations the groundwater monitoring programs detailed above should continue along with any activities that may effect groundwater. For example, if a pit or quarry site is used intermittently, each use of the pit or quarry should be considered like a construction period and the monitoring guidelines followed as above.

Biophysical Factor	Technical Support Documents Monitoring Commitments
Air	• A construction monitoring program is recommended as a mechanism to help mitigate and / or identify potential conditions that may lead to air quality impacts from construction related activities. A monitoring program, where feasible, may involve either or both air monitoring as well construction activity monitoring. Air quality communications updates are recommended as a mechanism to help mitigate and / or identify potential conditions that may contribute to air quality impacts from construction related activities and inform community members so they can respond accordingly for protection of those vulnerable including people with pre-existing health conditions, such as asthma, COPD, heart, and the young and elderly. • During Operation, it is recommended that consideration of input gathered through other technical monitoring programs specific to potential air quality concerns (i.e., potential dust deposition) is completed and evaluated for consideration of future mitigation or monitoring options.
All	• Owner / operator to develop a community-based reporting system that enables community members and employees to report concerns, including those related to water quality, country foods quality, and the biophysical environment, providing an option for anonymous reporting.

To meet the needs of the biophysical determinants to human health assessment, it is recommended that the following monitoring be conducted. This can be done in conjunction with the programs above or independently:

- The preconstruction monitoring program for soils should be expanded to include assessment of the material proposed to be used for road construction for potential for metal leaching and metal composition. Fugitive dust from the project will be made up of materials proposed to be used for road construction.
- An air monitoring station should be set up in Marten Falls First Nation throughout the construction phase and into the operation phase. Air monitoring in the community should have transparency in data to allow sensitive individuals to be aware of levels and remain inside during times of high particulate concentrations. This will need to be coordinated with the air quality team and the community well-being team to verify it meets the needs of the stakeholders. Consider establishing real time air quality mapping and air quality index and messaging for community members and local radio/news feeds for recreation outfitters and visitors, as well as workers. To allow people to make their own informed choices about whether to modify their daily activities by avoiding certain areas with construction activities and staying indoors, closing windows, watering and / or washing gardens and wild harvested country foods.

7. Data Gap

The Problem Formulation development was dependent on the findings of the technical support documents for the various disciplines, namely:

- Appendix F: Surface Water Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix H: Groundwater Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix N: Physiography, Terrain, and Soils Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix S1: Air Quality and Greenhouse Gas Technical Support Document: Existing Conditions and Effects Assessment; and
- Appendix U: Land and Resource Use Technical Support Document: Existing Conditions and Effects Assessment.

Other biophysical disciplines which have been considered and contributed to the data needs are:

- Appendix G: Fish and Fish Habitat Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix J: Vegetation Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix K: Wildlife Technical Support Document: Existing Conditions and Effects Assessment;
- Appendix L: Birds Technical Support Document: Existing Conditions and Effects Assessment; and
- Appendix M: Ungulates Technical Support Document: Existing Conditions and Effects Assessment Non-Confidential.

Based on the use of the information collected and collated by the technical disciplines, there are some data gaps that exist in the biophysical determinants to human health analysis. These include:

- Aggregate for road construction is proposed to be taken from quarry sites along the right of way. Information available for review related to the presence of potential contaminants of Concern in the material to be used for road construction show exceedances of arsenic, chromium, cobalt, manganese, nickel, and vanadium but not lead, and mercury. This should be verified by further sampling and chemical analysis and particle size fractions of crushed

rock and roadbed materials. If aggregate material containing potential contaminants of concern is used for road construction, there is the potential for generation of airborne dust containing contamination or the potential of leaching of metals into surface water bodies; and

- No quantitative evaluation of the potential risk of residual air quality effects on human health during the operation and maintenance phase has been conducted to evaluate if the Particulate matter / Suspended particulate concentrations in air pose an unacceptable level of risk to human receptors, specifically people of all ages, genders, and life-stages present in the areas of heaviest releases to air leading to potential the greatest exposures.

The potential risks identified by the air quality technical study were originally modelled based on no mitigative measures, such as dust control being implemented both during construction and operations and maintenance. Subsequent modelling included an evaluation of particulates during the operations phase if mitigations provided an 80% control efficiency. Even with this level of mitigation, Particulate Matter 2.5, Particulate Matter 10 and Total Suspended Particulate concentrations exceeded applicable standards when background concentrations were included. For the total suspended particulate, after mitigation, effects are expected up to 2.3 kilometers from the road on either side for its extent.

8. Uncertainty

Risk assessments are based on models and available environmental data for characterizing. Site conditions used for estimating the potential for risk of adverse effects to receptors from elevated exposures to contaminants of potential concern in the environment. A cautious approach is recommended using standardized models and reasonable maximum exposure assumptions in federal and provincial risk assessment guidance and models for avoiding the underestimation of environmental risk. Uncertainty is inherent in risk assessment due to the variability in environmental concentrations, exposure conditions, receptor characteristics, assumptions used in exposure models, and in the derivation of health effects criteria by credible health and environmental protection agencies. Uncertainty is increased when there is insufficient or estimated data. Uncertainty originates due to the necessity of simplifying reality. The uncertainty does not invalidate the work, but acknowledging and defining the uncertainty helps with interpreting the results.

Data gaps and assumptions can result in underestimating or overestimating human health risks. This would lead to the development of inappropriate mitigations and or monitoring programs (Health Canada, 2023).

Sources of uncertainty associated with the development of the Problem Formulation for the Marten Falls First Nation Community Access Road Project include:

- Data for existing conditions pre project was collected for surface water, sediment, groundwater, soils and air. These samples were collected as part of the technical studies of each discipline and not specifically for human health risk assessment purposes. For this reason, sample locations, data collected, quantity of samples collected, and parameters analysed may not represent the actual conditions at points of exposure. The absence of this data may lead to an under- or over- estimation of the risk;
- Existing conditions data for air was in large part estimated. These estimations did not account for the use of wood as fuel for heating of residences and the school. These estimates are potentially underestimating the seasonal air concentrations for those parameters. The lack of certainty in the values may lead to an over or underestimation of the risk;
- Air quality modelling was completed for the project effects. Environmental models are often conservative and rely on assumptions related to wind speed and direction as well as other inputs. These assumptions and the model itself insert uncertainty on the predicted air concentrations at the various Human receptor locations. This lack of certainty can lead to an over or underestimation of the risk;

- Effects from deposition of fugitive dust and emissions to air onto soils, surface water and sediment were modelled. This cross-media modelling introduces additional uncertainties. This can lead to an over- or under- estimation of the risk; and
- Noise and vibration are a very subjective to the receptor as to the effects which introduces uncertainty. This subjectiveness can lead to an over- or under - estimation of risk.

9. Conclusions and Recommendation

This Problem Formulation relied on information contained in the various technical support documents. Those data and information were not independently verified as part of the Problem Formulation.

- Surface water and groundwater should not be used for potable water without appropriate treatment
- Blasting protocols should be developed to reduce NO2, SO2 etc. during blasting activities
- Dust mitigation methods should be employed during construction and operations and maintenance
- Limits should be placed on the burning of brush during construction

The following next steps are recommended:

- To supplement soils data, conduct sampling of proposed quarry material for metals concentrations and potential for metals leachate. These materials will become the fugitive dust during construction and operations activities and will also settle or deposit on vegetation, soils, sediment and surface water, potentially impacting these media. Leaching from deposition material may also impact groundwater. Due to the identification of numerous potential mine sites in the geographic area, there is the possibility that background metals levels in these materials may be elevated.
- Monitoring of air quality conditions to evaluate any exceedances of applicable criteria during construction, operations and maintenance and verify or improve mitigation measures accordingly. The *Atmospheric Environment Technical Support Document Appendix ??]*has estimated predicted levels of Particulate matter larger than 2.5 micrometers ($PM_{2.5}$) and 10 micrometers diameter (PM_{10}) as well as Total Suspended Particulate matter, Benzo(a)pyrene and dust deposition exceeding applicable standards during the operation and maintenance phase of the project. These exceedances are predicted to extend a distance from the road and may impact areas of the community and other areas along the road that may be frequented by people. These will also result in deposition onto soils, vegetation, and surface water. These exceedances are noted greater than 2.3 kilometres away even when dust is mitigated with 80% efficiency.
- Future air, surface water and soils monitoring programs should include review monitoring reports for potential impacts on human health.

The pathways detailed in **Table 9-1** were deemed complete.

Table 9-1: Human Health Potential Exposure Pathways

Project Activity Release of Contaminants of Potential Concern to the Environment	Pathway	Existing	Gaps	Quantitative Human Health Risk Assessment
Air	Inhalation of vapours and / or suspended particulates in air	Modelled values during Construction and during Operation and Maintenance exceed air standards or criteria for some parameters. Models with 80% mitigation still resulted in criteria exceedances	Air models are conservative. Sampling of proposed quarry material for metals concentrations has not been completed.	No quantitative human health risk assessment has been completed at time of writing. Conservative models indicate potential exceedances of air criteria. Gravels and quarry materials for road construction should be chemical characterized for metal contaminants (e.g. arsenic, cobalt, vanadium and others).
Soil **Sediment** **Air**	Incidental soil and / or sediment ingestion including any deposition from air particulate	Some locations have exceedances of applicable soil standards or criteria protective of human health.	Dust Deposition Air models are conservative. Sampling of proposed quarry material for metals concentrations is not completed	No quantitative human health risk assessment has been completed at time of writing. Soil concentrations exceed standards protective of human health. Conservative models indicate potential exceedances of air criteria. Gravels and quarry materials for road construction should be chemical characterized for metal contaminants (e.g. arsenic, cobalt, vanadium and others).
Surface Water **Groundwater**	Inhalation of vapour if surface water or groundwater is used for showering / cooking	No groundwater is proposed to be used for potable sources. No volatile substances exceeded applicable standards / guidelines in surface water or groundwater.	None	No quantitative assessment necessary
Surface Water **Groundwater**	Ingestion of surface water and / or groundwater if used as water for drinking / cooking	No groundwater is proposed to be used for potable sources.	None	Surface water and groundwater should be treated before use as potable water. No quantitative assessment necessary
Surface Water	Incidental surface water ingestion during recreational activities	No surface water samples exceed the applicable recreational water guidelines.	None	No quantitative assessment necessary
Surface Water	Dermal contact with surface water during recreational activities	No surface water samples exceed recreational water guidelines.	None	No quantitative assessment necessary
Surface Water **Groundwater**	Dermal contact with surface water and / or groundwater if used for bathing / showering	No groundwater is proposed to be used for potable sources. No surface water samples exceed recreational water guidelines	None	No quantitative assessment necessary
Traditional Foods	Ingestion of country foods containing contaminants of potential concern	Country Foods sampling program was carried out in May 2025. Results can serve as a baseline for determination of project effects.	None	Baseline levels of lead in some game samples and mercury levels in fish of some country foods samples indicate potential risk. Lead shot use should be discontinued and Ontario guidance on fish consumption should be followed.

10. References

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. Toxicological profile for Cesium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Tin and Compounds (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for Barium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2022. Toxicological Profile for Acetone. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Chan, L., Receveur, O., Batal, M., David, W., Schwartz, H., Ing, A., Fediuk, K., Black, A., and Tikhonov, C. 2014. First Nations Food, Nutrition and Environment Study (FNFNES): Results from Ontario (2011/2012). Ottawa: University of Ottawa, Print, 2014.

Chiefs of Ontario. (2025). *Traditional Knowledge*. Retrieved from Chiefs of Ontario: https://chiefs-of-ontario.org/priorities/environment/#knowledge

Dillon Consulting Limited. (2021). *Aboriginal and Treaty Rights and Interests Study Plan.*

Dillon Consulting Limited. (2024a). *Draft Land and Resource Use Technical Support Document: Existing Conditions & Effects Assessment.*

Dillon Consulting Limited. (2024b). *Marten Falls Community Access Road: Aboriginal and / or Treaty Rights and Interests Draft Existing Conditions & Effects Assessment Report.*

Dillon Consulting Limited. (2025). *Draft Air Quality and Greenhouse Gas Technical Support Document: Existing Conditions & Effects Assessment, Volume 1 - Air Quality.*

Eabametoong First Nation. (n.d.). *Eabametoong First Nation's Biodiversity Atlas.* Laurentian University, WCS Canada, & Matawa First Nations Management.

Environment and Climate Change Canada & Health Canada. (2023). Draft assessment – Titanium containing Substances Group [Web page]. Government of Canada. Last updated: Oct 27, 2023. Retrieved December 9, 2025, from https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/draft-assessment-titanium-containing-substances-group.html#toc14

Environment and Climate Change Canada, & Health Canada. (2017). Screening assessment: Cobalt and cobalt-containing substances [PDF]. Government of Canada. Retrieved December 9, 2025, from https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/screening-assessment-cobaltcobalt-containing-substances.html

Environment Canada. (2007). *Best Practices for the Use and Storage of Chloride-Based Dust Suppressants.*

Fisheries and Oceans Canada. (2010). *All-Terrain Vehicles, Fish Habitat and You.*

Fisheries and Oceans Canada. (2022). *Code of Practice - Temporary Fords.*

Garvin, T., Nelson, S., Ellehoj, E., & Redmond, B. (2001). *A Guide to Conducting a Traditional Knowledge and Land Use Study.* Natural Resources Canada , Canadian Forest Service. Northern Forestry Centre. Retrieved from https://ostrnrcan-dostrncan.canada.ca/handle/1845/229717

Government of Canada. (2019). *Lake Sturgeon (Acipenser fulvescens), Southern Hudson Bay - James Bay populations.* Retrieved from Species at Risk Public Registry: https://species-registry.canada.ca/index-en.html#/species/841-596

Government of Canada. (2021). *Federal contaminated site risk assessment in Canada: Guidance on human health preliminary quantitative risk assessment (PQRA), Version 3.0.* Retrieved from Health Canada: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/contaminated-sites/federal-contaminated-site-risk-assessment-canada-part-guidance-human-health-preliminary-quantitative-risk-assessment-pqra-version-2-0.ht

Government of Canada. (2024a). *Analyzing Health, Social and Economic Effects under the Impact Assessment Act.* Retrieved from Impact Assessment Agency of Canada: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/analyzing-health-social-economic-effects-impact-assessment-act.html

Government of Canada. (2024b). *Glossary of Terms*. Retrieved from Impact Assessment Agency of Canada: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/glossary-of-terms.html

Government of Canada. (2024c). *Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment.* Retrieved from Health Canada: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-risk-assessment.html

Government of Canada. (2024d). *Guidance: Describing effects and characterizing extent of significance.* Retrieved from Impact Assessment Agency of Canada: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-describing-effects-characterizing-extent-significance.html

Government of Canada. (2025). Summary of Migratory Birds Hunting Regulations: Ontario, August 2025 to July 2026. Hunting regulations summary for migratory birds: Ontario - Canada.ca. Last updated: July 3, 2025. Retrieved: December 19, 2025.

Government of Canada. (2025a). *Registered Population of Aroland.* Retrieved from Indigenous Peoples and Communities: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=242&lang=eng

Government of Canada. (2025b). *Registered Population of Marten Falls.* Retrieved from Indigenous Peoples and Communities: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=186&lang=eng

Health Canada, (HC) (2016) Human Health Risk Assessment for Diesel Exhaust, Government of Canada. March 2016

Health Canada. (2020). Health Canada's Maximum Levels for Chemical Contaminants in Foods [Web Page]. Government of Canada. Last updated: July 24, 2020. Retrieved December 17, 2025, from https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/maximum-levels-chemical-contaminants-foods.html#a4

Health Canada. (2022). Nutrition labelling – Table of daily values [Web page]. Government of Canada. Publish: Oct 20, 2022. Retrieved December 9, 2025, from Nutrition Labelling – Table of Daily Values - Canada.ca

Health Canada. (2023). *Guidance for Evaluating Human Health Effects in Impact Assessment: Noise.* Retrieved from https://publications.gc.ca/collections/collection_2024/sc-hc/H129-54-3-2023-eng.pdf

Health Canada. (2025). Canadian Total Diet Study - Trace Elements 1993-2018 - Canadian Total Diet Study – Trace Elements 1993-2018. Government of Canada. Data last updated: July 10, 2025. Retrieved December 9, 2025, from Canadian Total Diet Study - Trace Elements 1993-2018 - Canadian Total Diet Study – Trace Elements 1993-2018 - Open Government Portal

Impact Assessment Agency of Canada. (2020, February 24). *Marten Falls Community Access Road Project Tailored Impact Statement Guidelines.* Retrieved from https://iaac-aeic.gc.ca/050/documents/p80184/133937E.pdf

Johnson, C.A., Moench, H., Wersin, P., Kugler, P. and Wenger, C. (2005), Solubility of Antimony and Other Elements in Samples Taken from Shooting Ranges. J. Environ. Qual., 34: 248-254. https://doi.org/10.2134/jeq2005.0248

LeBlanc, J. (2014). *Natural resource management and Indigenous food systems in Northern Ontario.* Retrieved from Lakehead University: https://knowledgecommons.lakeheadu.ca/handle/2453/589

Marten Falls First Nation. (2023a, October). *Existing Conditions Fact Sheet: Cultural Heritage.* Retrieved from Marten Falls First Nation Access Road: https://www.martenfallsaccessroad.ca/wp-content/uploads/2023/10/Existing-Conditions_CulturalHeritage.pdf

Marten Falls First Nation. (2023b). *Existing Conditions Fact Sheet: Fish and Fish Habitat.* Retrieved from Marten Falls First Nation Access Road: https://www.martenfallsaccessroad.ca/wp-content/uploads/2023/10/Existing-Conditions_Fish-and-Fish-Habitat.pdf

Marten Falls First Nation. (2023c). *Indigenous Knowledge Land Use and Occupancy Study for the Northern Access Roads.*

Ministry of Natural Resources. (1990). *Environmental Guidelines for Access Roads and Water Crossings.*

Ministry of Transportation. (2018). *Ontario Structure Inspection Manual.*

Ministry of Transportation. (2022). *Culvert Inspection Guide for Culverts less than 3000mm.*

Ontario Ministry of Natural Resources and Forestry. (2014). *Application standards for proposed pits and quarries. Provincial Standards of Ontario - Category 9 - Pit Above Water and Provincial Standards of Ontario - Category 11 - Quarry Above Water.*

Ontario Ministry of Natural Resources and Forestry. (2017). *Forest Management Planning Manual.*

Ontario Ministry of the Environment, Conservation and Parks (MECP). (2025). Guide to eating Ontario fish [Web page]. Government of Ontario. Last updated: September 23, 2025. Retrieved December 9, 2025, from https://www.ontario.ca/page/guide-eating-ontario-fish#section-3.

Ontario Ministry of the Environment, Conservation and Parks. (2021). Fish consumption advisory (Albany River) [Web page]. Government of Ontario. Last updated: Oct 17, 2021. Retrieved December 9, 2025, from https://www.ontario.ca/page/fish-consumption-report?id=51218348.

Ontario Ministry of Transportation. (2020). *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions for Provincial Transportation Projects.*

Ontario. (2024b). *Map: Well Records.* Retrieved from Ontario: https://www.ontario.ca/page/map-well-records?

Quinn, J., McFadden, R., Chan, C. W., & Carson, L. (2020). Titanium for Orthopedic Applications: An Overview of Surface Modification to Improve Biocompatibility and Prevent Bacterial Biofilm Formation. iScience, 23(11), 101745. https://doi.org/10.1016/j.isci.2020.101745

Teach for Canada. (2024). *Welcome to Marten Falls First Nation / Ogoki Post.* Retrieved January 30, 2025, from Teach for Canada: https://teachforcanada.ca/en/wp-content/uploads/2017/09/Marten-Falls-2024.pdf

U.S. Department of Health and Human Services, National Institutes of Health, Office of Dietary Supplements. 2022. Boron (Fact Sheet for Health Professionals). Last updated June 9, 2022. Retrieved December 9, 2025, from https://ods.od.nih.gov/factsheets/Boron-HealthProfessional/.

Wang, K., & Chin, V. (1978). *Northern Ontario Water Resources Studies: Ground Water Resources.* Retrieved from Ministry of the Environment: https://archive.org/details/31761120607833

Women and Gender Equality Canada. (2022, June). *Gender-based Analysis Plus.* Retrieved from Government of Canada: https://women-gender-equality.canada.ca/en/gender-based-analysis-plus/what-gender-based-analysis-plus.html

WSP. (2024a). *Draft Fish and Fish Habitat Technical Support Document: Existing Conditions and Effects Assessment.* WSP.

WSP. (2024b). *Draft Groundwater and Geochemistry Technical Support Document: Existing Conditions and Effects Assessment.* WSP.

WSP. (2024c). *Draft Physiography, Terrain, and Soils Technical Support Document: Existing Conditions & Effects Assessment.*

WSP. (2024d). *Draft Vegetation Technical Support Document: Existing Conditions & Effects Assessment.* WSP.

WSP. (2025a). *Draft Acoustic and Vibration Environment Technical Support Document: Existing Conditions & Effects Assessment.* WSP.

WSP. (2025b). *Draft Birds Technical Support Document: Existing Conditions & Effects Assessment.*

WSP. (2025c). *Draft Surface Water Technical Support Document: Existing Conditions and Effects Assessment.* WSP.

WSP. (2025d). *Draft Ungulates Technical Support Document: Existing Conditions and Effects Assessment.*

WSP. (2025e). *Draft Wildlife Technical Support Document: Existing Conditions & Effects Assessment.*

Zacchini M. (2024). Bismuth interaction with plants: Uptake and transport, toxic effects, tolerance mechanisms - A review. Chemosphere, 360, 142414. https://doi.org/10.1016/j.chemosphere.2024.142414

Attachment A

Figures

Figure A-1 Aquatics Habitat Effects Assessment Local and Regional Study Area

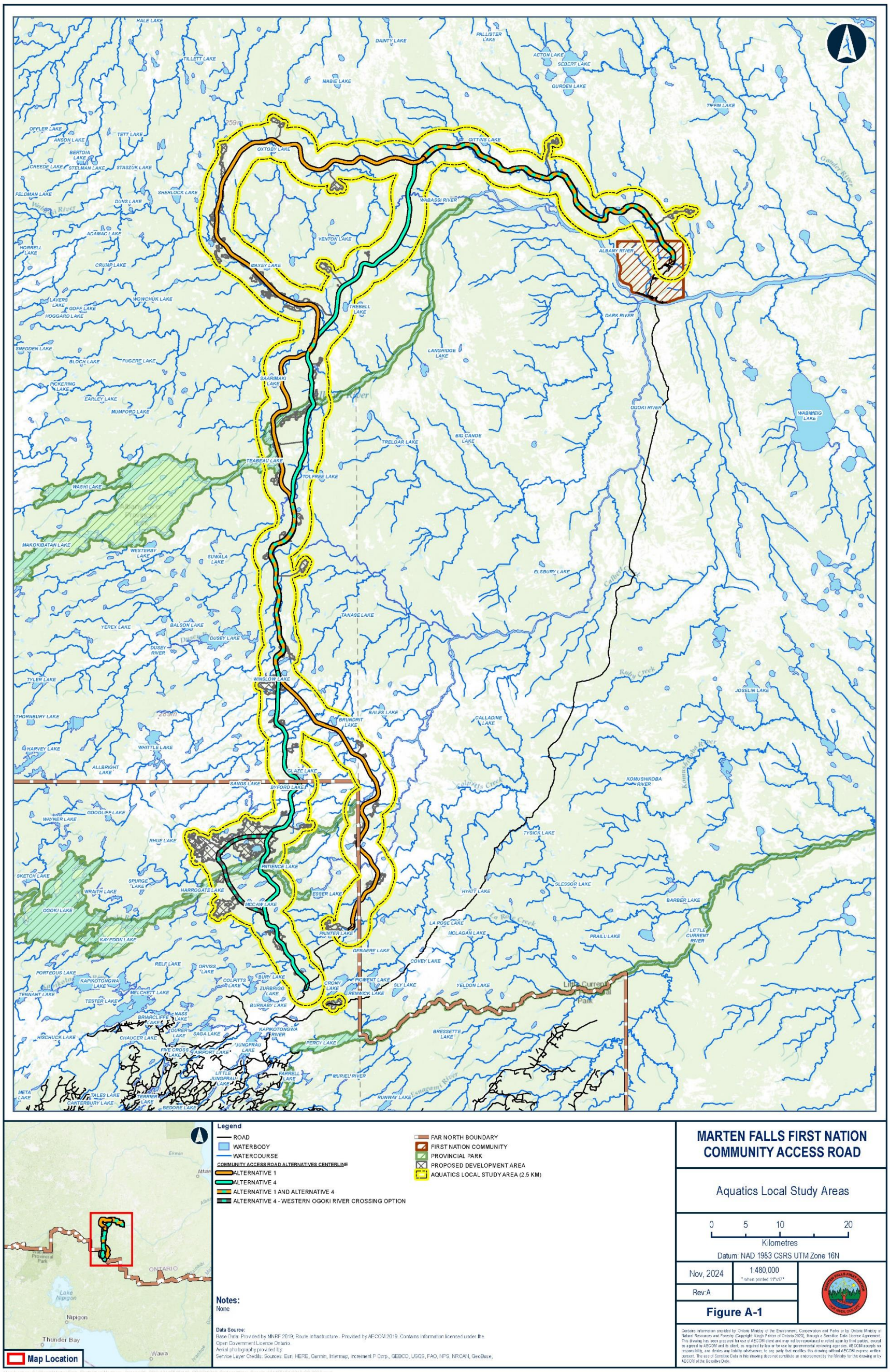


Figure A-2 Groundwater Effects Assessment Local and Regional Study Areas

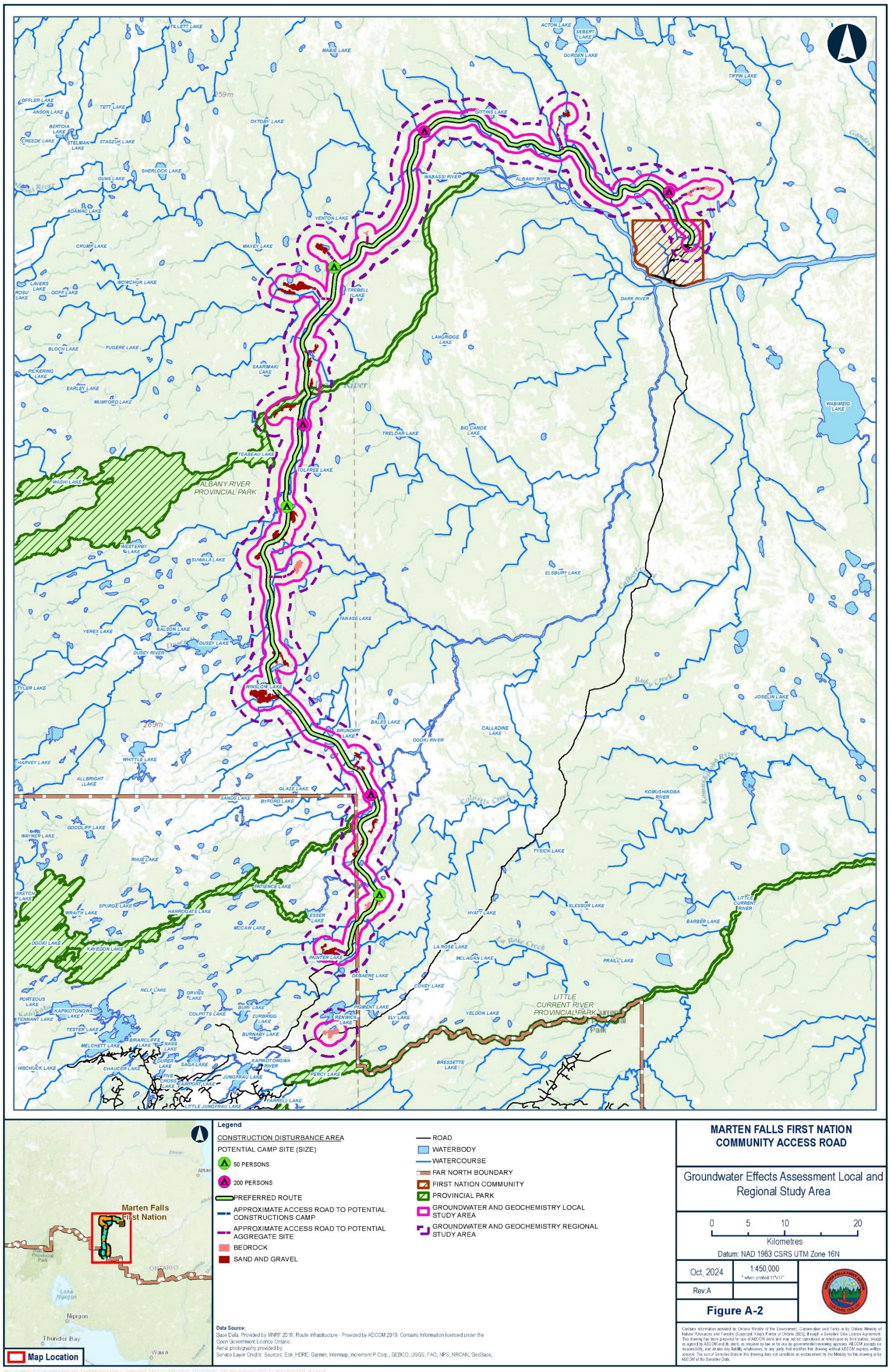


Figure A-3 Peatlands Effects Assessment Local and Regional Study Areas

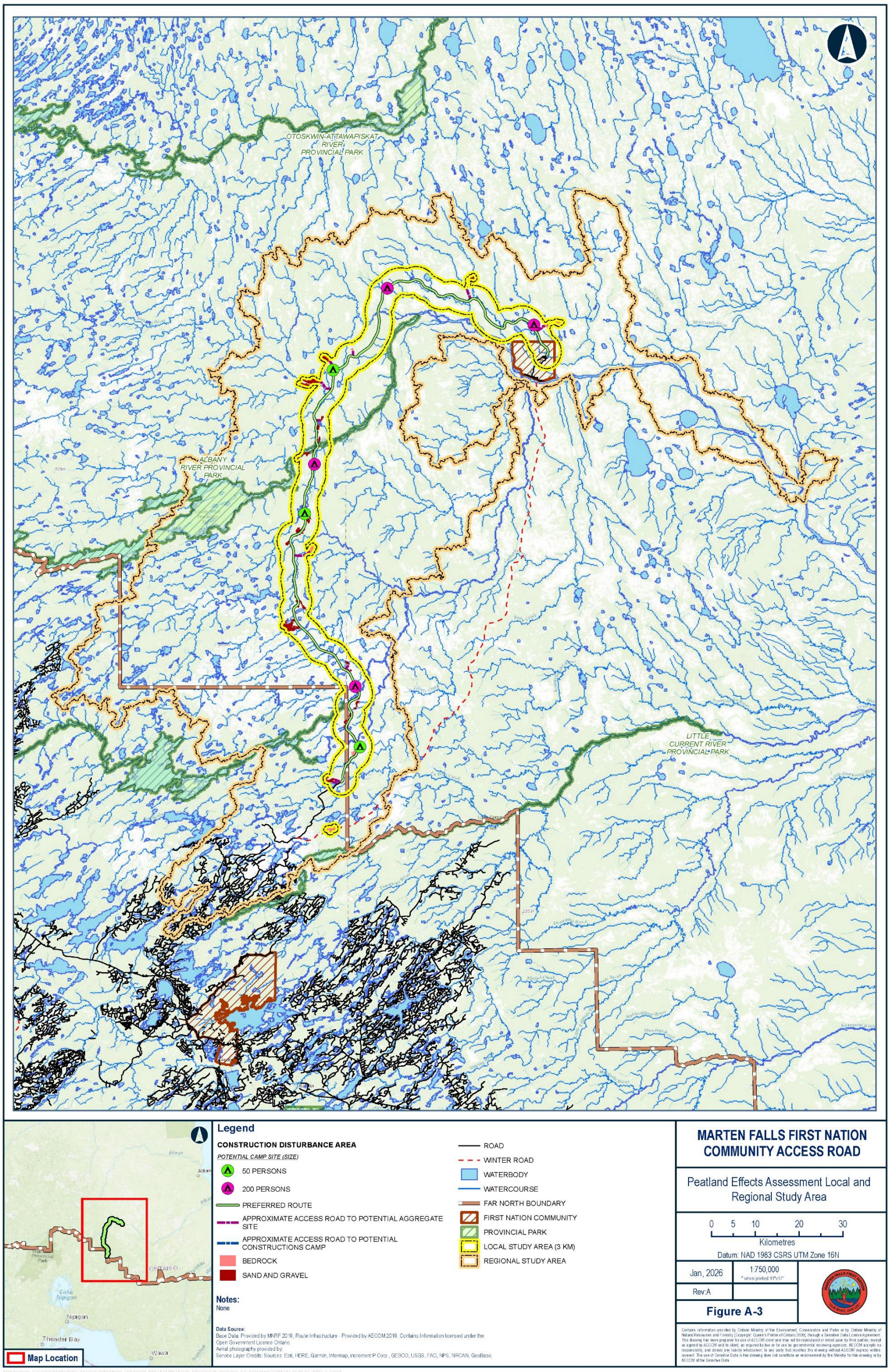


Figure A-4 Physiography, Terrain and Soils Effects Assessment Local and Regional Study Area

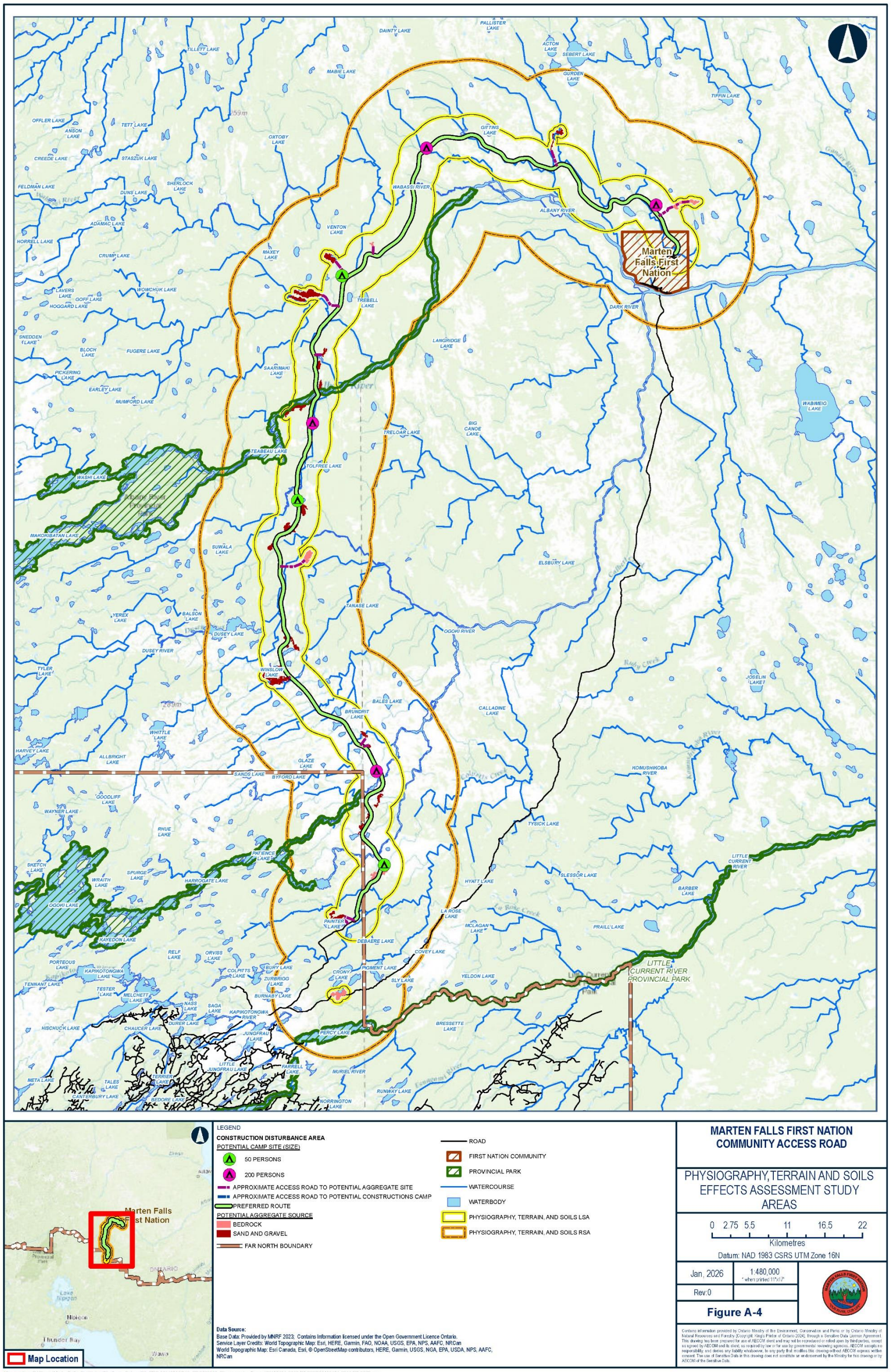


Figure A-5 Acoustic and Vibration Effects Assessment Local and Regional Study Area

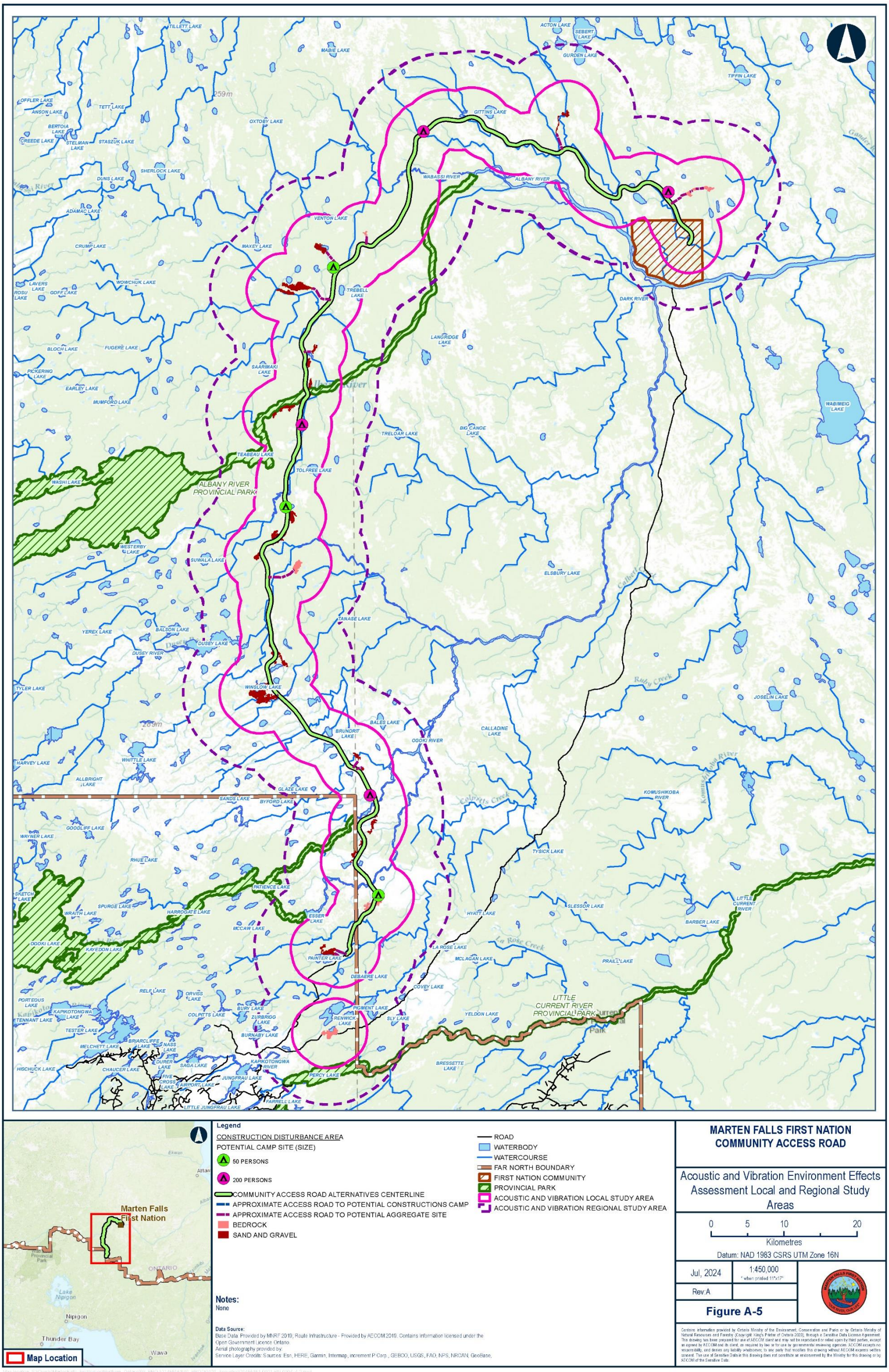


Figure A-6 Archaeology and Cultural Heritage Study Area

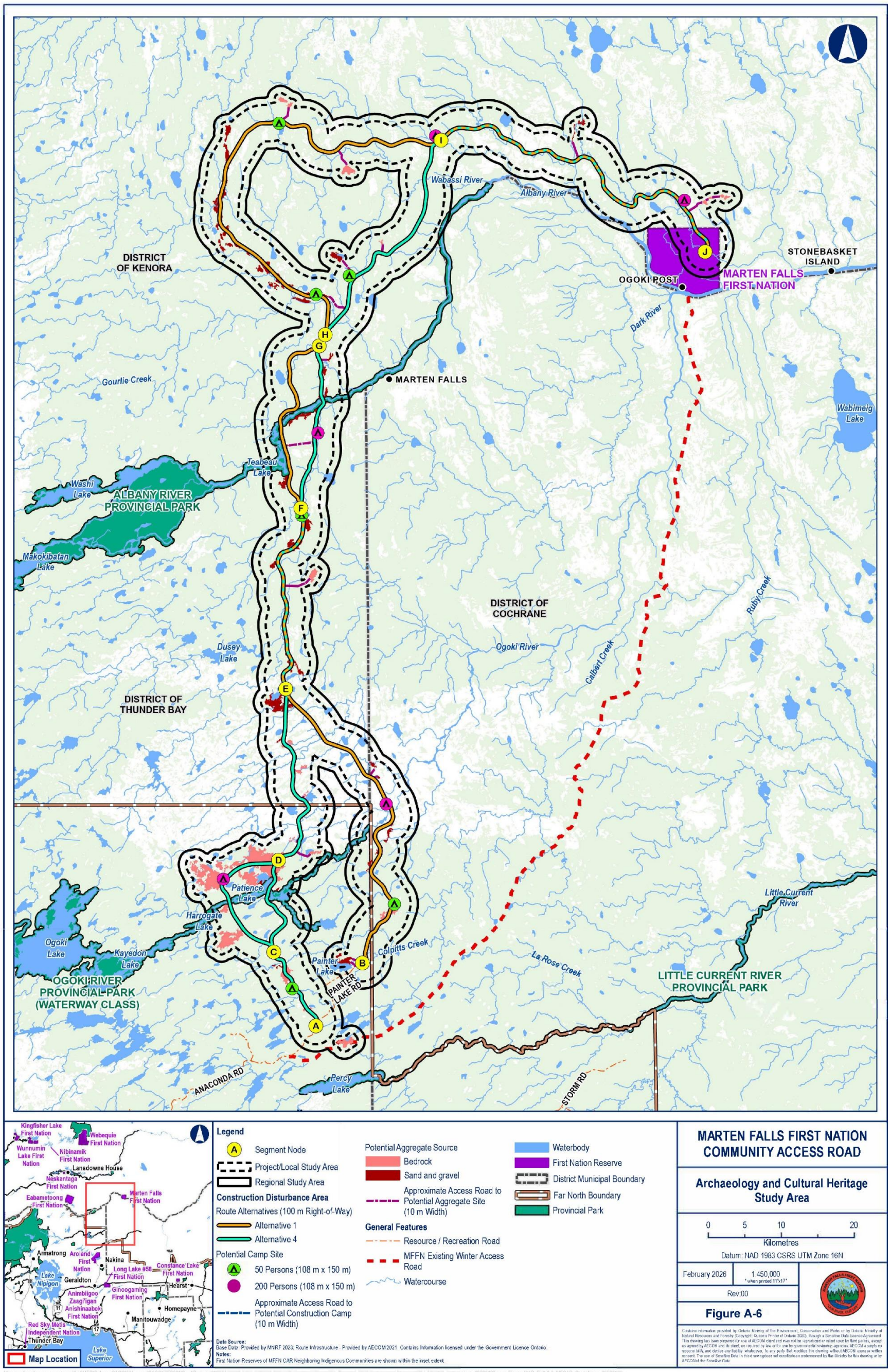


Figure A-7 Air Quality Study Area

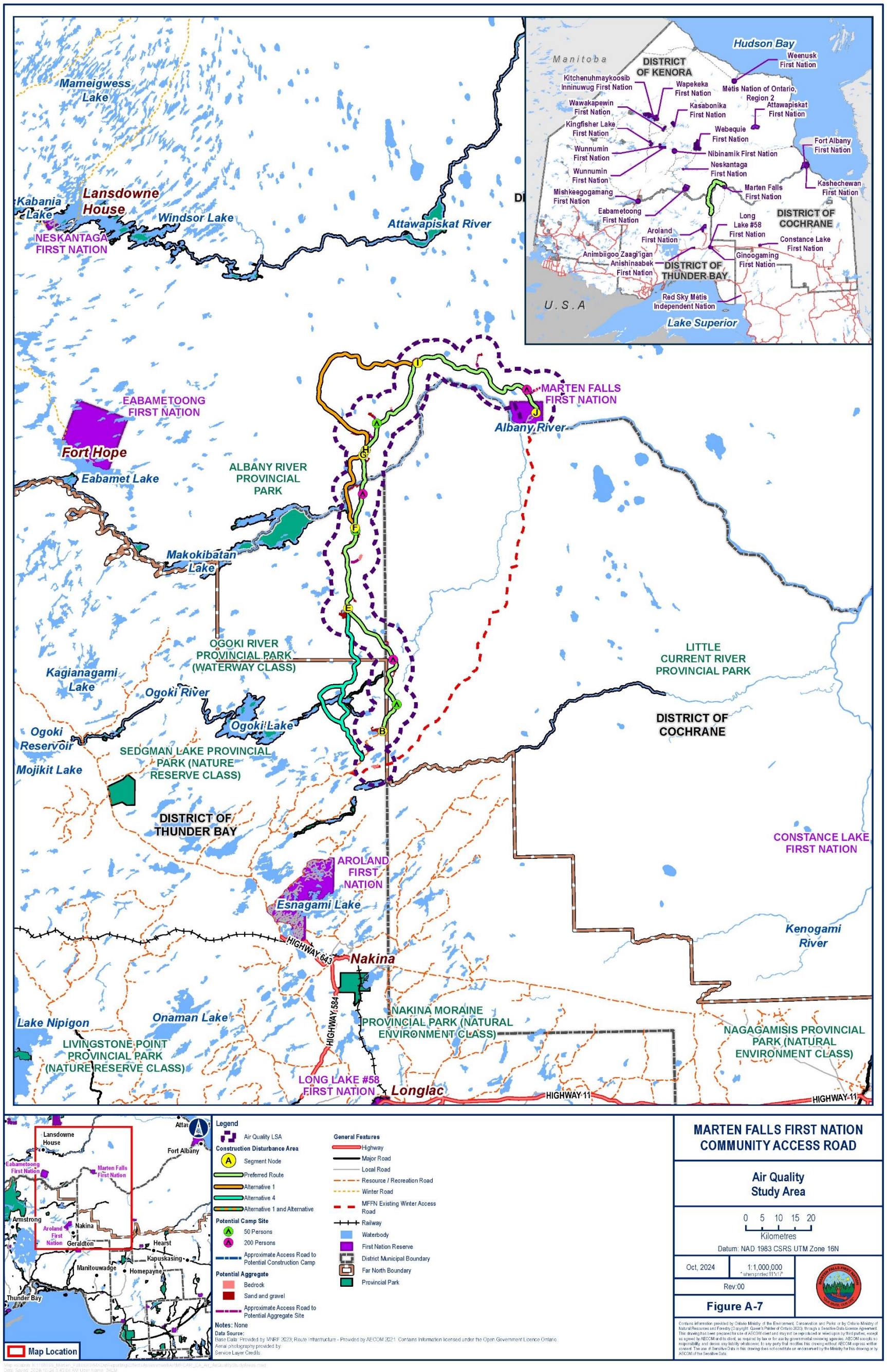
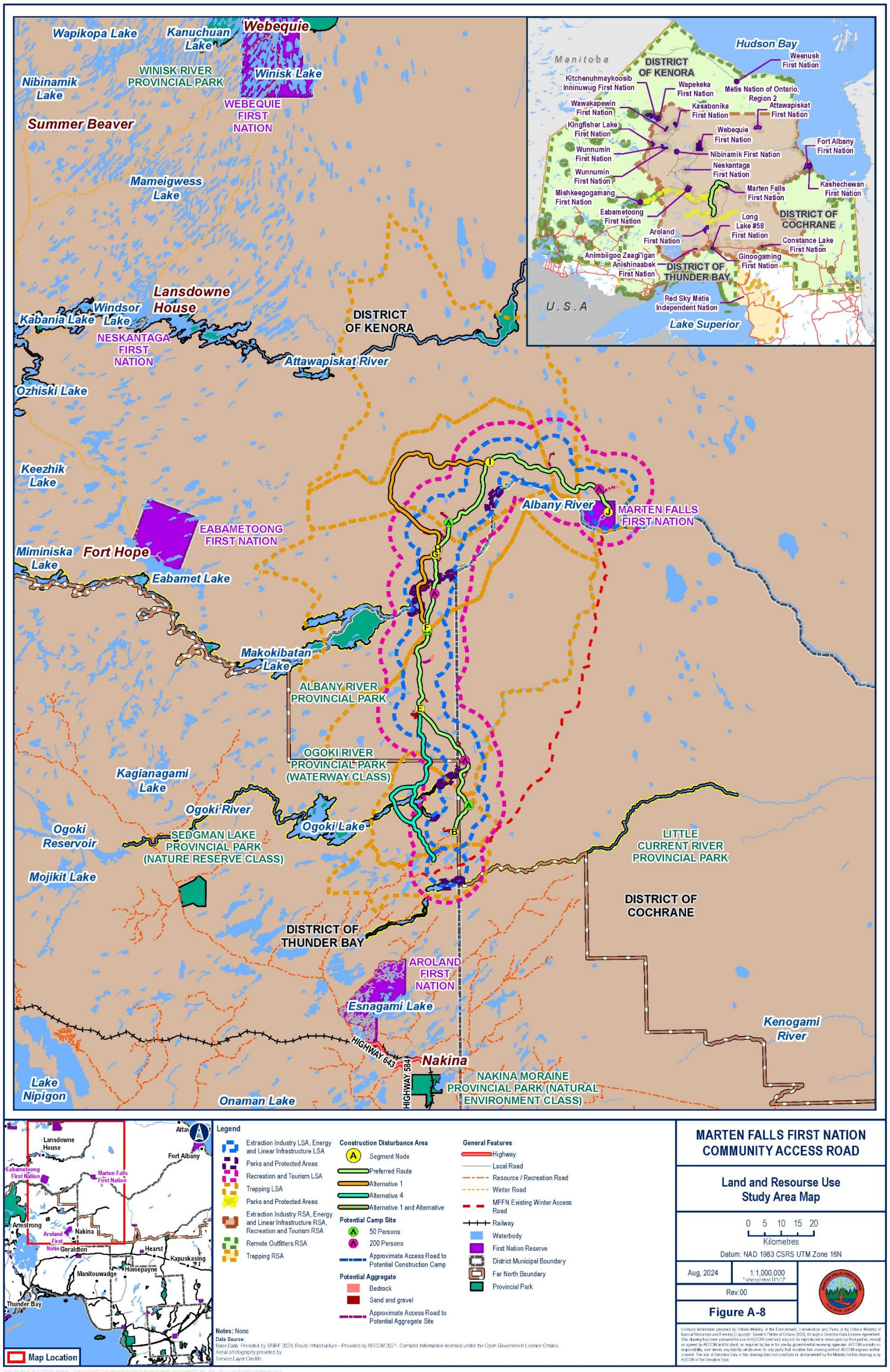


Figure A-8 Land and Resource Use Study Area Map



Attachment B

Tables

Table 1: Summary of Soil Analytical Results of Metals Parameters

							Location	M22S008-GEOCHEM	M22S011-GEOCHEM	M22S028-GEOCHEM	M22S032-GEOCHEM	M22S044-GEOCHEM	M22S055-GEOCHEM	M22S096-GEOCHEM	M22S127-GEOCHEM	M22S154-GEOCHEM	M22S156-GEOCHEM
							Sample ID	M22S008-GEOCHEM-SO_20220605	M22S011-GEOCHEM-SO_20220604	M22S028-GEOCHEM-SO_20220604	M22S032-GEOCHEM-SO_20220606	M22S044-GEOCHEM-SO_20220604	M22S055-GEOCHEM-SO_20220606	M22S096-GEOCHEM-SO_20220606	M22S127-GEOCHEM-SO_20220605	M22S154-GEOCHEM-SO_20220606	M22S156-GEOCHEM-SO_20220605
							Date	2022-06-05	2022-06-04	2022-06-04	2022-06-06	2022-06-04	2022-06-06	2022-06-06	2022-06-05	2022-06-06	2022-06-05
							Sample type	N	N	N	N	N	N	N	N	N	N
							Fraction	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards: OREG-153 (T2)/SO/R-P-I/COARSE	Generic Ontario Standards: OREG-153 (T8)/SO/R-P-I-I-C-C	Human Health Based Guidelines/Standards: CCME - HH SQG	Human Health Based Guidelines/Standards: Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]	Minimum RDL	Max Concentration										
Aluminum	µg/g	--	--	--	na	---	42000	6600	19000	20000	15000	11000	21000	14000	13000	1400	610
Antimony	µg/g	7.5	1.3	--	na	6	ND	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**30**	**10**	**30**	**5.7**	**2**	**5.7**	**3.6**	**3.4**	**6.1**	**1.1**	**7.3**
Barium	µg/g	390	220	6800	3800	---	**430**	35	54	91	69	61	100	96	63	25	15
Beryllium	µg/g	4	2.5	75	na	---	1.2	0.2	0.4	0.61	0.19	0.22	0.79	0.5	0.36	0.06	0.03
Bismuth	µg/g	--	--	--	na	0.09	0.58	< 0.09	0.17	0.21	0.13	0.11	0.22	0.16	0.15	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.31	0.1	0.08	0.09	0.27	0.21	0.07	0.12	0.19	0.13	0.09
Calcium	µg/g	--	--	--	na	---	140000	110000	2800	91000	22000	4200	100000	110000	32000	21000	13000
Chromium	µg/g	160	70	220	28000	---	**410**	21	43	50	69	26	51	41	29	2.2	1.4
Cobalt	µg/g	22	22	--	22	---	**27**	5.3	8	13	9.7	8.5	12	9.2	9.1	1.3	0.35
Copper	µg/g	140	92	1100	na	---	89	12	10	22	20	5	24	20	8	4.3	3.3
Iron	µg/g	--	--	--	na	---	55000	14000	25000	29000	29000	22000	30000	25000	19000	3900	1900
Lead	µg/g	120	120	61*	na	---	15	3.5	7.2	9.2	5.9	5.1	8.6	6.2	7.3	1.2	1.5
Lithium	µg/g	--	--	--	na	2	97	7	17	19	17	10	22	17	11	< 2	< 2
Magnesium	µg/g	--	--	--	na	---	30000	23000	6400	23000	8200	4100	25000	22000	15000	1600	1000
Manganese	µg/g	--	--	--	883**	---	1800	280	450	560	360	1800	510	580	630	160	24
Mercury	µg/g	0.27	0.27	6.6	na	0.05	0.11	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	**13**	0.7	0.6	0.8	0.8	0.8	0.2	1.4	0.5	0.2	0.3
Nickel	µg/g	100	82	200	330	---	**210**	12	24	31	28	12	31	24	17	1.8	2.8
Potassium	µg/g	--	--	--	na	---	21000	1200	2600	2900	2100	930	4000	3500	1400	210	160
Selenium	µg/g	2.4	1.5	80	110	0.7	**2.2**	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	560	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	150	63	11	58	21	16	63	91	23	24	21
Thallium	µg/g	1	1	1	na	0.02	0.75	0.07	0.13	0.16	0.21	0.09	0.17	0.13	0.09	< 0.02	< 0.02
Tin	µg/g	--	--	--	na	2	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	3000	620	1100	1200	1600	630	1400	1300	850	40	11
Uranium	µg/g	23	2.5	23	23	---	**13**	0.84	0.41	0.65	1.7	0.68	0.62	0.8	0.47	0.085	0.072
Vanadium	µg/g	86	86	--	39	---	**93**	23	**42**	**51**	**47**	29	**53**	**41**	35	2	1
Yttrium	µg/g	--	--	--	na	---	15	6	4.5	10	4.2	5.4	13	8.2	7.6	0.71	0.44
Zinc	µg/g	340	290	10000	na	---	98	22	72	51	54	63	51	54	39	14	9.9

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutional Property Use, Coarse
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Industrial/Commercial Property Use
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutional Property Use, Coarse
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water] and S-GW3 [soil to groundwater to surface water used by aquatic life]) had no standard available for substances screened in this table.
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tolerable Daily Intake List May 2025
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							M22S161-GEOCHEM	M22S258-GEOCHEM	M22S283-GEOCHEM	M22SAD1-GEOCHEM	MW22-01-1 SS8	MW22-01-2 SS4	MW22-01-2 SS6	MW22-02-1 SS5	MW22-02-1 SS6	MW22-02-1 SS7	MW22-02-1 SS8
							M22S161-GEOCHEM-SO_20220606	M22S258-GEOCHEM-SO_20220604	M22S283-GEOCHEM-SO_20220604	M22SAD1-GEOCHEM-SO_20220605	MW22-01-1 SS8-SO_20220909	MW22-01-2 SS4-SO_20220909	MW22-01-2 SS6-SO_20220909	MW22-02-1 SS5-SO_20220912	MW22-02-1 SS6-SO_20220912	MW22-02-1 SS7-SO_20220912	MW22-02-1 SS8-SO_20220912
							2022-06-06	2022-06-04	2022-06-04	2022-06-05	2022-09-09	2022-09-09	2022-09-09	2022-09-12	2022-09-12	2022-09-12	2022-09-12
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards: OREG-153 (T2)/SO/R-P-I/COARSE	Generic Ontario Standards: OREG-153 (T8)/SO/R-P-I-I-C-C	Human Health Based Guidelines/Standards: CCME - HH SQG	Human Health Based Guidelines/Standards: Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]	Minimum RDL											
Aluminum	µg/g	--	--	--	na	---	22000	33000	4700	9200	4400	13000	5600	5500	5400	4100	4800
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**3.8**	**11**	**3.3**	**6.4**	**2**	**9.1**	**2.3**	**2**	**1.8**	**1.7**	**2.6**
Barium	µg/g	390	220	6800	3800	---	120	140	27	27	36	99	28	43	42	31	36
Beryllium	µg/g	4	2.5	75	na	---	0.8	1	0.12	0.22	0.2	0.53	0.22	0.24	0.23	0.17	0.21
Bismuth	µg/g	--	--	--	na	0.09	0.27	0.3	< 0.09	< 0.09	< 0.09	0.19	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.06	0.08	0.2	0.06	0.04	0.09	0.04	0.05	0.04	0.03	0.04
Calcium	µg/g	--	--	--	na	---	100000	51000	5000	60000	100000	89000	120000	110000	100000	89000	120000
Chromium	µg/g	160	70	220	28000	---	59	**83**	11	28	**78**	**91**	**75**	**100**	**100**	**94**	**99**
Cobalt	µg/g	22	22	--	22	---	14	21	1.6	7	3.8	9.3	5.1	4.5	4.3	3.5	4.2
Copper	µg/g	140	92	1100	na	---	29	39	4.3	6.8	7.1	19	11	10	9.8	7.2	8.3
Iron	µg/g	--	--	--	na	---	35000	44000	5100	18000	11000	25000	13000	12000	12000	10000	12000
Lead	µg/g	120	120	61*	na	---	9.6	13	3.6	3.6	2.6	7.6	2.9	3.6	3.5	2.7	3.4
Lithium	µg/g	--	--	--	na	2	25	30	2	9	7	21	9	9	8	7	9
Magnesium	µg/g	--	--	--	na	---	25000	21000	990	11000	22000	22000	18000	25000	21000	18000	20000
Manganese	µg/g	--	--	--	883**	---	540	820	56	290	200	350	210	260	230	180	230
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.2	0.3	0.4	0.9	0.4	0.4	0.3	0.4	0.4	0.5	0.3
Nickel	µg/g	100	82	200	330	---	36	50	6.4	16	9.6	24	13	12	11	9.1	10
Potassium	µg/g	--	--	--	na	---	4000	4800	350	990	1100	3100	1100	1400	1400	1000	1300
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	390	410	420	370	440	370	340
Strontium	µg/g	--	--	--	na	---	65	45	13	39	64	59	75	67	62	54	83
Thallium	µg/g	1	1	1	na	0.02	0.19	0.24	0.02	0.04	0.14	0.32	0.14	0.16	0.16	0.13	0.22
Tin	µg/g	--	--	--	na	2	< 2	< 2	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	1500	1800	230	780	460	890	650	620	630	480	530
Uranium	µg/g	23	2.5	23	23	---	0.65	0.82	0.32	0.36	0.53	0.72	0.65	0.52	0.68	0.49	0.58
Vanadium	µg/g	86	86	--	39	---	**57**	**77**	9	29	17	38	23	20	20	17	19
Yttrium	µg/g	--	--	--	na	---	13	15	2.8	4.4	4.7	8.3	4.9	5.8	5.7	4.5	5
Zinc	µg/g	340	290	10000	na	---	58	81	18	23	25	54	29	28	28	23	26

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW22-03-1 SS3	MW22-03-1 SS4	MW22-03-1 SS5	MW22-03-1 SS6	MW22-04-1 SS10	MW22-04-1 SS6	MW22-04-1 SS7	MW22-04-1 SS8	MW22-05 SA-1	MW22-05 SA-2	MW22-05 SA-4
							MW22-03-1 SS3-SO_20220913	MW22-03-1 SS4-SO_20220913	MW22-03-1 SS5-SO_20220913	MW22-03-1 SS6-SO_20220913	MW22-04-1 SS10-SO_20220916	MW22-04-1 SS6-SO_20220916	MW22-04-1 SS7-SO_20220916	MW22-04-1 SS8-SO_20220916	MW22-05 SA-1-SO_20220922	MW22-05 SA-2-SO_20220922	MW22-05 SA-4-SO_20220922
							2022-09-13	2022-09-13	2022-09-13	2022-09-13	2022-09-16	2022-09-16	2022-09-16	2022-09-16	2022-09-22	2022-09-22	2022-09-22
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards: OREG-153 (T2)/SO/R-P-I/COARSE	Generic Ontario Standards: OREG-153 (T8)/SO/R-P-I-I-C-C	Human Health Based Guidelines/Standards: CCME - HH SQG	Human Health Based Guidelines/Standards: Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]	Minimum RDL											
Aluminum	µg/g	--	--	--	na	---	28000	21000	26000	4700	3400	4700	3500	4100	3200	4200	3700
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**4.8**	**4**	**3.8**	**1.9**	**1.5**	**1.9**	**1.6**	**1.7**	**1.5**	**1.9**	**1.9**
Barium	µg/g	390	220	6800	3800	---	190	150	190	33	30	36	29	37	16	18	17
Beryllium	µg/g	4	2.5	75	na	---	1.1	0.88	1.1	0.21	0.14	0.2	0.15	0.19	0.14	0.19	0.16
Bismuth	µg/g	--	--	--	na	0.09	0.4	0.32	0.39	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.09	0.1	0.1	0.04	0.03	0.04	0.02	0.04	0.032	0.044	0.044
Calcium	µg/g	--	--	--	na	---	72000	110000	90000	100000	69000	93000	72000	76000	78000	99000	96000
Chromium	µg/g	160	70	220	28000	---	**78**	62	**78**	**130**	**120**	**110**	**140**	**120**	57	57	46
Cobalt	µg/g	22	22	--	22	---	18	14	18	4.9	3.1	3.7	3.2	3.3	3.3	4.2	3.6
Copper	µg/g	140	92	1100	na	---	37	31	38	11	6.2	8.4	6.5	7	7.7	8.5	8.1
Iron	µg/g	--	--	--	na	---	43000	33000	43000	12000	9700	11000	11000	10000	9700	10000	9500
Lead	µg/g	120	120	61*	na	---	15	12	15	3.1	2.4	3.3	2.5	2.9	2.2	2.7	2.5
Lithium	µg/g	--	--	--	na	2	44	35	43	8	5	7	5	6	6.1	8.4	7.5
Magnesium	µg/g	--	--	--	na	---	21000	25000	23000	19000	11000	22000	9800	17000	13000	18000	17000
Manganese	µg/g	--	--	--	883**	---	610	540	590	200	130	210	150	180	180	290	180
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.4	0.4	0.4	0.5	0.3	0.5	0.5	0.4	1.7	**3.9**	1.3
Nickel	µg/g	100	82	200	330	---	47	36	47	12	7.3	9.5	7.7	8.7	8.1	11	8.7
Potassium	µg/g	--	--	--	na	---	6100	5000	6000	1100	890	1200	930	1100	570	640	650
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	560	480	520	330	440	410	450	480	-	-	-
Strontium	µg/g	--	--	--	na	---	61	79	71	62	46	56	48	49	53	64	64
Thallium	µg/g	1	1	1	na	0.02	0.64	0.48	0.5	0.22	0.08	0.14	0.1	0.14	0.028	0.067	0.045
Tin	µg/g	--	--	--	na	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	1400	1200	1500	540	430	510	460	480	420	460	450
Uranium	µg/g	23	2.5	23	23	---	1	0.91	1.1	0.9	0.41	0.45	0.45	0.5	0.41	0.43	0.43
Vanadium	µg/g	86	86	--	39	---	**69**	**56**	**68**	20	16	18	18	17	16	17	16
Yttrium	µg/g	--	--	--	na	---	12	11	12	4.6	4	5.1	4.2	4.7	4.5	5.5	4.8
Zinc	µg/g	340	290	10000	na	---	95	77	98	26	19	24	20	21	14	14	14

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW22-05 SA-6	MW22-05 SA-7	MW22-06 SA-1	MW22-06 SA-4	MW22-06 SA-7	MW22-06 SA-8	MW22-06 SA-9	MW22-07 SA-1	MW22-07 SA-2	MW22-07 SA-4	MW22-07 SA-6
							MW22-05 SA-6-SO_20220922	MW22-05 SA-7-SO_20220922	MW22-06 SA-1-SO_20220923	MW22-06 SA-4-SO_20220923	MW22-06 SA-7-SO_20220923	MW22-06 SA-8-SO_20220923	MW22-06 SA-9-SO_20220923	MW22-07 SA-1-SO_20220925	MW22-07 SA-2-SO_20220925	MW22-07 SA-4-SO_20220925	MW22-07 SA-6-SO_20220925
							2022-09-22	2022-09-22	2022-09-23	2022-09-23	2022-09-23	2022-09-23	2022-09-23	2022-09-25	2022-09-25	2022-09-25	2022-09-25
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards		Human Health Based Guidelines/Standards		Minimum RDL											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG	Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]												
Aluminum	µg/g	--	--	--	na	---	3700	3300	8300	5700	5300	5000	4700	13000	3400	3100	3200
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**1.7**	**1.6**	**2.5**	**2.3**	**2.2**	**2.1**	**2**	**3.5**	**1.6**	**1.7**	**1.8**
Barium	µg/g	390	220	6800	3800	---	16	16	25	18	17	19	16	38	17	13	16
Beryllium	µg/g	4	2.5	75	na	---	0.16	0.16	0.27	0.19	0.17	0.17	0.17	0.43	0.15	0.13	0.15
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	< 0.09	0.1	< 0.09	< 0.09	< 0.09	< 0.09	0.13	< 0.09	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.044	0.06	0.05	0.032	0.042	0.036	0.048	0.05	0.051	0.04	0.059
Calcium	µg/g	--	--	--	na	---	100000	98000	50000	110000	120000	110000	110000	53000	110000	91000	100000
Chromium	µg/g	160	70	220	28000	---	50	43	**170**	**73**	67	62	66	**130**	35	64	38
Cobalt	µg/g	22	22	--	22	---	3.7	3.2	5.9	5.4	5	4.4	4.4	8.6	3.1	3.4	3.3
Copper	µg/g	140	92	1100	na	---	8.8	7.2	10	12	11	9.9	9.7	12	6.6	6.7	7.3
Iron	µg/g	--	--	--	na	---	9500	8200	16000	14000	13000	11000	11000	23000	8500	9800	8200
Lead	µg/g	120	120	61*	na	---	2.6	2.7	4	2.7	2.7	2.7	2.4	5.7	2.4	2.2	2.5
Lithium	µg/g	--	--	--	na	2	7.9	7.3	12	11	11	10	9.4	16	5.8	5.4	5.8
Magnesium	µg/g	--	--	--	na	---	20000	20000	7100	14000	14000	13000	12000	9000	24000	12000	23000
Manganese	µg/g	--	--	--	883**	---	210	200	220	270	250	240	230	330	200	160	230
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	**3.2**	1	**13**	**2.8**	**4.1**	**2.5**	**4.4**	**4.2**	**2.1**	**2.1**	**2.4**
Nickel	µg/g	100	82	200	330	---	9.8	8	19	14	14	12	13	25	7.9	8.4	8.1
Potassium	µg/g	--	--	--	na	---	660	660	1200	750	650	830	640	1600	650	500	630
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	69	65	42	76	80	76	73	40	68	62	63
Thallium	µg/g	1	1	1	na	0.02	0.038	0.038	0.034	0.032	0.023	0.027	0.024	0.045	0.027	0.024	0.046
Tin	µg/g	--	--	--	na	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	470	420	740	580	570	500	500	1200	430	420	380
Uranium	µg/g	23	2.5	23	23	---	0.86	0.71	0.56	0.62	0.55	0.56	0.52	0.71	0.4	0.35	0.39
Vanadium	µg/g	86	86	--	39	---	16	14	26	21	20	17	17	**41**	15	16	14
Yttrium	µg/g	--	--	--	na	---	5.2	5	5.9	4.6	4.2	4	4	8	4.9	3.6	4.7
Zinc	µg/g	340	290	10000	na	---	15	14	19	22	21	19	17	30	13	12	13

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW22-07 SA-8	MW22-11-1 SS3	MW22-11-1 SS4	MW22-11-1 SS5	MW22-12-1 SS11	MW22-12-1 SS12	MW22-12-1 SS4	MW22-12-1 SS6	MW22-13-1 SS10	MW22-13-1 SS5	MW22-13-1 SS6
							MW22-07 SA-8-SO_20220925	MW22-11-1 SS3-SO_20221014	MW22-11-1 SS4-SO_20221014	MW22-11-1 SS5-SO_20221014	MW22-12-1 SS11-SO_20221118	MW22-12-1 SS12-SO_20221118	MW22-12-1 SS4-SO_20221117	MW22-12-1 SS6-SO_20221117	MW22-13-1 SS10-SO_20221122	MW22-13-1 SS5-SO_20221121	MW22-13-1 SS6-SO_20221122
							2022-09-25	2022-10-14	2022-10-14	2022-10-14	2022-11-18	2022-11-18	2022-11-17	2022-11-17	2022-11-22	2022-11-21	2022-11-22
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards		Human Health Based Guidelines/Standards		Minimum RDL											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG	Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [(a),(b)]												
Aluminum	µg/g	--	--	--	na	---	5500	3500	6100	5100	3100	5400	12000	5200	2600	2100	3000
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**2.4**	**2.6**	**4.7**	**3.9**	**1.7**	**2.2**	**2.3**	**2.1**	**1.5**	**1.4**	**1.5**
Barium	µg/g	390	220	6800	3800	---	27	28	34	28	23	37	94	38	16	11	19
Beryllium	µg/g	4	2.5	75	na	---	0.26	0.12	0.23	0.2	0.18	0.32	0.64	0.29	0.14	0.12	0.17
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	0.22	0.09	< 0.09	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.062	0.16	0.08	0.02	0.05	0.06	0.1	0.05	0.03	0.03	0.1
Calcium	µg/g	--	--	--	na	---	130000	41000	86000	140000	66000	82000	85000	74000	48000	55000	47000
Chromium	µg/g	160	70	220	28000	---	38	**410**	**320**	**130**	23	40	41	26	**78**	29	**83**
Cobalt	µg/g	22	22	--	22	---	5.1	2.6	4.9	5.1	3.2	5	10	4.6	2.6	2.2	2.8
Copper	µg/g	140	92	1100	na	---	11	14	12	9.5	6.9	11	22	11	6.5	6.1	8.9
Iron	µg/g	--	--	--	na	---	13000	12000	13000	11000	6700	11000	19000	9500	5600	5500	7200
Lead	µg/g	120	120	61*	na	---	3.8	2.4	4.1	2.6	2.6	3.9	8.9	4.1	1.8	1.9	2.4
Lithium	µg/g	--	--	--	na	2	11	5	9	14	7	12	25	11	6	4	6
Magnesium	µg/g	--	--	--	na	---	24000	5600	15000	15000	16000	18000	17000	21000	6700	12000	6900
Manganese	µg/g	--	--	--	883**	---	280	170	220	240	170	280	430	220	120	95	110
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.94	1.6	1.2	0.4	0.8	0.8	1	1	0.7	0.6	0.7
Nickel	µg/g	100	82	200	330	---	13	12	14	9.6	7.7	13	26	12	8.2	5.5	9.2
Potassium	µg/g	--	--	--	na	---	1100	590	1200	1200	500	840	2100	850	400	270	410
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	85	42	62	99	47	63	72	52	39	40	39
Thallium	µg/g	1	1	1	na	0.02	0.038	0.04	0.09	0.1	0.05	0.06	0.13	0.07	0.03	0.02	0.03
Tin	µg/g	--	--	--	na	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	570	220	550	560	150	220	380	210	120	140	140
Uranium	µg/g	23	2.5	23	23	---	0.63	0.5	1.1	0.76	0.41	0.6	0.83	0.53	0.46	0.31	0.4
Vanadium	µg/g	86	86	--	39	---	21	10	20	25	13	21	37	19	10	12	15
Yttrium	µg/g	--	--	--	na	---	5.9	2.8	5.2	4.7	4.1	5.3	8.4	5.4	2.6	3.8	3.4
Zinc	µg/g	340	290	10000	na	---	23	21	19	15	14	23	49	22	11	8.6	12

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW22-13-1 SS8	MW22-14-1 SS3	MW22-14-1 SS5	MW22-14-1 SS7	MW22-14-1 SS8	MW22-15-1 SS2	MW22-15-1 SS4	MW22-15-1 SS5	MW22-15-2 SS6	MW22-15-4 SS1	MW22-15-4 SS2
							MW22-13-1 SS8-SO_20221122	MW22-14-1 SS3-SO_20221125	MW22-14-1 SS5-SO_20221125	MW22-14-1 SS7-SO_20221125	MW22-14-1 SS8-SO_20221125	MW22-15-1 SS2-SO_20221202	MW22-15-1 SS4-SO_20221202	MW22-15-1 SS5-SO_20221202	MW22-15-2 SS6-SO_20221202	MW22-15-4 SS1-SO_20221203	MW22-15-4 SS2-SO_20221203
							2022-11-22	2022-11-25	2022-11-25	2022-11-25	2022-11-25	2022-12-02	2022-12-02	2022-12-02	2022-12-02	2022-12-03	2022-12-03
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards		Human Health Based Guidelines/Standards		Minimum RDL											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG	Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [(a),(b)]												
Aluminum	µg/g	--	--	--	na	---	2900	3600	4000	4800	3900	5800	5800	8500	6500	6900	10000
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**1.4**	**1.9**	**2.2**	**2.4**	**2.3**	**2**	**2.3**	**1.7**	**1.5**	**2.1**	**2.4**
Barium	µg/g	390	220	6800	3800	---	18	24	26	27	24	36	32	65	34	95	59
Beryllium	µg/g	4	2.5	75	na	---	0.16	0.18	0.2	0.24	0.21	0.15	0.16	0.19	0.17	0.25	0.37
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.04	0.03	0.04	0.06	0.04	0.05	0.05	0.03	0.03	0.31	0.08
Calcium	µg/g	--	--	--	na	---	49000	70000	85000	71000	94000	79000	78000	60000	73000	41000	96000
Chromium	µg/g	160	70	220	28000	---	61	38	43	39	34	**140**	**120**	**160**	**110**	**360**	**160**
Cobalt	µg/g	22	22	--	22	---	3.5	3.6	3.7	4.2	3.7	3.5	3.7	5.2	3.8	3.9	5.7
Copper	µg/g	140	92	1100	na	---	6.9	9	8.9	9.6	9.2	7.5	8.4	15	8.3	30	13
Iron	µg/g	--	--	--	na	---	6800	8100	8100	9800	7900	11000	11000	15000	11000	13000	15000
Lead	µg/g	120	120	61*	na	---	2.1	2.6	3	3.4	3.1	3.2	3.1	2.9	2.7	3.5	4.2
Lithium	µg/g	--	--	--	na	2	6	8	9	10	9	5	6	10	7	7	16
Magnesium	µg/g	--	--	--	na	---	7200	14000	14000	15000	18000	18000	16000	15000	17000	7900	21000
Manganese	µg/g	--	--	--	883**	---	120	190	180	180	190	190	170	210	190	140	220
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.9	0.7	0.6	0.6	0.5	0.5	0.5	0.9	0.5	**2.1**	0.7
Nickel	µg/g	100	82	200	330	---	10	9.3	10	11	9.7	10	9.2	13	10	14	14
Potassium	µg/g	--	--	--	na	---	440	430	560	580	490	1100	1100	2600	1300	960	1900
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	**2.2**	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	39	50	59	54	64	58	53	46	52	37	63
Thallium	µg/g	1	1	1	na	0.02	0.03	0.05	0.04	0.04	0.03	0.04	0.04	0.1	0.05	0.05	0.12
Tin	µg/g	--	--	--	na	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	140	180	180	230	170	600	570	910	670	330	690
Uranium	µg/g	23	2.5	23	23	---	0.39	0.34	0.38	0.51	0.41	0.47	0.46	0.52	0.78	**13**	0.95
Vanadium	µg/g	86	86	--	39	---	13	17	16	18	15	18	17	24	19	22	25
Yttrium	µg/g	--	--	--	na	---	3.1	3.8	4.1	4.8	4	5.2	5	5.1	5.2	6.5	6.4
Zinc	µg/g	340	290	10000	na	---	11	13	15	17	14	34	32	37	25	27	34

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW22-16-02 SA2	MW22-16-02 SA4	MW22-19-01-AS1	MW22-19-01-SA2B	MW22-19-01-SA3	MW22-19-01-SA4	MW22-19-01-SA5	MW22-20-01	MW22-20-01-SA1	MW22-20-01-SA3	MW23-15-1 SA1
							MW22-16-02 SA2-SO_20221205	MW22-16-02 SA4-SO_20221205	MW22-19-01-AS1-SO_20230607	MW22-19-01-SA2B-SO_20230607	MW22-19-01-SA3-SO_20230607	MW22-19-01-SA4-SO_20230607	MW22-19-01-SA5-SO_20230607	MW22-20-01-SO_20230608	MW22-20-01-SA1-SO_20230608	MW22-20-01-SA3-SO_20230608	MW23-15-1 SA1-SO_20230420
							2022-12-05	2022-12-05	2023-06-07	2023-06-07	2023-06-07	2023-06-07	2023-06-07	2023-06-08	2023-06-08	2023-06-08	2023-04-20
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards		Human Health Based Guidelines/Standards		Minimum RDL											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG	Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [(a),(b)]												
Aluminum	µg/g	--	--	--	na	---	6000	42000	10000	8100	7100	4600	10000	20000	2200	24000	22000
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**1.8**	0.9	**4**	**3.9**	**4.8**	**3.4**	**5**	< 0.5	**1.5**	**5.3**	< 0.5
Barium	µg/g	390	220	6800	3800	---	34	**350**	50	20	18	21	20	**230**	36	140	160
Beryllium	µg/g	4	2.5	75	na	---	0.23	1.2	0.4	0.26	0.22	0.18	0.32	0.08	0.1	0.94	0.11
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	0.58	0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	0.23	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.05	0.04	0.04	0.04	0.05	0.05	0.03	0.06	0.22	0.12	0.02
Calcium	µg/g	--	--	--	na	---	71000	3500	89000	81000	140000	100000	120000	880	31000	66000	3500
Chromium	µg/g	160	70	220	28000	---	16	**130**	48	**98**	57	48	**100**	**250**	7.3	67	67
Cobalt	µg/g	22	22	--	22	---	4	**26**	6.4	6.7	6	4.1	6.6	16	0.6	16	12
Copper	µg/g	140	92	1100	na	---	10	35	16	12	11	10	15	49	6.6	32	17
Iron	µg/g	--	--	--	na	---	9700	55000	17000	19000	17000	10000	20000	34000	2600	38000	32000
Lead	µg/g	120	120	61*	na	---	4.3	8.5	5.7	3.8	3.4	3.1	4	6.1	1.5	13	2.7
Lithium	µg/g	--	--	--	na	2	7	83	14	12	12	8	16	23	< 2	39	32
Magnesium	µg/g	--	--	--	na	---	13000	19000	23000	14000	23000	21000	23000	11000	2400	21000	15000
Manganese	µg/g	--	--	--	883**	---	222	471	300	300	330	220	260	440	78	610	470
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	< 0.1	1.4	0.2	0.5	0.4	0.3	0.5	1.6	0.6	0.3	0.2
Nickel	µg/g	100	82	200	330	---	10	**89**	17	21	16	10	23	53	3.7	42	35
Potassium	µg/g	--	--	--	na	---	610	21000	1200	800	720	670	1100	15000	130	5000	16000
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	56	6.5	55	58	84	62	76	4.9	42	56	12
Thallium	µg/g	1	1	1	na	0.02	0.08	0.75	0.1	0.05	0.07	0.05	0.04	0.55	< 0.02	0.24	0.57
Tin	µg/g	--	--	--	na	2	< 2	2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	220	3000	680	850	730	510	970	2300	39	1400	2500
Uranium	µg/g	23	2.5	23	23	---	0.51	**6.2**	0.51	0.72	0.58	0.36	0.74	**2.7**	0.31	1.2	0.79
Vanadium	µg/g	86	86	--	39	---	17	**93**	27	27	26	17	32	**70**	4	**59**	**66**
Yttrium	µg/g	--	--	--	na	---	5.3	6.8	7.2	5.5	5.3	4.8	6.2	6.3	1.7	12	8.8
Zinc	µg/g	340	290	10000	na	---	12	81	27	25	24	16	26	66	8.8	81	63

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW23-15-1 SA2	MW23-15-1 SA3	MW23-16-1 SA1	MW23-16-1 SA2	MW23-16-1 SA3	MW23-17-1 SA3	MW23-17-1 SA4	MW23-17-1 SA5	MW23-17-1 SA7	MW23-17-1 SA8	MW23-17-1 SA9
							MW23-15-1 SA2-SO_20230420	MW23-15-1 SA3-SO_20230420	MW23-16-1 SA1-SO_20230426	MW23-16-1 SA2-SO_20230426	MW23-16-1 SA3-SO_20230426	MW23-17-1 SA3-SO_20230413	MW23-17-1 SA4-SO_20230413	MW23-17-1 SA5-SO_20230413	MW23-17-1 SA7-SO_20230413	MW23-17-1 SA8-SO_20230413	MW23-17-1 SA9-SO_20230413
							2023-04-20	2023-04-20	2023-04-26	2023-04-26	2023-04-26	2023-04-13	2023-04-13	2023-04-13	2023-04-13	2023-04-13	2023-04-13
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards		Human Health Based Guidelines/Standards		Minimum RDL											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG	Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [(a),(b)]												
Aluminum	µg/g	--	--	--	na	---	13000	9700	28000	37000	18000	7000	6400	6400	12000	4600	3300
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	< 0.5	0.6	**1**	0.9	**1**	**2.7**	**3.4**	**3.7**	< 0.5	< 0.5	< 0.5
Barium	µg/g	390	220	6800	3800	---	110	98	120	**390**	**430**	22	22	20	34	25	35
Beryllium	µg/g	4	2.5	75	na	---	0.11	0.11	0.34	0.24	0.29	0.24	0.2	0.18	0.15	0.09	0.07
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	< 0.09	0.13	0.38	0.4	< 0.09	< 0.09	< 0.09	0.17	< 0.09	< 0.09
Cadmium	µg/g	1.2	1.2	14	na	0.02	< 0.02	< 0.02	0.02	0.04	0.08	0.04	0.03	0.03	0.03	< 0.02	< 0.02
Calcium	µg/g	--	--	--	na	---	2800	1800	15000	5600	5100	63000	88000	130000	3400	1400	1500
Chromium	µg/g	160	70	220	28000	---	34	20	**180**	**350**	**110**	25	23	21	41	14	7.5
Cobalt	µg/g	22	22	--	22	---	6.3	4.4	10	**27**	16	5	4.7	5	7.5	2.2	1
Copper	µg/g	140	92	1100	na	---	6.4	8.5	1.5	24	**89**	11	10	12	23	7.9	5.9
Iron	µg/g	--	--	--	na	---	18000	13000	13000	41000	34000	15000	13000	14000	18000	7500	4400
Lead	µg/g	120	120	61*	na	---	5.6	8.4	4.5	4.7	3.7	3.3	2.8	2.7	7.6	8.4	7
Lithium	µg/g	--	--	--	na	2	20	16	39	97	55	12	11	11	19	8	4
Magnesium	µg/g	--	--	--	na	---	7600	5700	14000	30000	12000	17000	19000	17000	5700	1800	890
Manganese	µg/g	--	--	--	883**	---	270	180	140	520	360	380	200	250	310	110	64
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.2	< 0.1	**2.5**	1	1.2	0.3	0.3	0.4	1.4	0.8	0.2
Nickel	µg/g	100	82	200	330	---	19	13	**95**	**210**	54	13	12	11	22	7.2	3.4
Potassium	µg/g	--	--	--	na	---	8500	6100	7300	21000	9300	830	1200	810	7100	3100	2300
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	14	14	97	24	13	40	59	88	8.3	9.3	11
Thallium	µg/g	1	1	1	na	0.02	0.32	0.22	0.23	0.66	0.25	0.05	0.07	0.04	0.46	0.16	0.08
Tin	µg/g	--	--	--	na	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	1300	850	1300	2800	2000	800	790	740	1300	370	150
Uranium	µg/g	23	2.5	23	23	---	0.84	2.4	0.53	1.8	**4**	0.56	0.55	0.46	**6.9**	**5.8**	**3.1**
Vanadium	µg/g	86	86	--	39	---	32	22	27	**85**	**70**	23	21	25	28	9	4
Yttrium	µg/g	--	--	--	na	---	5.7	8	1	5.2	7	5.7	5.2	4.5	3.3	3.5	2.6
Zinc	µg/g	340	290	10000	na	---	38	28	24	73	44	22	21	19	42	14	9.5

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							MW23-18-1 SA1	MW23-18-1 SA2	MW23-18-1 SA3	MW23-18-1 SA4	MW23-18-1 SA5	MW23-18-1 SA6	SA-1 MW22-09(SA-1)	SA-2 MW22-08(SA-2)	SA-2 MW22-10(SA-2)	SA-3 MW22-08(SA-3)	SA-3 MW22-10(SA-3)
							MW23-18-1 SA1-SO_20230423	MW23-18-1 SA2-SO_20230423	MW23-18-1 SA3-SO_20230423	MW23-18-1 SA4-SO_20230424	MW23-18-1 SA5-SO_20230424	MW23-18-1 SA6-SO_20230424	SA-1 MW22-09(SA-1)-SO_20220928	SA-2 MW22-08(SA-2)-SO_20220927	SA-2 MW22-10(SA-2)-SO_20220927	SA-3 MW22-08(SA-3)-SO_20220927	SA-3 MW22-10(SA-3)-SO_20221002
							2023-04-23	2023-04-23	2023-04-23	2023-04-24	2023-04-24	2023-04-24	2022-09-28	2022-09-27	2022-09-27	2022-09-27	2022-10-02
							N	N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards: OREG-153 (T2)/SO/R-P-I/COARSE	Generic Ontario Standards: OREG-153 (T8)/SO/R-P-I-I-C-C	Human Health Based Guidelines/Standards: CCME - HH SQG	Human Health Based Guidelines/Standards: Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]	Minimum RDL											
Aluminum	µg/g	--	--	--	na	---	8000	7600	11000	11000	11000	11000	1500	11000	12000	8500	8300
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**3.6**	**3.8**	**3.7**	**3.1**	**2.7**	**4**	**2.1**	**4**	**3.6**	**3.4**	**3.4**
Barium	µg/g	390	220	6800	3800	---	30	29	100	110	120	110	27	51	62	41	46
Beryllium	µg/g	4	2.5	75	na	---	0.32	0.33	0.66	0.65	0.71	0.69	0.07	0.51	0.48	0.39	0.37
Bismuth	µg/g	--	--	--	na	0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	0.11	0.2	0.2	0.17	0.15
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.04	0.04	0.02	< 0.02	< 0.02	< 0.02	0.11	0.078	0.083	0.082	0.077
Calcium	µg/g	--	--	--	na	---	71000	88000	7800	11000	8900	7400	23000	68000	87000	100000	100000
Chromium	µg/g	160	70	220	28000	---	23	25	22	27	26	23	**111**	59	44	34	44
Cobalt	µg/g	22	22	--	22	---	5.4	5.4	11	12	11	11	1.4	8.7	9.2	6.6	6.6
Copper	µg/g	140	92	1100	na	---	13	21	22	58	62	62	6.1	16	19	13	13
Iron	µg/g	--	--	--	na	---	15000	15000	28000	34000	31000	29000	5100	18000	21000	15000	15000
Lead	µg/g	120	120	61*	na	---	4	4	4.2	4.5	4.2	3.5	2.7	7	6.9	5.7	5.6
Lithium	µg/g	--	--	--	na	2	16	15	46	69	89	89	< 2	21	22	17	17
Magnesium	µg/g	--	--	--	na	---	18000	12000	9200	10000	11000	9400	2500	16000	17000	21000	20000
Manganese	µg/g	--	--	--	883**	---	280	340	460	540	460	420	118	400	370	260	300
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	0.5	0.5	0.7	**5.4**	0.5	0.7	**4**	**2.9**	0.52	0.58	1.9
Nickel	µg/g	100	82	200	330	---	13	13	14	16	15	15	8	22	23	17	17
Potassium	µg/g	--	--	--	na	---	800	1400	7600	8900	8100	7800	300	2100	2100	2000	1800
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	46	55	120	140	120	150	52	62	80	79	85
Thallium	µg/g	1	1	1	na	0.02	0.07	0.1	0.13	0.19	0.22	0.14	< 0.02	0.11	0.11	0.089	0.085
Tin	µg/g	--	--	--	na	2	< 2	< 2	2	< 2	< 2	2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	730	800	1500	1500	1500	1500	73	650	910	540	600
Uranium	µg/g	23	2.5	23	23	---	0.52	0.68	0.79	0.79	1.1	0.81	0.18	0.59	1.2	0.56	1.1
Vanadium	µg/g	86	86	--	39	---	24	26	**54**	**71**	**65**	**59**	4	31	36	25	25
Yttrium	µg/g	--	--	--	na	---	6.9	8.8	9.7	9.1	9	9.5	1.1	8.3	8.6	7.1	7.2
Zinc	µg/g	340	290	10000	na	---	21	24	62	67	63	61	15	37	41	32	31

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 1: Summary of Soil Analytical Results of Metals Parameters

							SA-4 MW22-08 (SA-4)	SA-4 MW22-09(SA-4)	SA-4 MW22-10(SA-4)	SA-5 MW22-09(SA-5)	SA-5 MW22-10(SA-5)	SA-6 MW22-08(SA-6)	SA-6 MW22-09(SA-6)	SA-6 MW22-10(SA-6)	SA-7 MW22-09(SA-7)	SA-8 MW22-08(SA-8)
							SA-4 MW22-08 (SA-4)-SO_20220927	SA-4 MW22-09(SA-4)-SO_20220928	SA-4 MW22-10(SA-4)-SO_20221002	SA-5 MW22-09(SA-5)-SO_20220928	SA-5 MW22-10(SA-5)-SO_20221002	SA-6 MW22-08(SA-6)-SO_20220927	SA-6 MW22-09(SA-6)-SO_20220928	SA-6 MW22-10(SA-6)-SO_20221002	SA-7 MW22-09(SA-7)-SO_20220928	SA-8 MW22-08(SA-8)-SO_20220927
							2022-09-27	2022-09-28	2022-10-02	2022-09-28	2022-10-02	2022-09-27	2022-09-28	2022-10-02	2022-09-28	2022-09-27
							N	N	N	N	N	N	N	N	N	N
							T	T	T	T	T	T	T	T	T	T
Parameter	Units	Generic Ontario Standards: OREG-153 (T2)/SO/R-P-I/COARSE	Generic Ontario Standards: OREG-153 (T8)/SO/R-P-I-I-C-C	Human Health Based Guidelines/Standards: CCME - HH SQG	Human Health Based Guidelines/Standards: Component S1 OREG-153 (T2)/SO/R-P-I/COARSE [a],[b]	Minimum RDL										
Aluminum	µg/g	--	--	--	na	---	8200	9200	9200	6000	4500	6200	5600	4300	5900	6200
Antimony	µg/g	7.5	1.3	--	na	6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Arsenic	µg/g	18	18	12	0.95	0.5	**3**	**2.8**	**3.8**	**2.2**	**1.7**	**3.5**	**2.5**	**1.6**	**2.3**	**2.8**
Barium	µg/g	390	220	6800	3800	---	47	47	49	33	21	38	29	21	32	34
Beryllium	µg/g	4	2.5	75	na	---	0.36	0.35	0.44	0.27	0.19	0.3	0.24	0.17	0.26	0.29
Bismuth	µg/g	--	--	--	na	0.09	0.14	0.17	0.18	0.11	< 0.09	0.13	0.1	< 0.09	0.11	0.11
Cadmium	µg/g	1.2	1.2	14	na	0.02	0.061	0.06	0.079	0.07	0.046	0.065	0.07	0.038	0.06	0.074
Calcium	µg/g	--	--	--	na	---	110000	100000	110000	130000	110000	110000	130000	100000	130000	130000
Chromium	µg/g	160	70	220	28000	---	53	69	36	60	50	35	51	52	41	40
Cobalt	µg/g	22	22	--	22	---	6.2	7.3	7.5	5.3	4.3	5.8	5.1	3.8	5.3	5.8
Copper	µg/g	140	92	1100	na	---	12	15	14	11	9.2	11	11	8.7	11	12
Iron	µg/g	--	--	--	na	---	14000	16000	17000	13000	11000	13000	13000	10000	13000	13000
Lead	µg/g	120	120	61*	na	---	5.2	5.5	6.5	3.9	3	4.6	3.6	2.5	4	4.4
Lithium	µg/g	--	--	--	na	2	16	16	19	12	10	14	12	8.8	12	14
Magnesium	µg/g	--	--	--	na	---	20000	21000	21000	23000	21000	23000	23000	17000	25000	23000
Manganese	µg/g	--	--	--	883**	---	280	275	310	259	220	280	320	200	274	280
Mercury	µg/g	0.27	0.27	6.6	na	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/g	6.9	2	--	110	0.1	**2.8**	**3.4**	0.59	1.9	**3.1**	0.93	**2.9**	1.9	1.1	1.8
Nickel	µg/g	100	82	200	330	---	16	19	19	14	11	14	13	9.4	13	15
Potassium	µg/g	--	--	--	na	---	2100	1800	2200	1400	800	1600	1200	840	1300	1400
Selenium	µg/g	2.4	1.5	80	110	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silver	µg/g	20	0.5	--	na	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Sodium	µg/g	--	--	--	na	---	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	na	---	88	77	84	90	73	90	89	71	88	92
Thallium	µg/g	1	1	1	na	0.02	0.082	0.09	0.092	0.06	0.04	0.072	0.05	0.039	0.05	0.061
Tin	µg/g	--	--	--	na	2	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Titanium	µg/g	--	--	--	na	---	570	706	600	556	510	480	513	520	583	550
Uranium	µg/g	23	2.5	23	23	---	0.96	0.84	0.72	0.62	0.57	0.72	0.64	0.54	0.65	0.7
Vanadium	µg/g	86	86	--	39	---	25	28	28	21	18	21	22	17	23	22
Yttrium	µg/g	--	--	--	na	---	6.8	7.4	7.5	6	5.4	6.3	5.5	4.8	5.8	6.1
Zinc	µg/g	340	290	10000	na	---	29	35	37	24	19	27	23	16	24	26

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutiona
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Inc
Component S1 OREG-153 (T2)/SO/R-P-I/COARSE: Component S1 (Human Direct Soil Contact) of Ontario Ministry of Environment F
(a) Only applied if there is an exceedance of generic standards
(b) Other human health relevant component values for Ontario soil standards (i.e. S-GW1 [soil to groundwater used as drinking water]
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction N: Organic or Other Constituents
Fraction T: Total [Metal] Concentration
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
** Value calculated from Tolerable Daily Intake of 0.047 mg/Kg/day from Ontario Ministry of Environment, Conservation and Parks Tol
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

Parameter	Units	Human Health Based Guidelines/Standards: CDWQ MAC	Human Health Based Guidelines/Standards: OREG 169/03 DWQ	Human Health Based Guidelines/Standards: Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	Other Guidelines: CDWQ AO	Max Concentration	Location	M22S008-GEOCHEM	M22S011-GEOCHEM	M22S028-GEOCHEM	M22S032-GEOCHEM	M22S044-GEOCHEM	M22S055-GEOCHEM	M22S096-GEOCHEM	M22S127-GEOCHEM	M22S154-GEOCHEM	M22S156-GEOCHEM	M22S161-GEOCHEM
							Sample ID	M22S008-GEOCHEM-SO_20220605	M22S011-GEOCHEM-SO_20220604	M22S028-GEOCHEM-SO_20220604	M22S032-GEOCHEM-SO_20220606	M22S044-GEOCHEM-SO_20220604	M22S055-GEOCHEM-SO_20220606	M22S096-GEOCHEM-SO_20220606	M22S127-GEOCHEM-SO_20220605	M22S154-GEOCHEM-SO_20220606	M22S156-GEOCHEM-SO_20220605	M22S161-GEOCHEM-SO_20220606
							Date	2022-06-05	2022-06-04	2022-06-04	2022-06-06	2022-06-04	2022-06-06	2022-06-06	2022-06-05	2022-06-06	2022-06-05	2022-06-06
							Sample type	N	N	N	N	N	N	N	N	N	N	N
							Fraction	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Aluminum	mg/L	2.9	--	na	--	**6.53**	0.136	1.53	0.095	0.179	0.94	0.016	0.423	0.123	0.237	0.177	0.2
Antimony	mg/L	0.006	0.006	na	--	0.0026	0.0014	< 0.0009	< 0.0009	< 0.0009	0.0011	0.0013	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic	mg/L	0.01	0.01	na	--	**0.303**	**0.0142**	0.0084	**0.29**	**0.259**	**0.303**	**0.0591**	**0.0167**	0.0024	**0.0193**	**0.183**	**0.0605**
Barium	mg/L	2	1	na	--	0.115	0.0151	0.0115	0.00991	0.0158	0.0102	0.0205	0.011	0.0188	0.0176	0.00632	0.00569
Beryllium	mg/L	--	--	0.004	--	0.000643	0.00001	0.00002	< 0.000007	0.000008	0.00003	0.000008	0.00002	0.00002	0.00002	0.00008	0.000011
Bismuth	mg/L	--	--	na	--	0.00003	0.00001	0.00001	< 0.00001	0.00001	0.00001	< 0.00001	< 0.00001	0.00001	0.00003	0.00001	< 0.00001
Boron	mg/L	5	5	na	--	1.93	0.289	1.56	0.725	0.816	0.546	0.009	0.473	0.33	1.93	1.61	0.503
Cadmium	mg/L	0.007	0.005	na	--	0.00022	0.0001	0.00004	0.00004	0.000055	0.00004	0.000019	0.000033	0.00018	0.00009	0.00022	0.00001
Calcium	mg/L	--	--	na	--	139	44.1	7.91	51.8	54	13.4	139	26.2	50.3	17.3	19	33.5
Chromium	mg/L	0.05	0.05	0.025	--	0.0168	0.00078	0.00435	0.00231	0.00252	0.00259	0.00031	0.00374	0.0024	0.00277	0.0168	0.00162
Cobalt	mg/L	--	--	0.003	--	**0.0069**	0.00061	0.00069	0.0002	0.000264	0.00103	0.000414	0.000193	0.00026	0.00054	0.00051	0.000124
Copper	mg/L	2	--	na	--	0.103	0.009	0.0094	0.0064	0.0035	0.0063	0.0083	0.0077	0.0051	0.0037	0.003	0.0058
Iron	mg/L	--	--	na	0.1	10.3	0.59	0.9	0.15	0.277	1.12	0.015	0.286	0.1	0.37	0.22	0.13
Lead	mg/L	0.005	0.01	na	--	**0.007**	0.00037	0.00042	0.00009	0.00295	0.00045	< 0.00009	0.0003	0.0001	0.00026	0.00016	0.00027
Lithium	mg/L	--	--	na	--	0.0778	0.0014	0.0016	0.0012	0.003	0.0013	0.0005	0.0043	0.0004	< 0.0001	0.003	0.0019
Magnesium	mg/L	--	--	na	--	16.4	3.57	2.08	8.61	8.24	2.5	16.4	3.12	8.38	3.48	3.47	4.47
Manganese	mg/L	--	--	na	0.12	0.339	0.0226	0.0329	0.00123	0.0255	0.231	0.131	0.00889	0.0122	0.0187	0.00215	0.00176
Mercury	mg/L	0.001	0.001	na	--	0.00004	< 0.00001	0.00001	0.00002	0.00003	0.00001	0.00003	0.00002	0.00002	0.00003	< 0.00001	0.00002
Molybdenum	mg/L	--	--	0.07	--	0.0423	0.00726	0.00083	0.00084	0.00201	0.0005	0.00141	0.0413	0.00119	0.00105	0.00132	0.00116
Nickel	mg/L	--	--	0.1	--	0.0232	0.0029	0.0029	0.0014	0.0017	0.0029	0.0026	0.0012	0.0023	0.0019	0.0056	0.0011
Potassium	mg/L	--	--	na	--	22.1	1.56	1.42	1	2.59	0.52	0.845	1.34	1.89	2.41	3.47	0.547
Selenium	mg/L	0.05	0.05	na	--	0.00805	0.00044	0.00043	0.00075	0.00027	0.00096	0.00229	0.00066	0.00075	0.00063	0.00118	0.00092
Silicon	mg/L	--	--	na	--	28	2.74	7.28	7.03	9.27	8.08	4.91	8.87	2.45	12.7	16.6	9.76
Silver	mg/L	--	--	na	--	0.00093	< 0.00005	< 0.00005	< 0.00005	0.00008	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00007	0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	53.1	8.43	25	39.2	26.4	19.8	1.84	53.1	7.32	34.7	45.8	32.7
Strontium	mg/L	7	--	na	--	0.377	0.0448	0.00812	0.04549	0.041	0.02133	0.119	0.0582	0.038	0.0157	0.024	0.0286
Thallium	mg/L	--	--	0.002	--	0.000119	< 0.000005	0.00001	< 0.000005	0.000015	< 0.000005	< 0.000005	0.000007	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L	--	--	na	--	0.00155	0.00037	0.00014	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00015	0.00035	0.00008
Titanium	mg/L	--	--	na	--	0.148	0.00707	0.0611	0.00316	0.0203	0.0384	0.00204	0.0244	0.00498	0.00847	0.0098	0.00991
Tungsten	mg/L	--	--	na	--	0.00487	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.0173	0.00211	0.00012	0.00143	0.000342	0.00025	0.00221	0.000741	0.00056	0.00009	0.00009	0.000364
Vanadium	mg/L	--	--	0.0062	--	**0.048**	0.00186	0.00287	0.00092	0.00256	0.00253	0.00083	**0.00773**	0.00067	0.00106	0.00116	0.0023
Yttrium	mg/L	--	--	na	--	0.00184	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	--	--	5	5	0.04	0.027	0.007	0.003	< 0.002	0.005	< 0.002	0.004	< 0.002	0.004	0.017	0.004

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						M22S258-GEOCHEM	M22S283-GEOCHEM	M22SAD1-GEOCHEM	MW22-01-1 SS8	MW22-01-2 SS4	MW22-01-2 SS6	MW22-02-1 SS5	MW22-02-1 SS6	MW22-02-1 SS7	MW22-02-1 SS8	MW22-03-1 SS3	MW22-03-1 SS4
						M22S258-GEOCHEM-SO_20220604	M22S283-GEOCHEM-SO_20220604	M22SAD1-GEOCHEM-SO_20220605	MW22-01-1 SS8-SO_20220909	MW22-01-2 SS4-SO_20220909	MW22-01-2 SS6-SO_20220909	MW22-02-1 SS5-SO_20220912	MW22-02-1 SS6-SO_20220912	MW22-02-1 SS7-SO_20220912	MW22-02-1 SS8-SO_20220912	MW22-03-1 SS3-SO_20220913	MW22-03-1 SS4-SO_20220913
						2022-06-04	2022-06-04	2022-06-05	2022-09-09	2022-09-09	2022-09-09	2022-09-12	2022-09-12	2022-09-12	2022-09-12	2022-09-13	2022-09-13
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.158	1.34	0.348	0.082	0.265	0.157	0.044	0.041	0.096	0.059	0.537	1.2
Antimony	mg/L	0.006	0.006	na	--	< 0.0009	0.0011	< 0.0009	0.0011	< 0.0009	< 0.0009	< 0.0009	0.0013	0.0023	0.0013	< 0.0009	0.001
Arsenic	mg/L	0.01	0.01	na	--	**0.0526**	**0.0352**	**0.162**	0.0028	0.0034	0.0023	0.0012	0.0012	0.0022	0.0022	0.001	0.0009
Barium	mg/L	2	1	na	--	0.0193	0.0166	0.00983	0.0122	0.0183	0.00261	0.00421	0.0172	0.0149	0.0189	0.0135	0.0204
Beryllium	mg/L	--	--	0.004	--	0.00001	0.00001	< 0.000007	< 0.000007	0.000014	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000019	0.000043
Bismuth	mg/L	--	--	na	--	0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002	0.00002
Boron	mg/L	5	5	na	--	1.42	1.17	0.408	0.019	0.032	0.016	0.011	0.017	0.015	0.013	0.022	0.028
Cadmium	mg/L	0.007	0.005	na	--	0.00003	0.00003	0.00006	0.000005	0.000024	< 0.000003	0.000004	< 0.000003	0.000005	0.000005	0.000009	0.000012
Calcium	mg/L	--	--	na	--	58.6	12.8	40.3	16.6	30.7	10.3	14.3	20.8	18	20.1	27.8	36.1
Chromium	mg/L	0.05	0.05	0.025	--	0.00316	0.00659	0.00244	0.00027	0.00089	0.00022	0.00305	0.00026	0.00037	0.00032	0.00257	0.00288
Cobalt	mg/L	--	--	0.003	--	0.00024	0.00113	0.00045	0.000032	0.000227	0.000018	0.000029	0.000043	0.000053	0.000051	0.000354	0.000743
Copper	mg/L	2	--	na	--	0.0107	0.0095	0.0042	0.0015	0.0051	0.0008	0.001	0.002	0.0019	0.0025	0.0066	0.0089
Iron	mg/L	--	--	na	0.1	0.12	0.88	0.37	0.012	0.198	0.008	0.014	0.013	0.034	0.023	0.352	0.95
Lead	mg/L	0.005	0.01	na	--	0.00031	0.0004	0.00036	< 0.00009	0.00015	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00021	0.00057
Lithium	mg/L	--	--	na	--	0.0029	0.0033	0.0008	0.0033	0.0045	0.0016	0.0028	0.0067	0.0102	0.0048	0.0051	0.0089
Magnesium	mg/L	--	--	na	--	9.61	2.25	2.17	3.4	5.28	2.12	3.01	3.58	3.22	3.34	3.42	5.12
Manganese	mg/L	--	--	na	0.12	0.00189	0.00758	0.00758	0.00462	0.0257	0.00103	0.00071	0.0143	0.00882	0.00842	0.0306	0.0669
Mercury	mg/L	0.001	0.001	na	--	0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Molybdenum	mg/L	--	--	0.07	--	0.00066	0.00068	0.00135	0.0101	0.0064	0.00414	0.0137	0.00339	0.0047	0.00816	0.00698	0.00629
Nickel	mg/L	--	--	0.1	--	0.0025	0.0044	0.0015	0.0008	0.0044	0.0002	0.0003	0.0005	0.0007	0.0009	0.0074	0.007
Potassium	mg/L	--	--	na	--	1.47	6.36	0.9	3.71	3.33	2.13	1.93	3.72	3.36	4.21	1.78	2.3
Selenium	mg/L	0.05	0.05	na	--	0.00087	0.00111	0.00085	0.00054	0.00282	0.00088	0.00017	0.00056	0.00054	0.00065	0.00055	0.0005
Silicon	mg/L	--	--	na	--	12	10.7	2.56	3	6.13	3.57	4.24	2.8	3.08	2.94	6.31	8.98
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	52.8	52	18.9	1.7	2.07	1.4	1.08	1.39	1.39	1.48	3.8	3.36
Strontium	mg/L	7	--	na	--	0.06275	0.01752	0.031	0.0375	0.035	0.0173	0.0174	0.0303	0.0296	0.0324	0.0402	0.0516
Thallium	mg/L	--	--	0.002	--	< 0.000005	< 0.000005	< 0.000005	0.000007	< 0.000005	0.000015	< 0.000005	0.000005	0.000005	0.000007	< 0.000005	0.000009
Tin	mg/L	--	--	na	--	< 0.00006	0.00017	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00013	0.00007
Titanium	mg/L	--	--	na	--	0.0104	0.071	0.0292	0.00063	0.0133	0.00022	0.00064	0.00083	0.00175	0.00125	0.0214	0.0591
Tungsten	mg/L	--	--	na	--	-	-	-	0.00487	0.00041	0.00053	0.00041	0.00067	0.00037	0.00041	0.00006	0.00005
Uranium	mg/L	0.02	0.02	na	--	0.00191	0.00015	0.00032	0.0016	0.000405	0.000583	0.000706	0.00168	0.00222	0.00276	0.000548	0.000525
Vanadium	mg/L	--	--	0.0062	--	0.00178	**0.0114**	0.00148	**0.0084**	0.00331	0.00465	0.0013	0.00508	0.00573	0.00577	0.00207	0.00347
Yttrium	mg/L	--	--	na	--	-	-	-	< 0.00002	0.00013	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00015	0.00053
Zinc	mg/L	--	--	5	5	0.003	0.004	0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	0.004

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW22-03-1 SS5	MW22-03-1 SS6	MW22-04-1 SS10	MW22-04-1 SS6	MW22-04-1 SS7	MW22-04-1 SS8	MW22-05 SA-1	MW22-05 SA-2	MW22-05 SA-4	MW22-05 SA-6	MW22-05 SA-7	MW22-06 SA-1
						MW22-03-1 SS5-SO_20220913	MW22-03-1 SS6-SO_20220913	MW22-04-1 SS10-SO_20220916	MW22-04-1 SS6-SO_20220916	MW22-04-1 SS7-SO_20220916	MW22-04-1 SS8-SO_20220916	MW22-05 SA-1-SO_20220922	MW22-05 SA-2-SO_20220922	MW22-05 SA-4-SO_20220922	MW22-05 SA-6-SO_20220922	MW22-05 SA-7-SO_20220922	MW22-06 SA-1-SO_20220923
						2022-09-13	2022-09-13	2022-09-16	2022-09-16	2022-09-16	2022-09-16	2022-09-22	2022-09-22	2022-09-22	2022-09-22	2022-09-22	2022-09-23
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	1.94	0.121	0.199	0.243	0.238	0.321	0.053	0.042	0.059	0.23	0.103	0.071
Antimony	mg/L	0.006	0.006	na	--	< 0.0009	0.0022	< 0.0009	< 0.0009	0.0011	0.0011	0.0009	< 0.0009	< 0.0009	0.0013	0.0011	< 0.0009
Arsenic	mg/L	0.01	0.01	na	--	0.0014	0.0032	0.0019	0.0013	0.0017	0.0012	0.0008	0.0007	0.0011	0.0024	0.0024	0.0016
Barium	mg/L	2	1	na	--	0.0266	0.0116	0.00345	0.00358	0.00343	0.00503	0.00339	0.0038	0.00408	0.00859	0.00565	0.00628
Beryllium	mg/L	--	--	0.004	--	0.000088	< 0.000007	< 0.000007	0.000009	0.000007	< 0.000007	0.000045	0.000019	0.000029	0.000016	0.000043	0.000019
Bismuth	mg/L	--	--	na	--	0.00003	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/L	5	5	na	--	0.185	0.014	0.01	0.014	0.01	0.013	0.014	0.014	0.017	0.085	0.084	0.011
Cadmium	mg/L	0.007	0.005	na	--	0.000008	0.000006	< 0.000003	0.000005	0.000003	0.000008	0.000031	0.000042	0.000065	0.000095	0.000119	0.000034
Calcium	mg/L	--	--	na	--	19.9	19.1	10.5	13.8	11	11.5	15.7	15.3	12.6	18.1	15.3	51.7
Chromium	mg/L	0.05	0.05	0.025	--	0.00635	0.00035	0.00082	0.0009	0.00097	0.00134	0.00327	0.00368	0.00149	0.0019	0.00144	0.00056
Cobalt	mg/L	--	--	0.003	--	0.0013	0.000086	0.000115	0.000104	0.000096	0.000107	0.000065	0.000043	0.000048	0.000144	0.000113	0.000284
Copper	mg/L	2	--	na	--	0.0107	0.004	0.0018	0.0025	0.0015	0.0018	0.0022	0.0016	0.0014	0.0038	0.003	0.0056
Iron	mg/L	--	--	na	0.1	1.81	0.047	0.17	0.207	0.147	0.266	0.022	0.016	0.024	0.151	0.09	0.034
Lead	mg/L	0.005	0.01	na	--	0.00117	< 0.00009	0.00014	0.00015	0.00011	0.00016	< 0.00009	< 0.00009	< 0.00009	0.00014	0.00012	< 0.00009
Lithium	mg/L	--	--	na	--	0.0105	0.0036	0.001	0.0005	0.0022	0.0021	0.0028	0.0014	0.0018	0.0032	0.0025	< 0.0001
Magnesium	mg/L	--	--	na	--	3.25	2.33	1.5	2.05	1.67	1.98	1.77	1.69	1.4	2.09	1.74	2.07
Manganese	mg/L	--	--	na	0.12	0.0494	0.00925	0.00376	0.00255	0.00383	0.00348	0.00825	0.0037	0.001	0.00508	0.00321	0.03919
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002
Molybdenum	mg/L	--	--	0.07	--	0.00481	0.00543	0.00202	0.00496	0.00564	0.00766	0.0185	0.013	0.00613	0.00844	0.00626	0.00114
Nickel	mg/L	--	--	0.1	--	0.0074	0.0012	0.0013	0.001	0.0011	0.0013	0.0007	0.0005	0.0006	0.001	0.0007	0.0008
Potassium	mg/L	--	--	na	--	2.4	2.32	0.848	0.974	1.06	1.17	0.969	0.756	1.07	1.86	1.42	0.912
Selenium	mg/L	0.05	0.05	na	--	0.00089	0.00805	0.00023	0.00012	0.0001	0.00008	0.00058	0.0009	0.00113	0.00286	0.00276	0.00091
Silicon	mg/L	--	--	na	--	8.31	3.55	3.47	3.17	3.22	4.19	1.46	1.55	1.53	1.32	1.33	1.53
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	30.8	0.99	0.51	1.13	1.06	0.89	0.77	0.73	0.79	7.77	6.86	0.84
Strontium	mg/L	7	--	na	--	0.0312	0.0262	0.00879	0.0134	0.0134	0.0116	0.0157	0.0135	0.0138	0.0236	0.0196	0.0477
Thallium	mg/L	--	--	0.002	--	0.000015	0.000009	0.000005	0.000005	< 0.000005	< 0.000005	0.000007	< 0.000005	0.000006	0.000005	0.000009	0.000007
Tin	mg/L	--	--	na	--	0.00007	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Titanium	mg/L	--	--	na	--	0.09	0.00382	0.00579	0.00935	0.00533	0.0104	0.00133	0.00129	0.00193	0.0165	0.00736	0.00224
Tungsten	mg/L	--	--	na	--	0.00032	0.00182	0.00019	0.00019	0.00031	0.00034	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.000899	0.0173	0.00048	0.0002	0.00103	0.000977	0.000331	0.000473	0.00032	0.00893	0.00591	0.000526
Vanadium	mg/L	--	--	0.0062	--	**0.00684**	**0.0124**	0.00194	0.00116	0.00161	0.00166	0.00079	0.00105	0.00096	0.00457	0.00302	0.00047
Yttrium	mg/L	--	--	na	--	0.0007	0.00003	0.00007	0.00014	0.00005	0.00009	-	-	-	-	-	-
Zinc	mg/L	--	--	5	5	0.008	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW22-06 SA-4	MW22-06 SA-7	MW22-06 SA-8	MW22-06 SA-9	MW22-07 SA-1	MW22-07 SA-2	MW22-07 SA-4	MW22-07 SA-6	MW22-07 SA-8	MW22-11-1 SS3	MW22-11-1 SS4	MW22-11-1 SS5
						MW22-06 SA-4-SO_20220923	MW22-06 SA-7-SO_20220923	MW22-06 SA-8-SO_20220923	MW22-06 SA-9-SO_20220923	MW22-07 SA-1-SO_20220925	MW22-07 SA-2-SO_20220925	MW22-07 SA-4-SO_20220925	MW22-07 SA-6-SO_20220925	MW22-07 SA-8-SO_20220925	MW22-11-1 SS4-SO_20221014	MW22-11-1 SS5-SO_20221014	MW22-12-1 SS11-SO_20221118
						2022-09-23	2022-09-23	2022-09-23	2022-09-23	2022-09-25	2022-09-25	2022-09-25	2022-09-25	2022-09-25	2022-10-14	2022-10-14	2022-11-18
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.369	0.41	0.367	0.345	0.093	0.092	0.172	0.19	0.121	0.259	0.439	0.376
Antimony	mg/L	0.006	0.006	na	--	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	0.0017	0.001	0.0011	< 0.0009
Arsenic	mg/L	0.01	0.01	na	--	0.0023	0.0024	0.0023	0.002	0.0027	0.0014	0.0026	0.0015	0.0026	0.0068	0.0089	0.0021
Barium	mg/L	2	1	na	--	0.00227	0.00466	0.00224	0.00254	0.0159	0.00244	0.00204	0.00352	0.0191	0.0117	0.00865	0.0124
Beryllium	mg/L	--	--	0.004	--	0.000011	0.000032	0.000037	0.000034	0.000071	0.000014	0.000012	0.000037	0.000029	0.00006	0.000026	0.000012
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001
Boron	mg/L	5	5	na	--	0.026	0.018	0.059	0.024	0.038	0.008	0.015	0.058	0.174	0.152	0.139	0.223
Cadmium	mg/L	0.007	0.005	na	--	0.000087	0.00004	0.000096	0.000028	0.000066	0.00003	0.000099	0.000095	0.000022	0.00022	0.000022	0.000003
Calcium	mg/L	--	--	na	--	10.9	10.3	9.88	10.2	55.5	12.6	10.6	10.6	22.6	36.1	19.5	20.5
Chromium	mg/L	0.05	0.05	0.025	--	0.00075	0.00086	0.00161	0.00229	0.00124	0.00054	0.00088	0.00224	0.0012	0.00133	0.00127	0.00078
Cobalt	mg/L	--	--	0.003	--	0.000034	0.000026	0.000035	0.000021	0.000759	0.000069	0.000067	0.000092	0.000118	0.00013	0.000664	0.000146
Copper	mg/L	2	--	na	--	0.0015	0.002	0.0008	0.0011	0.0046	0.0022	0.001	0.0013	0.0043	0.0029	0.0059	0.0021
Iron	mg/L	--	--	na	0.1	< 0.007	< 0.007	< 0.007	< 0.007	0.055	0.037	0.023	0.142	0.091	0.25	0.459	0.239
Lead	mg/L	0.005	0.01	na	--	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00011	< 0.00009	0.00031	0.00097	0.00012
Lithium	mg/L	--	--	na	--	0.0012	0.001	0.0014	0.0013	< 0.0001	0.0002	0.0007	0.0008	0.006	0.0011	0.0016	0.0029
Magnesium	mg/L	--	--	na	--	1.67	1.36	1.18	1.18	3.34	1.56	0.992	1.08	4.3	3.15	2.28	2.66
Manganese	mg/L	--	--	na	0.12	0.00079	0.00079	0.00056	0.00071	0.0291	0.00137	0.00109	0.00174	0.00279	0.0121	0.015	0.0062
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Molybdenum	mg/L	--	--	0.07	--	0.00221	0.00386	0.00285	0.0085	0.0015	0.00175	0.00173	0.00519	0.0083	0.0423	0.02	0.00455
Nickel	mg/L	--	--	0.1	--	0.0004	0.0003	0.0004	0.0004	0.0014	0.0007	0.0007	0.0006	0.0011	0.0007	0.0019	0.0007
Potassium	mg/L	--	--	na	--	1.42	1.3	1.12	1.06	0.727	0.445	0.712	0.703	3.99	0.83	0.617	1.04
Selenium	mg/L	0.05	0.05	na	--	0.00065	0.00043	0.00118	0.00031	0.00106	0.00049	0.00103	0.00048	0.00128	0.00096	0.00057	0.00048
Silicon	mg/L	--	--	na	--	1.84	1.28	1.76	1.23	1.6	2.01	2.16	2.17	2.02	28	2.47	3.84
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	1.53	0.94	0.75	0.76	0.83	0.91	0.77	12.6	11.7	13.5	14.1	9.52
Strontium	mg/L	7	--	na	--	0.0193	0.0162	0.014	0.0143	0.0464	0.0147	0.016	0.0123	0.122	0.0394	0.0217	0.0208
Thallium	mg/L	--	--	0.002	--	0.000011	0.000013	0.000012	0.000012	0.00001	0.000006	0.00001	0.000014	0.00001	< 0.000005	0.00001	< 0.000005
Tin	mg/L	--	--	na	--	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00155	< 0.00006	< 0.00006
Titanium	mg/L	--	--	na	--	0.0012	0.00069	0.00147	0.00072	0.00332	0.00323	0.0025	0.00793	0.00442	< 0.00005	0.0136	0.0178
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.000225	0.000208	0.000165	0.000185	0.000447	0.000164	0.000178	0.000106	0.00245	0.00141	0.00584	0.000799
Vanadium	mg/L	--	--	0.0062	--	0.00342	0.0032	0.00271	0.00214	0.00054	0.00312	0.00233	0.00162	0.00544	0.0048	**0.00705**	0.00272
Yttrium	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	--	--	5	5	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	0.012	0.003	< 0.002

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW22-12-1 SS11	MW22-12-1 SS12	MW22-12-1 SS4	MW22-12-1 SS6	MW22-13-1 SS10	MW22-13-1 SS5	MW22-13-1 SS6	MW22-13-1 SS8	MW22-14-1 SS3	MW22-14-1 SS5	MW22-14-1 SS7	MW22-14-1 SS8	MW22-15-1 SS2
						MW22-12-1 SS12-SO_20221118	MW22-12-1 SS4-SO_20221117	MW22-12-1 SS6-SO_20221117	MW22-13-1 SS10-SO_20221122	MW22-13-1 SS5-SO_20221121	MW22-13-1 SS6-SO_20221122	MW22-13-1 SS8-SO_20221122	MW22-14-1 SS3-SO_20221125	MW22-14-1 SS5-SO_20221125	MW22-14-1 SS7-SO_20221125	MW22-14-1 SS8-SO_20221125	MW22-15-1 SS2-SO_20221202	
						2022-11-18	2022-11-17	2022-11-17	2022-11-22	2022-11-21	2022-11-22	2022-11-22	2022-11-25	2022-11-25	2022-11-25	2022-11-25	2022-12-02	
						N	N	N	N	N	N	N	N	N	N	N	N	
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines													
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [a]	CDWQ AO													
Aluminum	mg/L	2.9	--	na	--	0.198	1.46	0.152	1.27	2.26	1.52	1.52	0.416	0.274	0.283	0.383	0.156	
Antimony	mg/L	0.006	0.006	na	--	0.0011	< 0.0009	< 0.0009	< 0.0009	0.0013	0.0011	0.0012	0.0012	0.0009	< 0.0009	< 0.0009	< 0.0009	
Arsenic	mg/L	0.01	0.01	na	--	0.0017	**0.0137**	0.0007	0.0044	0.0043	0.004	0.0056	0.0028	0.0015	0.0015	0.0008	0.0007	
Barium	mg/L	2	1	na	--	0.0186	0.0164	0.0265	0.0131	0.0189	0.0161	0.0157	0.00538	0.00475	0.00487	0.00579	0.00327	
Beryllium	mg/L	--	--	0.004	--	0.000009	0.000045	0.00001	0.000057	0.000098	0.000048	0.000052	0.000012	0.000008	0.00001	0.000017	< 0.000007	
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	< 0.00001	0.00001	0.00002	0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Boron	mg/L	5	5	na	--	0.271	0.522	0.164	0.1	0.164	0.271	0.271	0.099	0.127	0.113	0.125	0.004	
Cadmium	mg/L	0.007	0.005	na	--	< 0.000003	0.000008	0.000004	0.000013	0.000017	< 0.000003	0.000015	< 0.000003	0.000003	0.000011	< 0.000003	< 0.000003	
Calcium	mg/L	--	--	na	--	22.5	16.2	39.5	13.8	14.9	18.5	15.6	10.6	10.9	11.2	11.9	14.3	
Chromium	mg/L	0.05	0.05	0.025	--	0.00087	0.00332	0.00063	0.00348	0.00561	0.00386	0.00354	0.00092	0.00095	0.00097	0.00086	0.00024	
Cobalt	mg/L	--	--	0.003	--	0.000087	0.000572	0.000096	0.000745	0.001509	0.000691	0.000737	0.000097	0.000054	0.000075	0.00011	0.000043	
Copper	mg/L	2	--	na	--	0.003	0.0035	0.0018	0.0055	0.0162	0.0078	0.0061	0.0013	0.0008	0.001	0.0014	0.0013	
Iron	mg/L	--	--	na	0.1	0.136	1.08	0.088	1.29	2.27	1.34	1.38	0.314	0.211	0.215	0.298	0.042	
Lead	mg/L	0.005	0.01	na	--	< 0.00009	0.00076	< 0.00009	0.00115	0.00255	0.00111	0.00094	0.00013	0.00009	0.00012	0.00014	< 0.00009	
Lithium	mg/L	--	--	na	--	0.0055	0.0058	0.0044	0.0032	0.0027	0.0029	0.0032	0.0036	0.0043	0.0041	0.004	0.0012	
Magnesium	mg/L	--	--	na	--	4.26	3.12	5.32	1.95	1.78	2.33	2.1	2.23	2.57	2.61	2.82	2.08	
Manganese	mg/L	--	--	na	0.12	0.00971	0.0146	0.0319	0.0187	0.0285	0.022	0.0219	0.0029	0.00165	0.00195	0.0024	0.00156	
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Molybdenum	mg/L	--	--	0.07	--	0.00632	0.00376	0.0125	0.00239	0.00584	0.00721	0.00589	0.00343	0.0086	0.00732	0.00988	0.00446	
Nickel	mg/L	--	--	0.1	--	0.0013	0.0022	0.0009	0.0028	0.0048	0.0027	0.0029	0.0007	0.0006	0.0007	0.0006	0.0005	
Potassium	mg/L	--	--	na	--	3.26	1.68	1.56	1.1	0.927	1.24	1.26	0.587	0.819	0.7	0.716	1.08	
Selenium	mg/L	0.05	0.05	na	--	0.00073	0.00062	0.0006	0.00054	0.00078	0.00073	0.00068	0.00004	0.00006	0.00007	0.00012	< 0.00004	
Silicon	mg/L	--	--	na	--	3.96	9.24	2.25	3.84	4.33	5.72	5.67	4.47	4.35	4.26	4.48	2.54	
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	
Sodium	mg/L	--	--	na	200	14.3	24.5	8	9.91	11.2	14	13.1	7.86	9.65	10.7	8.2	0.84	
Strontium	mg/L	7	--	na	--	0.047	0.0212	0.0414	0.0131	0.0158	0.021	0.0176	0.0127	0.0136	0.0144	0.0149	0.0104	
Thallium	mg/L	--	--	0.002	--	0.000005	0.000012	< 0.000005	0.000013	0.000022	0.00001	0.000012	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000008	
Tin	mg/L	--	--	na	--	< 0.00006	< 0.00006	< 0.00006	0.00008	0.00008	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	
Titanium	mg/L	--	--	na	--	0.0084	0.0623	0.00731	0.0586	0.0934	0.076	0.073	0.0127	0.00872	0.00809	0.0117	0.00209	
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	mg/L	0.02	0.02	na	--	0.00327	0.00151	0.000868	0.00725	0.000331	0.000866	0.00186	0.000223	0.000725	0.00099	0.000869	0.000279	
Vanadium	mg/L	--	--	0.0062	--	0.00178	**0.00648**	0.00136	**0.00813**	**0.012**	**0.00852**	**0.0102**	0.00339	0.00191	0.00167	0.00165	0.00192	
Yttrium	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	mg/L	--	--	5	5	< 0.002	0.004	0.002	0.006	0.007	0.004	0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW22-15-1 SS2	MW22-15-1 SS4	MW22-15-1 SS5	MW22-15-2 SS6	MW22-15-4 SS1	MW22-15-4 SS2	MW22-16-02 SA2	MW22-16-02 SA4	MW22-19-01-AS1	MW22-19-01-SA2B	MW22-19-01-SA3	MW22-19-01-SA4
						MW22-15-1 SS4-SO_20221202	MW22-15-1 SS5-SO_20221202	MW22-15-2 SS6-SO_20221202	MW22-15-4 SS1-SO_20221203	MW22-15-4 SS2-SO_20221203	MW22-16-02 SA2-SO_20221205	MW22-16-02 SA4-SO_20221205	MW22-19-01-AS1-SO_20230607	MW22-19-01-SA2B-SO_20230607	MW22-19-01-SA3-SO_20230607	MW22-19-01-SA4-SO_20230607	MW22-19-01-SA5-SO_20230607
						2022-12-02	2022-12-02	2022-12-02	2022-12-03	2022-12-03	2022-12-05	2022-12-05	2023-06-07	2023-06-07	2023-06-07	2023-06-07	2023-06-07
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.098	0.088	0.084	0.097	0.075	0.112	0.21	0.24	0.204	0.22	0.139	0.332
Antimony	mg/L	0.006	0.006	na	--	0.0009	0.0026	0.0018	< 0.0009	0.0017	0.0022	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	0.0009
Arsenic	mg/L	0.01	0.01	na	--	0.001	0.0009	0.0011	0.002	0.0025	0.0005	0.0009	0.0027	0.0011	0.001	0.002	0.0017
Barium	mg/L	2	1	na	--	0.00357	0.00386	0.00289	0.0415	0.0354	0.00437	0.00424	0.00823	0.00232	0.00136	0.00508	0.00397
Beryllium	mg/L	--	--	0.004	--	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000013	0.000021	< 0.000007	< 0.000007	0.000008	< 0.000007
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	0.00003	< 0.00001	< 0.00001	< 0.00001
Boron	mg/L	5	5	na	--	0.007	0.006	0.008	0.732	0.006	0.004	0.033	0.358	0.021	0.023	0.33	0.014
Cadmium	mg/L	0.007	0.005	na	--	0.000006	0.000011	0.000003	0.000016	0.000008	< 0.000003	0.000005	0.000016	0.000003	< 0.000003	0.000003	< 0.000003
Calcium	mg/L	--	--	na	--	13.5	15.5	13	75.3	39	18.7	11	49.3	15.7	11.4	16.6	10.7
Chromium	mg/L	0.05	0.05	0.025	--	0.00018	0.00051	0.00015	0.00248	0.00018	0.00072	0.00059	0.00103	0.00043	0.00014	0.00048	< 0.00008
Cobalt	mg/L	--	--	0.003	--	0.000059	0.000059	0.000019	0.00014	0.000059	0.0001	0.000195	0.000337	0.000052	0.00002	0.000069	0.000008
Copper	mg/L	2	--	na	--	0.0008	0.0014	0.0006	0.0027	0.0012	0.0007	0.0015	0.0094	0.0015	0.0006	0.0015	0.0002
Iron	mg/L	--	--	na	0.1	0.023	0.039	0.019	0.074	0.042	0.084	0.12	0.185	0.011	< 0.007	0.081	< 0.007
Lead	mg/L	0.005	0.01	na	--	< 0.00009	< 0.00009	< 0.00009	0.00012	< 0.00009	< 0.00009	0.0001	0.00027	< 0.00009	< 0.00009	0.00161	< 0.00009
Lithium	mg/L	--	--	na	--	0.0041	0.0052	0.0047	0.0035	0.0034	0.0012	0.0107	0.0016	0.0012	0.0011	0.0014	0.0058
Magnesium	mg/L	--	--	na	--	2.47	2.74	2.52	7.84	3.4	2.64	1.97	5.94	2.5	3.18	1.85	1.64
Manganese	mg/L	--	--	na	0.12	0.00099	0.00804	0.00113	0.0254	0.0475	0.0034	0.00311	0.00898	0.00201	0.00057	0.00252	0.00074
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001					
Molybdenum	mg/L	--	--	0.07	--	0.0109	0.0299	0.021	0.0124	0.0203	0.00174	0.00875	0.00215	0.00386	0.00323	0.00475	0.00131
Nickel	mg/L	--	--	0.1	--	0.0004	0.0009	0.0004	0.0018	0.0007	0.0011	0.002	0.0024	0.0005	0.0002	0.0006	0.0002
Potassium	mg/L	--	--	na	--	3.59	3.64	3.4	2.95	5.4	0.128	4.01	0.777	0.987	1.73	1.31	1.62
Selenium	mg/L	0.05	0.05	na	--	< 0.00004	< 0.00004	0.00069	0.00117	0.00074	0.00005	0.00028	0.00067	0.00017	0.00011	0.00012	0.00041
Silicon	mg/L	--	--	na	--	3.39	3.68	3.36	5.24	1.37	4.09	2.82					
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	1.61	1.93	1.59	37.8	1.09	0.82	1.5	3.97	2	1.72	1.65	2.61
Strontium	mg/L	7	--	na	--	0.0138	0.017	0.0134	0.0613	0.033	0.0124	0.00762	0.0399	0.02	0.0279	0.0174	0.0213
Thallium	mg/L	--	--	0.002	--	< 0.000005	< 0.000005	< 0.000005	0.000005	< 0.000005	< 0.000005	< 0.000005	0.000012	0.000008	0.000012	0.000012	0.000006
Tin	mg/L	--	--	na	--	< 0.00006	< 0.00006	0.00017	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00024	0.00007	0.00007	0.00016	0.00085
Titanium	mg/L	--	--	na	--	0.00104	0.00184	0.00085	0.00269	0.00334	0.0047	0.00472	0.0115	0.00038	< 0.00007	0.00402	0.00018
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.000555	0.00051	0.00228	0.00215	0.00378	0.000155	0.00622	0.000504	0.000277	0.000141	0.000274	0.000295
Vanadium	mg/L	--	--	0.0062	--	0.00201	0.00265	0.00259	0.00105	0.00158	0.00161	0.00156	0.00294	0.00184	0.00222	0.00147	0.0034
Yttrium	mg/L	--	--	na	--	-	-	-	-	-	-	-	0.00054	< 0.00002	< 0.00002	0.00005	< 0.00002
Zinc	mg/L	--	--	5	5	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.005	< 0.002	< 0.002	0.009	0.006

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW22-19-01-SA5	MW22-20-01	MW22-20-01-SA1	MW22-20-01-SA3	MW23-15-1 SA1	MW23-15-1 SA2	MW23-15-1 SA3	MW23-16-1 SA1	MW23-16-1 SA2	MW23-16-1 SA3	MW23-17-1 SA3	MW23-17-1 SA4
						MW22-20-01-SA1-SO_20230608	MW22-20-01-SA3-SO_20230608	MW22-20-01-SO_20230608	MW23-15-1 SA1-SO_20230420	MW23-15-1 SA2-SO_20230420	MW23-15-1 SA3-SO_20230420	MW23-16-1 SA1-SO_20230426	MW23-16-1 SA2-SO_20230426	MW23-16-1 SA3-SO_20230426	MW23-17-1 SA3-SO_20230413	MW23-17-1 SA4-SO_20230413	MW23-17-1 SA5-SO_20230413
						2023-06-08	2023-06-08	2023-06-08	2023-04-20	2023-04-20	2023-04-20	2023-04-26	2023-04-26	2023-04-26	2023-04-13	2023-04-13	2023-04-13
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.117	0.059	0.317	1.01	0.818	0.709	0.375	0.839	0.484	0.227	0.228	0.415
Antimony	mg/L	0.006	0.006	na	--	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic	mg/L	0.01	0.01	na	--	0.0094	0.0013	0.0002	0.0004	0.0008	0.0012	0.0065	0.001	0.0023	0.0007	0.0011	0.0015
Barium	mg/L	2	1	na	--	0.00838	0.0457	0.00656	0.00361	0.00231	0.00401	0.0048	0.0116	0.00719	0.00541	0.0049	0.00469
Beryllium	mg/L	--	--	0.004	--	0.000008	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/L	5	5	na	--	0.226	0.039	0.02	0.007	0.006	0.008	0.015	0.009	0.016	0.004	0.006	0.017
Cadmium	mg/L	0.007	0.005	na	--	0.000037	0.000014	0.00001	< 0.000003	< 0.000003	< 0.000003	0.000004	< 0.000003	< 0.000003	0.000009	0.000003	0.000008
Calcium	mg/L	--	--	na	--	15.5	44.7	2.3	2.75	3.15	3.93	3.5	2.97	3.01	14.7	12.2	12.7
Chromium	mg/L	0.05	0.05	0.025	--	0.0003	0.00021	0.00069	0.00052	0.00015	0.00012	0.00144	0.0004	0.00067	0.00032	0.00051	0.0004
Cobalt	mg/L	--	--	0.003	--	0.00019	0.000168	0.000564	0.000099	0.000015	0.000016	0.00005	0.000072	0.000093	0.000078	0.000121	0.000083
Copper	mg/L	2	--	na	--	0.003	0.0047	0.001	0.0006	0.0003	0.0003	0.0015	0.001	0.0004	0.0041	0.0037	0.0022
Iron	mg/L	--	--	na	0.1	0.096	0.046	0.148	0.232	0.034	0.035	0.307	0.08	0.046	0.086	0.239	0.123
Lead	mg/L	0.005	0.01	na	--	0.00125	0.00011	0.00017	0.00017	< 0.00009	0.00012	< 0.00009	< 0.00009	< 0.00009	0.00013	0.00011	0.00012
Lithium	mg/L	--	--	na	--	0.0018	0.0076	0.0163	0.0056	0.0051	0.0049	0.025	0.0295	0.0436	0.001	0.0015	0.0014
Magnesium	mg/L	--	--	na	--	3.12	2.53	1.18	0.377	0.295	0.492	0.533	0.397	0.464	1.58	1.61	1.85
Manganese	mg/L	--	--	na	0.12	0.00831	0.0319	0.00407	0.00378	0.00065	0.00063	0.00284	0.00106	0.00237	0.005	0.0122	0.00411
Mercury	mg/L	0.001	0.001	na	--				0.00004	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Molybdenum	mg/L	--	--	0.07	--	0.0003	0.00844	0.00467	0.00026	0.00019	0.00033	0.00179	0.00147	0.00114	0.00708	0.00531	0.00531
Nickel	mg/L	--	--	0.1	--	0.0015	0.0056	0.0024	0.0005	< 0.0001	< 0.0001	0.0061	0.0232	0.0004	0.0091	0.0021	0.0004
Potassium	mg/L	--	--	na	--	2.74	3.31	22.1	10.2	8.76	6.97	9.84	10.1	14.8	1.24	1.6	2.14
Selenium	mg/L	0.05	0.05	na	--	0.00009	0.00077	0.00091	0.00005	0.00005	0.00009	< 0.00004	0.00009	0.0001	0.00009	0.00015	0.00013
Silicon	mg/L	--	--	na	--							3.71	2.25	2.59	1.56	2.44	2.66
Silver	mg/L	--	--	na	--	0.00034	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00014	0.00074	0.00064	0.00093	0.00026	< 0.00005
Sodium	mg/L	--	--	na	200	1.18	3.21	2.62	1.53	1.2	1.4	1.58	1.82	2.09	1.19	1.19	1.44
Strontium	mg/L	7	--	na	--	0.021	0.0755	0.00925	0.00867	0.00833	0.0139	0.0057	0.00945	0.00668	0.0136	0.013	0.0146
Thallium	mg/L	--	--	0.002	--	0.000013	0.000011	0.000015	0.000011	0.000007	0.000005	0.000042	< 0.000005	0.00002	< 0.000005	< 0.000005	0.000006
Tin	mg/L	--	--	na	--	0.00014	< 0.00006	0.00006	0.00012	< 0.00006	< 0.00006	0.00007	0.00008	0.0001	0.00012	0.00013	< 0.00006
Titanium	mg/L	--	--	na	--	0.00128	0.00229	0.0114	0.0192	0.00307	0.00214	0.0023	0.0042	0.00322	0.0036	0.00345	0.00622
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.000428	0.00505	0.000154	0.000191	0.000138	0.00054	0.000115	0.000773	0.000237	0.000142	0.000321	0.000362
Vanadium	mg/L	--	--	0.0062	--	0.00066	0.00103	0.00345	**0.00718**	0.0052	0.00418	**0.00876**	**0.00736**	**0.0064**	0.00218	0.00523	0.00452
Yttrium	mg/L	--	--	na	--	0.00015	0.00005	0.00004	0.00011	< 0.00002	0.00004	-	-	-	-	-	-
Zinc	mg/L	--	--	5	5	0.007	0.003	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						MW23-17-1 SA5	MW23-17-1 SA7	MW23-17-1 SA8	MW23-17-1 SA9	MW23-18-1 SA1	MW23-18-1 SA2	MW23-18-1 SA3	MW23-18-1 SA4	MW23-18-1 SA5	MW23-18-1 SA6	SA-1 MW22-09(SA-1)	SA-2 MW22-08(SA-2)
						MW23-17-1 SA7-SO_20230413	MW23-17-1 SA8-SO_20230413	MW23-17-1 SA9-SO_20230413	MW23-18-1 SA1-SO_20230423	MW23-18-1 SA2-SO_20230423	MW23-18-1 SA3-SO_20230423	MW23-18-1 SA4-SO_20230424	MW23-18-1 SA5-SO_20230424	MW23-18-1 SA6-SO_20230424	SA-1 MW22-09(SA-1)-SO_20220928	SA-2 MW22-08(SA-2)-SO_20220927	SA-2 MW22-10(SA-2)-SO_20220927
						2023-04-13	2023-04-13	2023-04-13	2023-04-23	2023-04-23	2023-04-23	2023-04-24	2023-04-24	2023-04-24	2022-09-28	2022-09-27	2022-09-27
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.563	0.784	0.724	0.234	0.433	2.03	**5.11**	0.349	**6.53**	0.073	0.222	0.075
Antimony	mg/L	0.006	0.006	na	--	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic	mg/L	0.01	0.01	na	--	0.0014	0.0012	0.0014	0.0008	0.0006	0.0019	0.0025	0.0024	0.0054	0.0065	0.0017	0.0013
Barium	mg/L	2	1	na	--	0.00157	0.00138	0.00175	0.00402	0.00382	0.0238	0.0674	0.00488	0.115	0.0256	0.0255	0.0186
Beryllium	mg/L	--	--	0.004	--	< 0.000007	< 0.000007	< 0.000007	0.000009	0.000015	0.000119	0.000643	0.000011	0.000352	0.000034	0.000044	0.00001
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001
Boron	mg/L	5	5	na	--	0.016	0.006	0.005	0.007	< 0.002	0.007	0.015	0.005	0.007	0.781	0.45	0.252
Cadmium	mg/L	0.007	0.005	na	--	0.000004	< 0.000003	0.000003	0.000006	0.000008	0.000004	0.000024	< 0.000003	0.000014	0.000084	0.000039	0.000041
Calcium	mg/L	--	--	na	--	6.83	4.6	4.9	17.7	7.99	5.03	8.94	3.58	7.6	45.2	59.8	49.2
Chromium	mg/L	0.05	0.05	0.025	--	0.0002	0.00012	0.00014	0.00037	0.00071	0.00315	0.00808	0.00112	0.01038	0.0033	0.00172	0.00156
Cobalt	mg/L	--	--	0.003	--	0.000131	0.000111	0.000018	0.00036	0.000169	0.002	**0.0069**	0.000149	**0.00663**	0.000223	0.000179	0.000173
Copper	mg/L	2	--	na	--	0.0006	0.0003	0.0003	0.0027	0.0036	0.0139	0.103	0.0018	0.0084	0.0025	0.008	0.0026
Iron	mg/L	--	--	na	0.1	0.029	0.028	0.023	0.147	0.335	3.15	8.4	0.682	10.3	0.051	0.192	0.063
Lead	mg/L	0.005	0.01	na	--	< 0.00009	0.0002	0.00023	0.00031	0.00014	0.00139	**0.007**	< 0.00009	0.00205	0.00027	0.00033	0.00013
Lithium	mg/L	--	--	na	--	0.0056	0.0046	0.0027	0.001	0.0006	0.016	0.0456	0.0161	0.0778	0.004	0.0008	0.0051
Magnesium	mg/L	--	--	na	--	0.951	0.528	0.502	3.02	1.1	2.83	6.4	0.741	8.38	9.5	6.17	5.91
Manganese	mg/L	--	--	na	0.12	0.00061	0.00283	0.00065	0.00364	0.0266	0.0949	0.339	0.00721	0.258	0.0182	0.00856	0.0416
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00004	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Molybdenum	mg/L	--	--	0.07	--	0.00237	0.00237	0.00123	0.00431	0.00386	0.00101	0.00177	0.00054	0.00029	0.00074	0.00162	0.00546
Nickel	mg/L	--	--	0.1	--	0.0009	0.0003	0.0017	0.0011	0.0006	0.0033	0.0075	0.007	0.0091	0.0027	0.002	0.001
Potassium	mg/L	--	--	na	--	7.34	4.88	4.67	0.637	0.636	8.04	9.47	8.08	12.2	3.21	1.77	1.77
Selenium	mg/L	0.05	0.05	na	--	0.00034	0.00008	0.00008	0.00012	0.00009	0.00011	0.00037	0.0001	0.00021	0.00117	0.00051	0.00051
Silicon	mg/L	--	--	na	--	3.52	3.87	4.26							4.79	4.61	5.72
Silver	mg/L	--	--	na	--	< 0.00005	0.00048	0.00057	< 0.00005	< 0.00005	< 0.00005	0.00022	< 0.00005	0.00006	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	2.14	1.99	2.02	0.75	0.43	3.35	3.48	3.29	3.78	36.5	14.2	18.9
Strontium	mg/L	7	--	na	--	0.0159	0.0161	0.0199	0.017	0.00964	0.0958	0.0999	0.045	0.377	0.104	0.0568	0.098
Thallium	mg/L	--	--	0.002	--	0.000014	0.000006	< 0.000005	0.000007	0.000019	0.000028	0.000108	0.000007	0.000119	0.000011	0.000009	< 0.000005
Tin	mg/L	--	--	na	--	0.0001	0.00009	0.00007	0.00028	0.00013	< 0.00006	0.00011	0.00009	< 0.00006	0.00012	< 0.00006	< 0.00006
Titanium	mg/L	--	--	na	--	0.00043	0.00236	0.00089	0.00739	0.0153	0.0682	0.109	0.0048	0.148	0.00475	0.0117	0.00421
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.00211	0.00245	0.0034	0.000439	0.000536	0.000211	0.0015	0.000471	0.000566	0.000057	0.000409	0.00167
Vanadium	mg/L	--	--	0.0062	--	0.00544	0.00235	0.00121	0.00195	0.00228	**0.0203**	**0.0427**	**0.0346**	**0.048**	0.00107	0.00159	0.00134
Yttrium	mg/L	--	--	na	--	-	-	-	0.00016	0.00034	0.00069	0.00184	0.00003	0.00164	-	-	-
Zinc	mg/L	--	--	5	5	< 0.002	< 0.002	< 0.002	0.003	0.003	0.013	0.035	0.002	0.04	0.004	0.003	< 0.002

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						SA-2 MW22-10(SA-2)	SA-3 MW22-08(SA-3)	SA-3 MW22-10(SA-3)	SA-4 MW22-08 (SA-4)	SA-4 MW22-09(SA-4)	SA-4 MW22-10(SA-4)	SA-5 MW22-09(SA-5)	SA-5 MW22-10(SA-5)	SA-6 MW22-08(SA-6)	SA-6 MW22-09(SA-6)	SA-6 MW22-10(SA-6)	SA-7 MW22-09(SA-7)
						SA-3 MW22-08(SA-3)-SO_20220927	SA-3 MW22-10(SA-3)-SO_20221002	SA-4 MW22-08 (SA-4)-SO_20220927	SA-4 MW22-09(SA-4)-SO_20220928	SA-4 MW22-10(SA-4)-SO_20221002	SA-5 MW22-09(SA-5)-SO_20220928	SA-5 MW22-10(SA-5)-SO_20221002	SA-6 MW22-08(SA-6)-SO_20220927	SA-6 MW22-09(SA-6)-SO_20220928	SA-6 MW22-10(SA-6)-SO_20221002	SA-7 MW22-09(SA-7)-SO_20220928	SA-8 MW22-08(SA-8)-SO_20220927
						2022-09-27	2022-10-02	2022-09-27	2022-09-28	2022-10-02	2022-09-28	2022-10-02	2022-09-27	2022-09-28	2022-10-02	2022-09-28	2022-09-27
						N	N	N	N	N	N	N	N	N	N	N	N
						TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines												
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [a]	CDWQ AO												
Aluminum	mg/L	2.9	--	na	--	0.172	0.157	0.142	0.049	0.214	0.035	0.249	0.251	0.027	0.083	0.059	0.134
Antimony	mg/L	0.006	0.006	na	--	< 0.0009	< 0.0009	0.0009	0.001	< 0.0009	< 0.0009	< 0.0009	0.0014	0.001	< 0.0009	0.0016	0.0016
Arsenic	mg/L	0.01	0.01	na	--	0.0017	0.0017	0.0064	0.0017	0.0026	0.0014	0.0015	0.0031	0.0018	0.0017	0.0017	0.0028
Barium	mg/L	2	1	na	--	0.00664	0.0184	0.0147	0.0391	0.00844	0.0287	0.00995	0.0258	0.0304	0.00947	0.015	0.0299
Beryllium	mg/L	--	--	0.004	--	0.000029	0.000033	0.00001	0.000035	0.000041	0.000027	0.000015	0.00004	0.000021	0.000037	0.00006	0.000042
Bismuth	mg/L	--	--	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00003	< 0.00001
Boron	mg/L	5	5	na	--	0.294	0.236	0.328	0.037	0.267	0.034	0.118	0.183	0.036	0.073	0.507	0.166
Cadmium	mg/L	0.007	0.005	na	--	0.000084	0.000108	0.000067	0.000092	0.000069	0.000068	0.000086	0.00012	0.000033	0.000104	0.00002	0.000062
Calcium	mg/L	--	--	na	--	23.9	33.8	23.7	37	23.6	23.1	15.3	26.8	26.6	16.5	23.6	23.4
Chromium	mg/L	0.05	0.05	0.025	--	0.00299	0.00192	0.00156	0.00057	0.00298	0.00044	0.00165	0.00189	0.00057	0.00165	0.00259	0.00139
Cobalt	mg/L	--	--	0.003	--	0.000101	0.000143	0.000115	0.000133	0.000121	0.000076	0.000202	0.000205	0.000131	0.000123	0.00039	0.000176
Copper	mg/L	2	--	na	--	0.0028	0.0042	0.0061	0.0036	0.0041	0.0033	0.0049	0.0061	0.0039	0.0029	0.0044	0.0058
Iron	mg/L	--	--	na	0.1	0.132	0.125	0.103	0.027	0.151	0.02	0.191	0.176	0.017	0.087	0.16	0.096
Lead	mg/L	0.005	0.01	na	--	0.00012	0.00011	< 0.00009	< 0.00009	0.00011	< 0.00009	0.00024	0.00011	< 0.00009	< 0.00009	0.00019	< 0.00009
Lithium	mg/L	--	--	na	--	0.0017	0.0053	0.0058	0.004	0.0041	0.005	0.0038	0.0062	0.006	0.0046	0.01	0.0077
Magnesium	mg/L	--	--	na	--	2.35	3.88	3.34	4.09	2.34	3.35	1.33	3.96	4.44	1.45	6.57	4.38
Manganese	mg/L	--	--	na	0.12	0.00163	0.0141	0.00496	0.0524	0.00325	0.0221	0.00478	0.00919	0.0179	0.00344	0.004	0.0065
Mercury	mg/L	0.001	0.001	na	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Molybdenum	mg/L	--	--	0.07	--	0.00217	0.0128	0.0113	0.0148	0.00358	0.00723	0.00508	0.0112	0.00832	0.00587	0.0102	0.00858
Nickel	mg/L	--	--	0.1	--	0.0012	0.0011	0.0016	0.0017	0.0011	0.001	0.001	0.0016	0.0012	0.0009	< 0.0001	0.0014
Potassium	mg/L	--	--	na	--	1.3	1.93	2.84	2.21	1.56	3.34	1.24	3.47	4.54	1.36	3.1	4.48
Selenium	mg/L	0.05	0.05	na	--	0.00092	0.00155	0.00173	0.00106	0.0014	0.00104	0.00247	0.0023	0.00117	0.00176	0.0012	0.00177
Silicon	mg/L	--	--	na	--	8.17	3.54	5.37	0.9	4.3	0.91	2.16	1.96	1.25	1.48	5.57	1.71
Silver	mg/L	--	--	na	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	--	--	na	200	12.8	9.38	13	1.94	10.9	2.1	8.6	14.6	2.63	6.16	20.8	15.1
Strontium	mg/L	7	--	na	--	0.0222	0.085	0.106	0.111	0.0274	0.0992	0.0214	0.169	0.124	0.0282	0.102	0.189
Thallium	mg/L	--	--	0.002	--	0.000007	0.000005	< 0.000005	0.000021	0.000006	0.000016	0.000005	0.000007	0.00001	0.00001	0.00003	0.000008
Tin	mg/L	--	--	na	--	< 0.00006	< 0.00006	< 0.00006	0.00009	< 0.00006	< 0.00006	0.00008	< 0.00006	< 0.00006	< 0.00006	0.00019	< 0.00006
Titanium	mg/L	--	--	na	--	0.00944	0.00866	0.00633	0.00402	0.00908	0.00205	0.0118	0.011	0.00121	0.00497	0.00242	0.00539
Tungsten	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	0.02	0.02	na	--	0.000456	0.00223	0.005	0.00132	0.00157	0.00184	0.000997	0.00308	0.00312	0.00105	0.00315	0.00414
Vanadium	mg/L	--	--	0.0062	--	0.00179	0.00327	0.00537	0.0025	0.00216	0.00219	0.00458	0.0055	0.00338	0.00382	0.00273	0.00565
Yttrium	mg/L	--	--	na	--	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	--	--	5	5	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.011	< 0.002	< 0.002	< 0.002	0.014	< 0.002

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 2: Summary of Soil Analytical Results of Toxicity Characteristic Leaching Procedure

						SA-8 MW22-08(SA-8)
						SA-8 MW22-08(SA-8)-SO_20220927
						2022-09-27
						N
						TCLP
		Human Health Based Guidelines/Standards			Other Guidelines	
Parameter	Units	CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO	
Aluminum	mg/L	2.9	--	na	--	6200
Antimony	mg/L	0.006	0.006	na	--	< 6
Arsenic	mg/L	0.01	0.01	na	--	2.8
Barium	mg/L	2	1	na	--	34
Beryllium	mg/L	--	--	0.004	--	0.29
Bismuth	mg/L	--	--	na	--	0.11
Boron	mg/L	5	5	na	--	0.074
Cadmium	mg/L	0.007	0.005	na	--	130000
Calcium	mg/L	--	--	na	--	40
Chromium	mg/L	0.05	0.05	0.025	--	5.8
Cobalt	mg/L	--	--	0.003	--	12
Copper	mg/L	2	--	na	--	13000
Iron	mg/L	--	--	na	0.1	4.4
Lead	mg/L	0.005	0.01	na	--	14
Lithium	mg/L	--	--	na	--	23000
Magnesium	mg/L	--	--	na	--	280
Manganese	mg/L	--	--	na	0.12	< 0.05
Mercury	mg/L	0.001	0.001	na	--	1.8
Molybdenum	mg/L	--	--	0.07	--	15
Nickel	mg/L	--	--	0.1	--	1400
Potassium	mg/L	--	--	na	--	< 0.7
Selenium	mg/L	0.05	0.05	na	--	< 1
Silicon	mg/L	--	--	na	--	-
Silver	mg/L	--	--	na	--	92
Sodium	mg/L	--	--	na	200	0.061
Strontium	mg/L	7	--	na	--	< 2
Thallium	mg/L	--	--	0.002	--	550
Tin	mg/L	--	--	na	--	0.7
Titanium	mg/L	--	--	na	--	22
Tungsten	mg/L	--	--	na	--	6.1
Uranium	mg/L	0.02	0.02	na	--	-
Vanadium	mg/L	--	--	0.0062	--	-
Yttrium	mg/L	--	--	na	--	-
Zinc	mg/L	--	--	5	5	26

Notes:
CDWQ MAC = Canadian Drinking Water Quality Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW 1, OREG 153/04 T2 SCS Potable (coarse): component GW1 (drinking water) of ORE(
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction TCLP: Toxicity Characteristic Leaching Procedure
mg/L: milligrams per litre
Sample type N: Normal Environmental Sample
* No Guideline available for TCLP samples
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
---: RDL not reported in data tables
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					Location	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01
					Sample ID	MW22-06-1_20230628	MW22-06-2_20230628	MW22-07-01_20230628	MW22-07-02_20230628	MW22-08-1_20230627	MW22-08-2_20230627	MW22-09-1_20230627	MW22-09-2_20230627	MW22-10-1_20230627
					Date	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27
					Lab sample ID	TY2306190-010	TY2306190-011	TY2306190-012	TY2306190-013	TY2306190-006	TY2306190-007	TY2306190-004	TY2306190-005	TY2306190-002
					Sample type	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards		Max Concentration									
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	1.36	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	4.61	< 0.5	< 0.5	< 0.5	< 0.5	0.51	0.63	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	8.98	< 0.5	< 0.5	1.05	< 0.5	0.71	0.65	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-10-04	MW22-11-01	MW22-13-01	MW22-13-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-05-01
					MW22-10-4_20230627	MW22-11-1_20230627	MW22-13-1_20230628	MW22-13-2_20230628	MW22-2-1_20230628	MW22-2-2_20230628	MW22-3-1_20230628	MW22-3-2_20230628	MW22-04-1_20230702	MW22-05-1_20230702
					2023-06-27	2023-06-27	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-07-02	2023-07-02
					TY2306190-003	TY2306190-001	TY2306190-014	TY2306190-015	TY2306190-018	TY2306190-019	TY2306190-016	TY2306190-017	TY2306289-005	TY2306289-002
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	0.51	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.34
Xylenes, Total	µg/L	90	90	90	< 0.5	0.73	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.32

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-05-02	MW22-12-01	MW22-12-04	MW22-14-01	MW22-14-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02
					MW22-05-2_20230702	MW22-12-1_20230702	MW22-12-4_20230702	MW22-14-1_20230702	MW22-14-2_20230702	MW22-19-1_20230703	MW22-20-1_20230703	MW22-20-2_20230703	MW22-01-1_20230704	MW22-01-2_20230704
					2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-03	2023-07-03	2023-07-03	2023-07-04	2023-07-04
					TY2306289-001	TY2306289-003	TY2306289-004	TY2306289-006	TY2306289-007	TY2306289-009	TY2306289-011	TY2306289-012	TY2306508-005	TY2306508-006
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	0.53	< 0.5	< 0.5	1.3	< 0.5	1.36	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	0.97	1.32	< 0.5	4.04	1.38	4.61	0.64	0.73	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	3.62	3.06	1.03	8.98	2.72	8.98	2.23	2.4	2.27	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-15-01	MW22-15-03	MW22-16-01	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-01-01	MW22-01-02	MW22-05-01
					MW22-15-1_20230705	MW22-15-3_20230705	MW22-16-1_20230705	MW22-17-1_20230704	MW22-17-2_20230704	MW22-18-1_20230704	MW22-18-2_20230704	MW22-01-1_20230809	MW22-01-2_20230809	MW22-05-1_20230808
					2023-07-05	2023-07-05	2023-07-05	2023-07-04	2023-07-04	2023-07-04	2023-07-04	2023-08-09	2023-08-09	2023-08-08
					TY2306508-010	TY2306508-011	TY2306508-008	TY2306508-001	TY2306508-002	TY2306508-004	TY2306508-003	TY2307856-007	TY2307856-008	TY2307856-001
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.36	< 0.5	2.56

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-05-02	MW22-06-01	MW22-06-02	MW22-11-01	MW22-16-01	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW2-12
					MW22-05-2_20230808	MW22-06-1_20230808	MW22-06-2_20230808	MW22-11-1_20230808	MW22-16-1_20230809	MW22-17-01_20230809	MW22-17-2_20230809	MW22-18-1_20230809	MW22-18-2_20230809	MW2-12-1_20230811
					2023-08-08	2023-08-08	2023-08-08	2023-08-08	2023-08-09	2023-08-09	2023-08-09	2023-08-09	2023-08-09	2023-08-11
					TY2307856-002	TY2307856-004	TY2307856-003	TY2307856-005	TY2307856-015	TY2307856-013	TY2307856-009	TY2307856-011	TY2307856-010	TY2308084-011
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	1.45	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	1.22	< 0.5	< 0.5	3.35	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01
					MW22-02-1_20230812	MW22-02-2_20230812	MW22-03-1_20230810	MW22-03-2_20230810	MW22-04-1_20230811	MW22-08-1_20230811	MW22-08-2_20230811	MW22-09-1_20230811	MW22-09-2_20230811	MW22-10-1_20230811
					2023-08-12	2023-08-12	2023-08-10	2023-08-10	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11
					TY2308084-019	TY2308084-020	TY2308084-008	TY2308084-009	TY2308084-010	TY2308084-017	TY2308084-018	TY2308084-015	TY2308084-016	TY2308084-013
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.94	0.91	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.64	2.68	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-10-04	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02
					MW22-10-4_20230811	MW22-12-4_20230811	MW22-13-1_20230810	MW22-13-2_20230810	MW22-14-2_20230810	MW22-19-1_20230810	MW22-20-1_20230810	MW22-20-2_20230810	MW22-01-01_20230924	MW22-01-02_20230924
					2023-08-11	2023-08-11	2023-08-10	2023-08-10	2023-08-10	2023-08-10	2023-08-10	2023-08-10	2023-09-24	2023-09-24
					TY2308084-014	TY2308084-012	TY2308084-002	TY2308084-001	TY2308084-003	TY2308084-004	TY2308084-005	TY2308084-007	TY2309741-010	TY2309741-012
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.83	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	1.31	1.99	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	2.77	6.11	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-16-01	MW22-16-02	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02
					MW22-02-01_20230924	MW22-02-02_20230924	MW22-03-01_20230924	MW22-03-02_20230924	MW22-16-01_20230925	MW22-16-02_20230925	MW22-17-01_20230924	MW22-17-02_20230924	MW22-18-01_20230924	MW22-18-02_20230924
					2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-25	2023-09-25	2023-09-24	2023-09-24	2023-09-24	2023-09-24
					TY2309741-002	TY2309741-001	TY2309741-004	TY2309741-005	TY2309741-007	TY2309741-006	TY2309741-008	TY2309741-009	TY2309741-013	TY2309741-014
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01
					MW22-04-1_20230923	MW22-05-01_20230920	MW22-05-02_20230920	MW22-06-1_20230920	MW22-06-2_20230920	MW22-07-1_20230923	MW22-07-2_20230923	MW22-08-1_20230923	MW22-08-2_20230923	MW22-09-1_20230920
					2023-09-23	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-20
					TY2309749-028	TY2309749-010	TY2309749-009	TY2309749-005	TY2309749-006	TY2309749-022	TY2309749-021	TY2309749-020	TY2309749-019	TY2309749-001
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.71	0.75	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	0.99	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.91	2.55	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-09-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-12-01	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02
					MW22-09-2_20230920	MW22-10-1_20230920	MW22-10-4_20230920	MW22-11-1_20230920	MW22-12-01_20230923	MW22-12-04_20230923	MW22-13-01_20230923	MW22-13-2_20230923	MW22-14-01_20230921	MW22-14-2_20230921
					2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-21	2023-09-21
					TY2309749-002	TY2309749-008	TY2309749-007	TY2309749-003	TY2309749-024	TY2309749-023	TY2309749-025	TY2309749-027	TY2309749-017	TY2309749-018
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	0.65	< 0.5	< 0.5	< 0.5	< 0.5	1.14	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	1.97	< 0.5	< 0.5	< 0.5	< 0.5	2.32	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-15-01	MW22-15-03	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-03-01
					MW22-15-01_20230921	MW22-15-03_20230921	MW22-19-1_20230921	MW22-20-01_20230921	MW22-20-02_20230921	MW22-01-1_20240605	MW22-01-2_20240605	MW22-02-1_20240604	MW22-02-2_20240604	MW22-03-1_20240604
					2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04
					TY2309749-014	TY2309749-015	TY2309749-016	TY2309749-011	TY2309749-013	TY2405789-004	TY2405789-005	TY2405789-001	TY2405789-002	TY2405789-023
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	1.64	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-03-02	MW22-04-01	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-17-01	MW22-17-02
					MW22-03-2_20240604	MW22-04-1_20240603	MW22-13-1_20240603	MW22-13-2_20240603	MW22-14-1_20240603	MW22-14-2_20240603	MW22-15-1_20240605	MW22-15-3_20240605	MW22-17-1_20240605	MW22-17-2_20240605
					2024-06-04	2024-06-03	2024-06-03	2024-06-03	2024-06-03	2024-06-03	2024-06-05	2024-06-05	2024-06-05	2024-06-05
					TY2405789-024	TY2405789-013	TY2405789-014	TY2405789-015	TY2405789-016	TY2405789-017	TY2405789-007	TY2405789-008	TY2405789-011	TY2405789-025
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01
					MW22-18-1_20240605	MW22-18-2_20240605	MW22-19-1_20240604	MW22-20-1_20240604	MW22-20-2_20240604	MW22-07-1_20240610	MW22-07-2_20240610	MW22-08-1_20240610	MW22-08-2_20240610	MW22-09-1_20240610
					2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10
					TY2405789-009	TY2405789-010	TY2405789-019	TY2405789-021	TY2405789-022	TY2405941-001	TY2405941-002	TY2405941-005	TY2405941-006	TY2405941-003
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.75	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.07	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	4.45	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-09-02	MW22-12-01	MW22-12-04	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-08-01	MW22-08-02	MW22-09-01
					MW22-09-2_20240610	MW22-12-1_20240610	MW22-12-4_20240610	MW22-01-1_20240813	MW22-01-2_20240813	MW22-02-1_20240811	MW22-02-2_20240813	MW22-08-1_20240812	MW22-08-2_20240812	MW22-09-1_20240812
					2024-06-10	2024-06-10	2024-06-10	2024-08-13	2024-08-13	2024-08-11	2024-08-13	2024-08-12	2024-08-12	2024-08-12
					TY2405941-004	TY2405941-007	TY2405941-008	TY2408880-017	TY2408880-018	TY2408880-006	TY2408880-019	TY2408880-014	TY2408880-013	TY2408880-011
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.82	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-09-02	MW22-12-01	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-17-01
					MW22-09-2_20240812	MW22-12-1_20240812	MW22-12-4_20240812	MW22-13-1_20240811	MW22-13-2_20240811	MW22-14-1_20240811	MW22-14-2_20240812	MW22-15-1_20240813	MW22-15-3_20240813	MW22-17-1_20240813
					2024-08-12	2024-08-12	2024-08-12	2024-08-11	2024-08-11	2024-08-11	2024-08-12	2024-08-13	2024-08-13	2024-08-13
					TY2408880-012	TY2408880-009	TY2408880-010	TY2408880-001	TY2408880-002	TY2408880-003	TY2408880-015	TY2408880-020	TY2408880-021	TY2408880-022
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-19-02	MW-BD	MW-BD	MW22-04-01	MW22-05-01	MW22-05-02
					MW22-17-2_20240813	MW22-18-1_20240813	MW22-18-2_20240813	MW22-19-1_20240811	MW22-19-2_20240811	MWBD1_20240811	MWBD2_20240812	MW22-04-1_20240815	MW22-05-1_20240814	MW22-05-2_20240814
					2024-08-13	2024-08-13	2024-08-13	2024-08-11	2024-08-11	2024-08-11	2024-08-12	2024-08-15	2024-08-14	2024-08-14
					TY2408880-023	TY2408880-024	TY2408880-025	TY2408880-004	TY2408880-005	TY2408880-008	TY2408880-016	TY2409020-010	TY2409020-001	TY2409020-002
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-16-01	MW22-16-02	MW22-20-01
					MW22-06-1_20240814	MW22-06-2_20240814	MW22-07-01_20240815	MW22-07-2_20240815	MW22-10-1_20240814	MW22-10-4_20240814	MW22-11-1_20240814	MW22-16-1_20240815	MW22-16-2_20240815	MW22-20-1_20240815
					2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-15
					TY2409020-003	TY2409020-004	TY2409020-018	TY2409020-011	TY2409020-005	TY2409020-006	TY2409020-007	TY2409020-012	TY2409020-013	TY2409020-014
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-20-02	MW-BD	MW-BD	RA4-WC-34	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-01
					MW22-20-2_20240815	MWBD3_20240814	MWBD4_20240815	RA4-WC-34_WG-20210915	MW22-04-01_20240930	MW22-05-01_20240929	MW22-05-02_20240929	MW22-06-01_20240929	MW22-06-02_20240929	MW22-07-01_20240930
					2024-08-15	2024-08-14	2024-08-15	2021-09-15	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-30
					TY2409020-015	TY2409020-008	TY2409020-017	QRU398	TY2411036-018	TY2411036-004	TY2411036-009	TY2411036-008	TY2411036-003	TY2411036-016
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-02	MW22-11-01	MW22-12-01	MW22-12-04
					MW22-07-02_20240930	MW22-08-01_20240930	MW22-08-02_20240930	MW22-09-01_20240930	MW22-09-02_20240930	MW22-10-01_20240929	MW22-10-02_20240929	MW22-11-01_20240929	MW22-12-01_20240929	MW22-12-04_20240929
					2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29
					TY2411036-010	TY2411036-017	TY2411036-011	TY2411036-019	TY2411036-012	TY2411036-007	TY2411036-001	TY2411036-002	TY2411036-005	TY2411036-006
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	0.57	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02
					MW22-01-01_20241002	MW22-01-02_20241002	MW22-02-01_20241001	MW22-02-02_20241001	MW22-03-01_20241003	MW22-03-02_20241003	MW22-13-01_20241001	MW22-13-02_20241001	MW22-14-01_20241001	MW22-14-02_20241001
					2024-10-02	2024-10-02	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-01	2024-10-01
					TY2411264-012	TY2411264-013	TY2411264-007	TY2411264-003	TY2411264-021	TY2411264-020	TY2411264-001	TY2411264-009	TY2411264-008	TY2411264-002
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-15-01	MW22-15-03	MW22-16-01	MW22-16-02	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01
					MW22-15-01_20241003	MW22-15-03_20241003	MW22-16-01_20241001	MW22-16-02_20241001	MW22-17-01_20241003	MW22-17-02_20241003	MW22-18-01_20241001	MW22-18-02_20241001	MW22-19-01_20241002	MW22-20-01_20241002
					2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-02	2024-10-02
					TY2411264-018	TY2411264-019	TY2411264-011	TY2411264-010	TY2411264-023	TY2411264-022	TY2411264-006	TY2411264-004	TY2411264-014	TY2411264-016
					N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Benzene	µg/L	1	5	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	24	60	60	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 3: Summary of Groundwater Analytical Results of BTEX Parameters

					MW22-20-02
					MW22-20-02_20241002
					2024-10-02
					TY2411264-015
					N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**		
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ	
Benzene	µg/L	1	5	1	< 0.5
Ethylbenzene	µg/L	2.4	140	140	< 0.5
Toluene	µg/L	24	60	60	< 0.5
Xylenes, Total	µg/L	90	90	90	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wat
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					Location	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-04
					Sample ID	MW22-06-1_20230628	MW22-06-2_20230628	MW22-07-01_20230628	MW22-07-02_20230628	MW22-08-1_20230627	MW22-08-2_20230627	MW22-09-1_20230627	MW22-09-2_20230627	MW22-10-1_20230627	MW22-10-4_20230627
					Date	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27
					Lab sample ID	TY2306190-010	TY2306190-011	TY2306190-012	TY2306190-013	TY2306190-006	TY2306190-007	TY2306190-004	TY2306190-005	TY2306190-002	TY2306190-003
					Sample type	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards		Max Concentration										
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	ND	< 0.01	< 0.01	< 0.094	< 0.059	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	ND	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	ND	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.406	< 0.015	< 0.015	< 0.015	< 0.015	0.033	0.042	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.134	< 0.01	< 0.01	< 0.01	< 0.01	0.011	0.017	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.272	< 0.01	< 0.01	0.012	< 0.01	0.022	0.025	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	0.644	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	ND	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	0.027	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-11-01	MW22-13-01	MW22-13-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-05-01	MW22-05-02	MW22-12-01
					MW22-11-1_20230627	MW22-13-1_20230628	MW22-13-2_20230628	MW22-2-1_20230628	MW22-2-2_20230628	MW22-3-1_20230628	MW22-3-2_20230628	MW22-04-1_20230702	MW22-05-1_20230702	MW22-05-2_20230702	MW22-12-1_20230702
					2023-06-27	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-07-02	2023-07-02	2023-07-02	2023-07-02
					TY2306190-001	TY2306190-014	TY2306190-015	TY2306190-018	TY2306190-019	TY2306190-016	TY2306190-017	TY2306289-005	TY2306289-002	TY2306289-001	TY2306289-003
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.049	< 0.013	< 0.01	< 0.01	< 0.015	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.044	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	0.189	0.208	0.131
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.013	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.07	0.063	0.044
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.031	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.119	0.145	0.087
Naphthalene	µg/L	11	--	--	0.084	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.245	0.425	0.281
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.015	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-12-04	MW22-14-01	MW22-14-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-15-01	MW22-15-03	MW22-16-01
					MW22-12-4_20230702	MW22-14-1_20230702	MW22-14-2_20230702	MW22-19-1_20230703	MW22-20-1_20230703	MW22-20-2_20230703	MW22-01-1_20230704	MW22-01-2_20230704	MW22-15-1_20230705	MW22-15-3_20230705	MW22-16-1_20230705
					2023-07-02	2023-07-02	2023-07-02	2023-07-03	2023-07-03	2023-07-03	2023-07-04	2023-07-04	2023-07-05	2023-07-05	2023-07-05
					TY2306289-004	TY2306289-006	TY2306289-007	TY2306289-009	TY2306289-011	TY2306289-012	TY2306508-005	TY2306508-006	TY2306508-010	TY2306508-011	TY2306508-008
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.071	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.053	0.286	0.09	0.235	0.192	0.169	0.048	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.018	0.079	0.026	0.071	0.059	0.054	0.015	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.035	0.207	0.064	0.164	0.133	0.115	0.033	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	0.103	0.644	0.258	0.565	0.51	0.417	0.168	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-01-01	MW22-01-02	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-11-01
					MW22-17-1_20230704	MW22-17-2_20230704	MW22-18-1_20230704	MW22-18-2_20230704	MW22-01-1_20230809	MW22-01-2_20230809	MW22-05-1_20230808	MW22-05-2_20230808	MW22-06-1_20230808	MW22-06-2_20230808	MW22-11-1_20230808
					2023-07-04	2023-07-04	2023-07-04	2023-07-04	2023-08-09	2023-08-09	2023-08-08	2023-08-08	2023-08-08	2023-08-08	2023-08-08
					TY2306508-001	TY2306508-002	TY2306508-004	TY2306508-003	TY2307856-007	TY2307856-008	TY2307856-001	TY2307856-002	TY2307856-004	TY2307856-003	TY2307856-005
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.034	< 0.01	< 0.01	< 0.01	< 0.01	< 0.019	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	< 0.015	< 0.015	0.036	< 0.015	0.083	0.073	0.043	0.039	0.09
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	0.012	< 0.01	0.027	0.027	0.013	0.012	0.025
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.011	0.012	< 0.01	< 0.01	0.024	< 0.01	0.056	0.046	0.03	0.027	0.065
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	0.09	< 0.05	0.242	0.093	0.088	0.086	0.228
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-16-01	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW2-12	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01
					MW22-16-1_20230809	MW22-17-01_20230809	MW22-17-2_20230809	MW22-18-1_20230809	MW22-18-2_20230809	MW2-12-1_20230811	MW22-02-1_20230812	MW22-02-2_20230812	MW22-03-1_20230810	MW22-03-2_20230810	MW22-04-1_20230811
					2023-08-09	2023-08-09	2023-08-09	2023-08-09	2023-08-09	2023-08-11	2023-08-12	2023-08-12	2023-08-10	2023-08-10	2023-08-11
					TY2307856-015	TY2307856-013	TY2307856-009	TY2307856-011	TY2307856-010	TY2308084-011	TY2308084-019	TY2308084-020	TY2308084-008	TY2308084-009	TY2308084-010
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.028	< 0.031	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.013	0.01	< 0.01	< 0.01	< 0.01	0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-04	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-02	MW22-19-01
					MW22-08-1_20230811	MW22-08-2_20230811	MW22-09-1_20230811	MW22-09-2_20230811	MW22-10-1_20230811	MW22-10-4_20230811	MW22-12-4_20230811	MW22-13-1_20230810	MW22-13-2_20230810	MW22-14-2_20230810	MW22-19-1_20230810
					2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-10	2023-08-10	2023-08-10	2023-08-10
					TY2308084-017	TY2308084-018	TY2308084-015	TY2308084-016	TY2308084-013	TY2308084-014	TY2308084-012	TY2308084-002	TY2308084-001	TY2308084-003	TY2308084-004
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.017	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.056	0.077	0.035	< 0.015	0.033	< 0.015	< 0.015	< 0.015	< 0.015	0.048	0.113
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.014	0.019	0.016	< 0.01	0.015	< 0.01	< 0.01	< 0.01	< 0.01	0.014	0.039
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.042	0.058	0.019	< 0.01	0.018	< 0.01	< 0.01	< 0.01	0.014	0.034	0.074
Naphthalene	µg/L	11	--	--	0.104	0.174	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.118	0.214
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.013

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-16-01	MW22-16-02	MW22-17-01
					MW22-20-1_20230810	MW22-20-2_20230810	MW22-01-01_20230924	MW22-01-02_20230924	MW22-02-01_20230924	MW22-02-02_20230924	MW22-03-01_20230924	MW22-03-02_20230924	MW22-16-01_20230925	MW22-16-02_20230925	MW22-17-01_20230924
					2023-08-10	2023-08-10	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-25	2023-09-25	2023-09-24
					TY2308084-005	TY2308084-007	TY2309741-010	TY2309741-012	TY2309741-002	TY2309741-001	TY2309741-004	TY2309741-005	TY2309741-007	TY2309741-006	TY2309741-008
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	0.019	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	0.014	0.019	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	0.086	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-17-02	MW22-18-01	MW22-18-02	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-08-01	MW22-08-02	MW22-09-01
					MW22-17-02_20230924	MW22-18-01_20230924	MW22-18-02_20230924	MW22-04-1_20230923	MW22-05-01_20230920	MW22-05-02_20230920	MW22-06-1_20230920	MW22-06-2_20230920	MW22-08-1_20230923	MW22-08-2_20230923	MW22-09-1_20230920
					2023-09-24	2023-09-24	2023-09-24	2023-09-23	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23	2023-09-20
					TY2309741-009	TY2309741-013	TY2309741-014	TY2309749-028	TY2309749-010	TY2309749-009	TY2309749-005	TY2309749-006	TY2309749-020	TY2309749-019	TY2309749-001
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	< 0.015	0.196	0.068	0.029	< 0.015	< 0.015	0.107	0.095	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	0.078	0.022	0.01	< 0.01	< 0.01	0.029	0.025	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	0.118	0.046	0.019	0.01	0.012	0.078	0.07	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	0.161	0.105	< 0.05	< 0.05	< 0.05	0.184	0.171	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	0.018	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-09-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-12-01	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01
					MW22-09-2_20230920	MW22-10-1_20230920	MW22-10-4_20230920	MW22-11-1_20230920	MW22-12-01_20230923	MW22-12-04_20230923	MW22-13-01_20230923	MW22-13-2_20230923	MW22-14-01_20230921	MW22-14-2_20230921	MW22-15-01_20230921
					2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-21	2023-09-21	2023-09-21
					TY2309749-002	TY2309749-008	TY2309749-007	TY2309749-003	TY2309749-024	TY2309749-023	TY2309749-025	TY2309749-027	TY2309749-017	TY2309749-018	TY2309749-014
					N	N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	0.048	< 0.015	0.058	0.038	< 0.015	0.018	0.037	0.108	0.028	0.018
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	0.021	< 0.01	0.015	0.014	< 0.01	< 0.01	0.013	0.027	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	0.027	< 0.01	0.043	0.024	0.014	0.018	0.024	0.081	0.028	0.018
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	0.092	< 0.05	< 0.05	< 0.05	< 0.05	0.16	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-13-01	MW22-13-02
					MW22-20-01_20230921	MW22-20-02_20230921	MW22-01-1_20240605	MW22-01-2_20240605	MW22-02-1_20240604	MW22-02-2_20240604	MW22-03-1_20240604	MW22-03-2_20240604	MW22-04-1_20240603	MW22-13-1_20240603	MW22-13-2_20240603
					2023-09-21	2023-09-21	2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04	2024-06-04	2024-06-03	2024-06-03	2024-06-03
					TY2309749-011	TY2309749-013	TY2405789-004	TY2405789-005	TY2405789-001	TY2405789-002	TY2405789-023	TY2405789-024	TY2405789-013	TY2405789-014	TY2405789-015
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.010	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	0.015	< 0.015	< 0.015	< 0.015	< 0.015	0.113	< 0.015	0.084	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.045	< 0.01	0.033	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.013	0.015	< 0.01	< 0.01	< 0.01	< 0.01	0.068	< 0.01	0.051	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.144	< 0.05	0.089	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.024	< 0.01	0.013	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01	MW22-20-02
					MW22-14-1_20240603	MW22-14-2_20240603	MW22-15-1_20240605	MW22-15-3_20240605	MW22-17-1_20240605	MW22-17-2_20240605	MW22-18-1_20240605	MW22-18-2_20240605	MW22-19-1_20240604	MW22-20-1_20240604	MW22-20-2_20240604
					2024-06-03	2024-06-03	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04
					TY2405789-016	TY2405789-017	TY2405789-007	TY2405789-008	TY2405789-011	TY2405789-025	TY2405789-009	TY2405789-010	TY2405789-019	TY2405789-021	TY2405789-022
					N	N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.016	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	0.047	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.015	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.016	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.032	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-12-01	MW22-12-04	MW22-01-01	MW22-01-02	MW22-02-01
					MW22-07-1_20240610	MW22-07-2_20240610	MW22-08-1_20240610	MW22-08-2_20240610	MW22-09-1_20240610	MW22-09-2_20240610	MW22-12-1_20240610	MW22-12-4_20240610	MW22-01-1_20240813	MW22-01-2_20240813	MW22-02-1_20240811
					2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-08-13	2024-08-13	2024-08-11
					TY2405941-001	TY2405941-002	TY2405941-005	TY2405941-006	TY2405941-003	TY2405941-004	TY2405941-007	TY2405941-008	TY2408880-017	TY2408880-018	TY2408880-006
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	0.032	0.104	0.048	< 0.015	< 0.015	0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	0.013	0.028	0.012	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	0.019	0.076	0.036	< 0.01	< 0.01	0.015	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	0.142	0.058	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-02-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-12-01	MW22-12-04	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02
					MW22-02-2_20240813	MW22-08-1_20240812	MW22-08-2_20240812	MW22-09-1_20240812	MW22-09-2_20240812	MW22-12-1_20240812	MW22-12-4_20240812	MW22-13-1_20240811	MW22-13-2_20240811	MW22-14-1_20240811	MW22-14-2_20240812
					2024-08-13	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-11	2024-08-11	2024-08-11	2024-08-12
					TY2408880-019	TY2408880-014	TY2408880-013	TY2408880-011	TY2408880-012	TY2408880-009	TY2408880-010	TY2408880-001	TY2408880-002	TY2408880-003	TY2408880-015
					N	N	N	N	N	N	N	N	N	N	N
Parameter	**Units**	**Generic Ontario Standards**	**Human Health Based Guidelines/Standards**												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	0.063	0.018	< 0.015	< 0.015	< 0.015	< 0.015	0.032	0.019	0.046	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	0.015	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.011	< 0.01	0.015	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	0.048	0.018	< 0.01	< 0.01	< 0.01	< 0.01	0.021	0.019	0.031	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	0.104	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.058	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-15-01	MW22-15-03	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-19-02	MW-BD	MW-BD	MW22-04-01
					MW22-15-1_20240813	MW22-15-3_20240813	MW22-17-1_20240813	MW22-17-2_20240813	MW22-18-1_20240813	MW22-18-2_20240813	MW22-19-1_20240811	MW22-19-2_20240811	MWBD1_20240811	MWBD2_20240812	MW22-04-1_20240815
					2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-11	2024-08-11	2024-08-11	2024-08-12	2024-08-15
					TY2408880-020	TY2408880-021	TY2408880-022	TY2408880-023	TY2408880-024	TY2408880-025	TY2408880-004	TY2408880-005	TY2408880-008	TY2408880-016	TY2409020-010
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	0.052	0.019	< 0.015	0.032
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.017	< 0.01	< 0.01	0.013
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.035	0.019	< 0.01	0.019
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.109	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-16-01	MW22-16-02	MW22-20-01
					MW22-05-1_20240814	MW22-05-2_20240814	MW22-06-1_20240814	MW22-06-2_20240814	MW22-07-2_20240815	MW22-10-1_20240814	MW22-10-4_20240814	MW22-11-1_20240814	MW22-16-1_20240815	MW22-16-2_20240815	MW22-20-1_20240815
					2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-15
					TY2409020-001	TY2409020-002	TY2409020-003	TY2409020-004	TY2409020-011	TY2409020-005	TY2409020-006	TY2409020-007	TY2409020-012	TY2409020-013	TY2409020-014
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.151	0.131	0.057	0.064	0.406	0.087	< 0.015	0.02	0.103	0.118	0.019
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.052	0.049	0.018	0.021	0.134	0.03	< 0.01	< 0.01	0.034	0.043	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.099	0.082	0.039	0.043	0.272	0.057	< 0.01	0.02	0.069	0.075	0.019
Naphthalene	µg/L	11	--	--	0.157	0.107	< 0.05	0.06	0.45	0.088	< 0.05	< 0.05	0.086	0.123	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-20-02	MW-BD	MW-BD	RA4-WC-34	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02
					MW22-20-2_20240815	MWBD3_20240814	MWBD4_20240815	RA4-WC-34_WG-20210915	MW22-04-01_20240930	MW22-05-01_20240929	MW22-05-02_20240929	MW22-06-01_20240929	MW22-06-02_20240929	MW22-07-01_20240930	MW22-07-02_20240930
					2024-08-15	2024-08-14	2024-08-15	2021-09-15	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-30	2024-09-30
					TY2409020-015	TY2409020-008	TY2409020-017	QRU398	TY2411036-018	TY2411036-004	TY2411036-009	TY2411036-008	TY2411036-003	TY2411036-016	TY2411036-010
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	0.022	0.018		0.171	0.04	0.051	0.036	0.018	< 0.015	0.364
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.05	0.07	0.015	0.018	0.012	< 0.01	< 0.01	0.134
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	0.022	0.018	< 0.05	0.101	0.025	0.033	0.024	0.018	0.013	0.23
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	0.114	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.251
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.05	0.023	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-02	MW22-11-01	MW22-12-01	MW22-12-04	MW22-01-01	MW22-01-02
					MW22-08-01_20240930	MW22-08-02_20240930	MW22-09-01_20240930	MW22-09-02_20240930	MW22-10-01_20240929	MW22-10-02_20240929	MW22-11-01_20240929	MW22-12-01_20240929	MW22-12-04_20240929	MW22-01-01_20241002	MW22-01-02_20241002
					2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-10-02	2024-10-02
					TY2411036-017	TY2411036-011	TY2411036-019	TY2411036-012	TY2411036-007	TY2411036-001	TY2411036-002	TY2411036-005	TY2411036-006	TY2411264-012	TY2411264-013
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.03	0.017	< 0.015	< 0.015	0.103	< 0.015	0.033	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	0.045	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.03	0.017	< 0.01	< 0.01	0.058	0.014	0.033	0.011	< 0.01	< 0.01	< 0.01
Naphthalene	µg/L	11	--	--	0.06	< 0.05	< 0.05	< 0.05	0.051	< 0.05	0.064	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	0.018	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-16-01
					MW22-02-01_20241001	MW22-02-02_20241001	MW22-03-01_20241003	MW22-03-02_20241003	MW22-13-01_20241001	MW22-13-02_20241001	MW22-14-01_20241001	MW22-14-02_20241001	MW22-15-01_20241003	MW22-15-03_20241003	MW22-16-01_20241001
					2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01
					TY2411264-007	TY2411264-003	TY2411264-021	TY2411264-020	TY2411264-001	TY2411264-009	TY2411264-008	TY2411264-002	TY2411264-018	TY2411264-019	TY2411264-011
					N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards												
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ											
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	< 0.015	< 0.015	0.077	< 0.015	< 0.015	0.029	0.036	< 0.015	< 0.015	< 0.015	0.048
Methylnaphthalene, 1-	µg/L	3.2	--	--	< 0.01	< 0.01	0.028	< 0.01	< 0.01	0.01	0.012	< 0.01	< 0.01	< 0.01	0.016
Methylnaphthalene, 2-	µg/L	3.2	--	--	< 0.01	< 0.01	0.049	< 0.01	0.011	0.019	0.024	< 0.01	< 0.01	< 0.01	0.032
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	0.088	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	0.027	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 4: Summary of Groundwater Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					MW22-16-02	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01	MW22-20-02
					MW22-16-02_20241001	MW22-17-01_20241003	MW22-17-02_20241003	MW22-18-01_20241001	MW22-18-02_20241001	MW22-19-01_20241002	MW22-20-01_20241002	MW22-20-02_20241002
					2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-02	2024-10-02	2024-10-02
					TY2411264-010	TY2411264-023	TY2411264-022	TY2411264-006	TY2411264-004	TY2411264-014	TY2411264-016	TY2411264-015
					N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards									
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ								
Acenaphthene	µg/L	4.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/L	2.4	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/L	1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/L	0.01	0.04	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(b+j)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/L	0.1	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	µg/L	0.2	--	--	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	µg/L	0.41	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/L	120	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.2	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl Naphthalene	µg/L	3.2	--	--	0.066	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methylnaphthalene, 1-	µg/L	3.2	--	--	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methylnaphthalene, 2-	µg/L	3.2	--	--	0.04	0.012	< 0.01	< 0.01	< 0.01	< 0.01	0.014	< 0.01
Naphthalene	µg/L	11	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	1	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	µg/L	890	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Wate
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guidelines/Standards: CDWQ MAC	Human Health Based Guidelines/Standards: OREG 169/03 DWQ	Human Health Based Guidelines/Standards: Component GW1, OREG 153/04 (a)	Other Guidelines: CDWQ AO	Max Concentration	MW-08-2	MW22-01-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-06-01	MW22-06-02	MW22-06-03	MW22-07-02	MW22-07-03	MW22-07-04	MW22-08-01	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-02
Sample ID								MW-08-2_20221125	MW22-01-2_20221125	MW22-02-01_20221126	MW22-02-02_20221126	MW22-03-01_20221124	MW22-03-2_20221124	MW22-04-1_20221124	MW22-06-1_20221125	MW22-06-2_20221125	MW22-06-3_20221125	MW22-07-2_20221127	MW22-07-3_20221127	MW22-07-4_20221127	MW22-08-1_20221125	MW22-09-1_20221124	MW22-09-2_20221124	MW22-10-1_20221124	MW22-10-02_20221124
Date								2022-11-25	2022-11-25	2022-11-26	2022-11-26	2022-11-24	2022-11-24	2022-11-24	2022-11-25	2022-11-25	2022-11-25	2022-11-27	2022-11-27	2022-11-27	2022-11-25	2022-11-24	2022-11-24	2022-11-24	2022-11-24
Lab sample ID								TY2204527-012	TY2204527-013	TY2204527-015	TY2204527-016	TY2204527-002	TY2204527-001	TY2204527-003	TY2204527-009	TY2204527-010	TY2204527-014	TY2204527-022	TY2204527-023	TY2204527-020	TY2204527-011	TY2204527-007	TY2204527-008	TY2204527-004	TY2204527-005
Sample type								N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Fraction								D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Aluminum	mg/L	--	2.9	--	na	--	**535**	0.0022	0.0016	0.0011	0.0036	0.0042	0.0018	0.0018	0.0018	0.0214	0.0073	0.0019	0.0034	0.0038	0.0019	0.0018	0.011	0.0027	0.211
Antimony	mg/L	0.006	0.006	0.006	na	--	0.00475	< 0.0001	0.00012	0.0008	< 0.0001	0.00028	0.00016	0.00018	< 0.0001	< 0.0001	< 0.0001	0.00018	0.00012	0.00018	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.025	--	**0.12**	0.00839	0.0005	0.00021	0.00023	0.00184	0.00095	< 0.0001	0.00022	0.0002	0.00019	0.00141	0.00042	0.00082	0.0055	0.00632	0.00215	0.00251	0.00067
Barium	mg/L	1	2	1	1	--	**4.3**	0.0313	0.028	0.0459	0.0404	0.0563	0.0817	0.0148	0.0126	0.0141	0.014	0.03	0.0147	0.0189	0.0457	0.092	0.0175	0.0708	0.0196
Beryllium	mg/L	0.004	--	--	0.004	--	**0.0201**	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002
Bismuth	mg/L	--	--	--	na	--	0.00478	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	na	--	0.547	0.032	0.022	0.015	0.015	0.012	0.021	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.02	0.028	0.079	0.063	< 0.01	0.02	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	na	--	0.00406	< 0.000005	< 0.000005	< 0.000005	0.0000132	< 0.000005	0.0000131	< 0.000005	0.0000192	< 0.000005	< 0.000005	0.0000072	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000101	0.0000212
Calcium	mg/L	--	--	--	na	--	5560	74.2	61.4	68.1	70.6	85.1	90.5	72.8	59	61.3	60.1	59.2	59.8	54.4	59.1	78.9	43.6	105	62.4
Cesium	mg/L	--	--	--	na	--	0.0638	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.05	--	**1.12**	< 0.0005	< 0.0005	< 0.0005	0.00053	< 0.0005	< 0.0005	0.00116	< 0.0005	0.00065	0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00068
Chromium (Hexavalent)	mg/L	0.025	--	--	na	--	0.00207	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0038	--	--	0.003	--	**0.311**	< 0.0001	0.00063	0.00012	< 0.0001	0.00013	< 0.0001	< 0.0001	< 0.0001	0.00015	0.00011	0.0004	< 0.0001	0.00013	0.00037	0.00031	0.00013	0.00036	0.00039
Copper	mg/L	0.087	2	--	1	--	**0.666**	0.00082	0.00063	< 0.00035	0.00053	0.00111	0.00072	0.00063	0.00067	0.00092	0.00084	0.00043	0.00075	0.00057	0.00036	0.00045	< 0.00035	0.00109	0.00364
Iron	mg/L	--	--	--	na	0.1	**516**	< 0.01	0.045	0.869	< 0.01	0.365	< 0.01	< 0.01	< 0.01	0.026	< 0.01	< 0.01	< 0.01	< 0.01	0.157	0.55	0.875	< 0.01	0.14
Lead	mg/L	0.01	0.005	0.01	0.01	--	**0.297**	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000059	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000083
Lead-210	Bq/L	--	2	0.1	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	na	--	0.849	0.0048	0.004	0.01	0.0094	0.0054	0.0077	0.0044	0.0024	0.0023	0.0022	0.0043	0.0038	0.0042	0.0056	0.0105	0.0018	0.0056	0.0015
Magnesium	mg/L	--	--	--	na	--	1420	15.7	16.1	20.5	21.9	15.7	17.2	17.8	10.5	11	10.7	13.9	13.3	13.4	17.5	31.1	4.88	17.5	5.19
Manganese	mg/L	--	--	--	na	0.12	**17.4**	0.0467	0.195	0.0396	0.0395	0.186	0.0662	0.00956	0.0174	0.0434	0.0407	0.181	0.00205	0.0247	0.211	0.0609	0.0744	0.332	0.164
Mercury	mg/L	0.001	0.001	0.001	na	--	0.0000499	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000061
Molybdenum	mg/L	0.07	--	--	0.07	--	**0.0844**	0.00518	0.0035	0.00172	0.00487	0.00117	0.00138	0.000479	0.00029	0.000293	0.000315	0.00249	0.00471	0.00523	0.00639	0.00178	< 0.00005	0.00256	0.00194
Nickel	mg/L	0.1	--	--	0.1	--	**0.767**	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00057	< 0.0005	< 0.0005	0.00098	0.00078	< 0.0005	< 0.0005	< 0.0005	0.00098	0.00165
Potassium	mg/L	--	--	--	na	--	182	1.38	2.7	3.12	3.75	1.83	1.7	1.05	0.793	1.22	1.23	2.69	2.64	3.47	2.65	3.23	0.231	1.92	0.531
Potassium-40	Bq/L	--	--	--	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	na	--	1.04	0.00044	0.00313	0.00082	0.00108	0.00151	0.00088	0.00055	0.00119	0.0019	0.00186	0.00156	0.0012	0.00149	0.0008	0.00187	0.00059	0.0013	0.00072
Selenium	mg/L	0.01	0.05	0.05	na	--	0.00508	0.000065	< 0.00005	< 0.00005	0.00057	< 0.00005	0.000053	0.00007	0.000059	0.000077	0.000086	< 0.00005	0.000246	0.000188	< 0.00005	< 0.00005	< 0.00005	0.000126	0.000207
Silver	mg/L	0.0015	--	--	0.1	--	**0.0213**	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	na	200	72.3	10.8	3.49	7.47	8.85	7.09	15.5	1.79	1.2	1.11	1.15	6.4	3.69	5.01	28.9	18.3	1.02	9.32	7.52
Strontium	mg/L	--	7	--	na	--	4.63	0.204	0.068	0.115	0.0965	0.128	0.183	0.061	0.0478	0.0531	0.0527	0.177	0.0752	0.103	0.314	0.429	0.0968	0.131	0.0616
Tellurium	mg/L	--	--	--	na	--	ND	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	0.002	--	**0.00737**	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000011	0.000011	< 0.00001	0.000015	0.000018	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	na	--	0.254	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00046
Thorium-228	Bq/L	--	--	2	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	na	--	0.0191	0.00013	0.00035	0.00024	0.00034	0.00012	0.00018	0.00019	0.00025	< 0.0001	0.0001	0.0006	0.00066	0.00059	0.0001	0.00011	0.00016	0.00021	0.00024
Titanium	mg/L	--	--	--	na	--	39	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	0.00109	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	0.00047	< 0.0003	0.00593
Tungsten	mg/L	--	--	--	na	--	0.0955	< 0.0001	0.00037	0.00012	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.02	--	**0.0698**	0.00117	0.00316	0.000048	0.003	0.000942	0.00168	0.00145	0.000339	0.00042	0.000414	0.000977	0.000685	0.000938	0.00127	0.000081	0.00007	0.00221	0.00126
Uranium-234	Bq/L	--	--	4	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.0062	--	**1.25**	0.00099	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00066	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00073	0.00116
Zinc	mg/L	1.1	--	--	5	5	**1.44**	0.0014	0.003	< 0.001	0.0017	0.0026	0.0013	0.0019	0.0021	< 0.001	< 0.001	0.0015	0.0014	< 0.001	< 0.001	0.0012	< 0.001	< 0.001	< 0.001
Zirconium	mg/L	--	--	--	na	--	0.309	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	0.00089

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-10-03 MW22-10-03_20221124 2022-11-24 TY2204527-006 N D	MW22-10-04 MW22-10-04_20221127 2022-11-27 TY2204527-019 N D	MW22-13-01 MW22-13-1_20221127 2022-11-27 TY2204527-017 N D	MW22-13-02 MW22-13-2_20221127 2022-11-27 TY2204527-018 N D	MW22-13-03 MW22-13-3_20221127 2022-11-27 TY2204527-024 N D	MW22-06-01 MW22-06-1_20230628 2023-06-28 TY2306190-010 N D	MW22-06-01 MW22-06-1_20230628 2023-06-28 TY2306190-010 N T	MW22-06-02 MW22-06-2_20230628 2023-06-28 TY2306190-011 N D	MW22-06-02 MW22-06-2_20230628 2023-06-28 TY2306190-011 N T	MW22-07-01 MW22-07-01_20230628 2023-06-28 TY2306190-012 N D	MW22-07-01 MW22-07-01_20230628 2023-06-28 TY2306190-012 N T	MW22-07-02 MW22-07-02_20230628 2023-06-28 TY2306190-013 N D	MW22-07-02 MW22-07-02_20230628 2023-06-28 TY2306190-013 N T	MW22-08-01 MW22-08-1_20230627 2023-06-27 TY2306190-006 N D	MW22-08-01 MW22-08-1_20230627 2023-06-27 TY2306190-006 N T	MW22-08-02 MW22-08-2_20230627 2023-06-27 TY2306190-007 N D	MW22-08-02 MW22-08-2_20230627 2023-06-27 TY2306190-007 N T	MW22-09-01 MW22-09-1_20230627 2023-06-27 TY2306190-004 N D	MW22-09-01 MW22-09-1_20230627 2023-06-27 TY2306190-004 N T	MW22-09-02 MW22-09-2_20230627 2023-06-27 TY2306190-005 N D	MW22-09-02 MW22-09-2_20230627 2023-06-27 TY2306190-005 N T	MW22-10-01 MW22-10-1_20230627 2023-06-27 TY2306190-002 N D
Aluminum	mg/L	--	2.9	--	0.883	0.0153	0.0043	0.0059	0.0036	0.001	0.009	0.0017	0.0619	0.0053	0.0503	0.0024	1.3	0.0171	**9.91**	0.0035	**5.04**	0.003	**153**	0.026	2.85	0.0014
Antimony	mg/L	0.006	0.006	0.006	< 0.0005	< 0.0001	< 0.0001	0.0008	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00024	0.00027	0.00014	0.00045	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0001	< 0.002	< 0.0002	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00063	0.00875	0.00154	0.00335	0.0014	0.00017	0.0002	0.00017	0.00025	0.0036	0.00372	0.00278	0.00345	0.00893	**0.0119**	0.0059	0.00784	**0.0249**	**0.0604**	0.00135	0.00233	0.00517
Barium	mg/L	1	2	1	0.0194	0.0474	0.0362	0.042	0.0341	0.0112	0.0116	0.0128	0.0132	0.0351	0.0358	0.0275	0.0375	0.055	0.129	0.0358	0.0754	0.0923	**1.2**	0.0101	0.0318	0.0718
Beryllium	mg/L	0.004	--	--	< 0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000054	< 0.00002	0.000356	< 0.00002	0.000159	< 0.00002	**0.00576**	< 0.00004	0.000094	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.0001	< 0.00005	0.00131	< 0.0001	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	< 0.05	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.104	0.107	0.035	0.04	0.099	0.118	0.054	0.061	0.068	0.315	< 0.02	< 0.01	0.017
Cadmium	mg/L	0.005	0.007	0.005	0.0000404	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000099	< 0.000005	0.0000242	< 0.000005	0.0000554	< 0.000005	0.0000598	< 0.000005	0.00111	< 0.00001	0.0000344	0.0000058
Calcium	mg/L	--	--	--	46	83.9	73.2	80.4	72.8	57.5	54.6	60	56.4	54.9	52.6	60.3	86	55.5	120	70.4	94.4	72.1	1670	25.4	31.7	102
Cesium	mg/L	--	--	--	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000139	< 0.00001	0.00119	< 0.00001	0.000581	< 0.00001	0.0174	< 0.00002	0.000298	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00062	< 0.0005	< 0.0005	< 0.0005	0.00293	< 0.0005	0.0213	< 0.0005	0.0101	< 0.0005	**0.386**	< 0.001	0.00622	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00112	0.00034	< 0.0001	0.00025	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00025	0.00082	0.00087	0.0004	0.00132	0.00036	**0.00619**	0.00023	0.00294	0.00033	**0.0969**	< 0.0002	0.00184	0.00046
Copper	mg/L	0.087	2	--	0.00424	0.00041	0.00032	0.00068	0.00025	0.00022	< 0.0005	0.00036	0.00091	0.00052	< 0.0005	0.00095	0.00217	< 0.0002	0.0113	< 0.0002	0.00664	< 0.0002	**0.201**	< 0.0004	0.00383	0.00034
Iron	mg/L	--	--	--	0.514	**2.78**	1.01	**2.3**	**1.32**	< 0.01	< 0.01	< 0.01	0.097	0.457	0.573	0.049	**1.63**	0.276	**11.4**	0.11	**5.25**	**2.77**	**192**	0.704	**4.01**	0.032
Lead	mg/L	0.01	0.005	0.01	0.00166	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000732	< 0.00005	0.00436	< 0.00005	0.00208	< 0.00005	**0.0859**	< 0.0001	0.00142	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	< 0.005	0.0057	0.004	0.0049	0.0044	0.0014	0.0015	0.0012	0.0012	0.0039	0.0037	0.0031	0.0051	0.0044	0.0187	0.0039	0.0097	0.0068	0.229	< 0.002	0.0038	0.0045
Magnesium	mg/L	--	--	--	4.11	13.7	15.6	14	15.2	11	11.4	12.2	12.4	20.8	20.2	15.2	21.8	19.5	31.8	18.2	24	32.5	389	4.22	7.05	18
Manganese	mg/L	--	--	--	0.691	0.275	0.126	0.172	0.123	0.00061	0.00205	0.00106	0.0174	0.204	0.21	0.244	0.305	0.226	0.467	0.242	0.35	0.0721	**4.93**	0.0603	0.109	0.343
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000163	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000011	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000307	0.00183	0.000816	0.00204	0.000783	0.000202	0.000199	0.000083	0.000081	0.00901	0.00871	0.00232	0.00209	0.00729	0.00587	0.00586	0.00565	0.00335	0.00564	< 0.0001	0.000069	0.00138
Nickel	mg/L	0.1	--	--	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00183	0.00208	0.0005	0.00238	< 0.0005	0.0158	< 0.0005	0.00752	< 0.0005	**0.24**	< 0.001	0.00433	0.00111
Potassium	mg/L	--	--	--	< 0.25	1.28	0.967	1.36	0.938	0.729	0.757	0.582	0.621	5.05	4.91	2.07	2.5	2.38	5.3	1.26	2.74	2.93	47.7	0.121	0.894	1.38
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	< 0.001	0.00053	0.00098	0.00163	0.00092	0.00118	0.00115	0.00132	0.00149	0.00166	0.00177	0.00121	0.00375	0.00082	0.0202	0.0005	0.00999	0.00152	0.292	< 0.0004	0.00565	0.00155
Selenium	mg/L	0.01	0.05	0.05	0.000274	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000066	0.000078	0.00007	0.000095	0.000068	0.000085	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	0.000165	< 0.00005	0.00115	< 0.0001	0.000082	< 0.00005
Silver	mg/L	0.0015	--	--	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00002	< 0.00001	0.000573	< 0.00002	0.000014	< 0.0001
Sodium	mg/L	490	--	--	3.25	8.06	2.53	3.4	2.42	1.18	1.2	1.08	1.2	22.5	23.2	6.52	7.34	28.9	30.7	12.6	13	18.3	36	0.775	1.36	5.22
Strontium	mg/L	--	7	--	0.041	0.124	0.0784	0.0893	0.0773	0.0509	0.0489	0.0492	0.0496	0.253	0.234	0.191	0.203	0.428	0.47	0.278	0.304	0.445	1.8	0.0466	0.058	0.126
Tellurium	mg/L	--	--	--	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0004	< 0.0002	< 0.004	< 0.0004	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000012	< 0.00001	0.000075	< 0.00001	0.000044	< 0.00001	0.00163	< 0.00002	0.000026	< 0.00001
Thorium	mg/L	--	--	--	0.00052	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00057	< 0.0001	0.0036	< 0.0001	0.00094	< 0.0001	0.0768	< 0.0002	0.00066	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00058	0.00054	0.00024	0.00016	0.00026	< 0.0001	< 0.0001	< 0.0001	0.00021	0.00178	0.00326	0.0007	0.00099	< 0.0001	< 0.0005	< 0.0001	0.00021	< 0.0001	0.0057	< 0.0002	0.00025	< 0.0001
Titanium	mg/L	--	--	--	0.00764	0.00044	< 0.0003	0.0006	< 0.0003	< 0.0003	0.00054	< 0.0003	0.0037	< 0.0003	0.0028	< 0.0003	0.095	0.00102	0.516	< 0.0003	0.216	< 0.0003	10.4	0.00061	0.127	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00015	0.00012	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0001	0.00225	< 0.0002	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.000264	0.000139	0.000246	0.000391	0.000203	0.000215	0.000225	0.000229	0.000239	0.000658	0.0007	0.000944	0.00107	0.000868	0.0014	0.00154	0.00211	0.000048	0.0106	< 0.00002	0.000151	0.0015
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00062	< 0.0005	0.00333	0.00068	**0.022**	0.00192	**0.012**	< 0.0005	**0.376**	< 0.001	0.00603	0.00082
Zinc	mg/L	1.1	--	--	0.005	0.0013	0.0013	0.0027	0.001	< 0.001	< 0.003	< 0.001	0.0036	0.002	< 0.003	0.0023	0.006	< 0.001	0.0306	< 0.001	0.0157	< 0.001	0.444	< 0.002	0.0118	< 0.001
Zirconium	mg/L	--	--	--	< 0.0015	< 0.0003	0.00031	0.00075	< 0.0003	< 0.0003	< 0.0002	< 0.0003	< 0.0002	< 0.0003	0.00037	< 0.0003	0.0009	< 0.0003	0.00218	< 0.0003	0.00176	< 0.0003	0.0449	< 0.0006	0.00145	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-10-01 1_20230627 2023-06-27 TY2306190-002 N T	MW22-10-04 4_20230627 2023-06-27 TY2306190-003 N D	MW22-10-04 4_20230627 2023-06-27 TY2306190-003 N T	MW22-11-01 1_20230627 2023-06-27 TY2306190-001 N D	MW22-11-01 1_20230627 2023-06-27 TY2306190-001 N T	MW22-13-01 1_20230628 2023-06-28 TY2306190-014 N D	MW22-13-01 1_20230628 2023-06-28 TY2306190-014 N T	MW22-13-02 2_20230628 2023-06-28 TY2306190-015 N D	MW22-13-02 2_20230628 2023-06-28 TY2306190-015 N T	MW22-02-01 1_20230628 2023-06-28 TY2306190-018 N D	MW22-02-01 1_20230628 2023-06-28 TY2306190-018 N T	MW22-02-02 2_20230628 2023-06-28 TY2306190-019 N D	MW22-02-02 2_20230628 2023-06-28 TY2306190-019 N T	MW22-03-01 1_20230628 2023-06-28 TY2306190-016 N D	MW22-03-01 1_20230628 2023-06-28 TY2306190-016 N T	MW22-03-02 2_20230628 2023-06-28 TY2306190-017 N D	MW22-03-02 2_20230628 2023-06-28 TY2306190-017 N T	MW22-04-01 1_20230702 2023-07-02 TY2306289-005 N D	MW22-04-01 1_20230702 2023-07-02 TY2306289-005 N T	MW22-05-01 1_20230702 2023-07-02 TY2306289-002 N D	MW22-05-01 1_20230702 2023-07-02 TY2306289-002 N T	MW22-05-02 2_20230702 2023-07-02 TY2306289-001 N D
Aluminum	mg/L	--	2.9	--	1.72	0.0838	2.88	0.104	0.431	0.0028	1.72	0.0282	1.93	< 0.001	0.272	0.0022	0.419	< 0.001	**9.33**	0.0017	**61.5**	0.158	**4.96**	0.0016	**8.74**	0.0038
Antimony	mg/L	0.006	0.006	0.006	0.0001	0.00011	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	0.0016	0.00475	< 0.0001	0.00022	0.0001	< 0.0002	< 0.0001	< 0.002	< 0.0001	0.00032	< 0.0001	< 0.0002	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00616	0.00404	0.00528	0.00138	0.00152	0.00206	0.00239	0.00289	0.00402	0.00015	0.00033	0.00033	0.00049	0.0021	0.00377	0.00097	**0.0168**	0.00034	0.00472	< 0.0001	0.00479	0.00248
Barium	mg/L	1	2	1	0.0838	0.0222	0.0418	0.0154	0.0174	0.0268	0.0374	0.0441	0.0593	0.0409	0.0442	0.0396	0.0432	0.0527	0.119	0.0662	0.59	0.0176	0.0595	0.0132	0.0844	0.0176
Beryllium	mg/L	0.004	--	--	0.000061	< 0.00002	0.000132	0.000026	0.000042	< 0.00002	0.00006	< 0.00004	0.000097	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000355	< 0.00002	**0.00401**	< 0.00002	0.000296	< 0.00002	0.000476	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.0001	< 0.00005	0.000066	< 0.00005	< 0.00005	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	0.00102	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005
Boron	mg/L	5	5	5	0.02	0.018	0.029	< 0.01	0.011	0.013	0.014	< 0.02	< 0.02	0.022	0.023	0.016	0.018	0.012	0.021	0.022	< 0.2	< 0.01	0.022	< 0.01	0.03	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000267	0.0000081	0.0000422	< 0.0000005	0.0000078	< 0.0000005	0.0000111	< 0.00001	0.0000242	0.0000178	0.0000263	0.0000107	0.0000241	< 0.0000005	0.0000746	0.0000166	0.000614	0.0000162	0.00017	< 0.0000005	0.000239	< 0.0000005
Calcium	mg/L	--	--	--	123	44.9	58.7	59.2	67.2	70.8	73.9	97.6	103	65.2	67.1	66.1	71.5	84.4	139	91.7	261	80.7	383	69	517	71.4
Cesium	mg/L	--	--	--	0.000199	< 0.00001	0.000342	< 0.00001	0.000033	< 0.00001	0.000185	< 0.00002	0.000238	< 0.00001	0.00003	< 0.00001	0.000044	< 0.00001	0.00103	< 0.00001	0.00662	0.000013	0.000435	< 0.00001	0.000819	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00359	< 0.0005	0.00575	0.00053	0.00124	< 0.0005	0.00421	0.00189	0.0068	< 0.0005	0.00088	0.00066	0.00173	< 0.0005	0.0217	< 0.0005	**0.103**	0.00165	0.0131	0.00093	0.02	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00062	0.00055	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00136	0.00131	0.00093	0.00099	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.0015	0.00017	0.00174	0.00059	0.00083	< 0.0001	0.00103	< 0.0002	0.00146	< 0.0001	0.00026	< 0.0001	0.00034	0.00018	**0.00574**	0.00032	**0.0294**	0.0006	**0.00919**	< 0.0001	**0.00986**	0.00043
Copper	mg/L	0.087	2	--	0.00331	0.00042	0.00403	0.00031	0.00185	< 0.0002	0.00255	< 0.0004	0.00452	0.00042	0.00105	0.00022	0.00107	< 0.0002	0.0129	0.00137	0.0787	0.00132	0.0204	0.00024	0.023	0.00067
Iron	mg/L	--	--	--	**2.13**	1.06	**4.42**	**1.79**	**2.29**	**2.96**	**5.03**	**8.38**	**11.8**	< 0.01	0.555	< 0.01	0.506	0.426	**11.5**	0.01	**55.6**	0.42	**10.4**	< 0.01	**13.5**	0.058
Lead	mg/L	0.01	0.005	0.01	0.000826	< 0.00005	0.00142	< 0.00005	0.00022	< 0.00005	0.000783	< 0.0001	0.00128	< 0.00005	0.000134	< 0.00005	0.000195	< 0.00005	0.00491	< 0.00005	**0.0375**	0.000641	**0.00785**	< 0.00005	**0.00875**	0.000067
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0064	0.0027	0.0059	< 0.001	0.0016	0.0025	0.0045	0.0024	0.0061	0.0109	0.0117	0.0082	0.009	0.0039	0.0162	0.0068	0.0721	0.004	0.0127	0.003	0.0188	0.0032
Magnesium	mg/L	--	--	--	22.8	7.01	10.3	9.53	10.4	15	16.7	13.8	15.5	22	22	23.8	23.9	16.8	31.6	20	67.8	18.8	70.6	13.5	98.9	15.5
Manganese	mg/L	--	--	--	0.391	0.0976	0.159	0.162	0.178	0.164	0.205	0.367	0.435	0.0145	0.04	0.0249	0.0502	0.233	0.514	0.307	**1.78**	0.0295	0.542	0.00067	0.752	0.396
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	0.0000058	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00138	0.00172	0.0016	0.000136	0.000169	0.00111	0.000998	0.000456	0.000473	0.00344	0.00341	0.00572	0.00524	0.000634	0.000534	0.000987	0.00196	0.000192	0.000416	0.00036	0.000376	0.00247
Nickel	mg/L	0.1	--	--	0.00352	< 0.0005	0.00463	< 0.0005	0.00071	< 0.0005	0.00253	< 0.001	0.0035	< 0.0005	0.0008	< 0.0005	0.00099	< 0.0005	0.0146	0.00061	0.0733	0.00074	0.0121	< 0.0005	0.0168	< 0.0005
Potassium	mg/L	--	--	--	1.94	0.522	1.4	0.127	0.234	0.775	1.31	0.998	1.65	3.83	3.67	5.12	5.05	1.82	4.44	1.62	15.8	1.12	2.37	0.863	2.93	1.45
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00461	0.0004	0.00618	0.00026	0.00078	0.00097	0.00406	0.00144	0.00503	0.00101	0.0015	0.00137	0.00206	0.00126	0.019	0.00079	0.0997	0.00106	0.00772	0.00057	0.0131	0.00064
Selenium	mg/L	0.01	0.05	0.05	0.000077	0.0001	0.000111	0.000107	0.00007	0.000328	< 0.00005	< 0.0001	< 0.0001	< 0.00005	< 0.00005	0.00118	0.00106	< 0.00005	< 0.0001	< 0.00005	< 0.001	0.000057	< 0.0001	0.0004	0.000451	< 0.00005
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	0.000024	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000028	< 0.00001	0.000238	< 0.00001	0.000027	< 0.00001	0.000049	< 0.00001
Sodium	mg/L	490	--	--	5.84	11.3	12.2	1.65	1.74	13.4	13.6	10.4	10.8	8.58	8.89	12.1	12.5	5.59	7.12	12.6	18	1.65	2.22	1.53	2.47	1.92
Strontium	mg/L	--	7	--	0.145	0.0625	0.0757	0.0542	0.0553	0.0817	0.0821	0.111	0.112	0.12	0.116	0.1	0.0977	0.117	0.166	0.174	0.405	0.0706	0.262	0.0614	0.341	0.0776
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.004	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002
Thallium	mg/L	0.002	--	--	0.000021	< 0.00001	0.000028	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00002	< 0.00002	< 0.00001	< 0.00001	< 0.00001	0.000013	< 0.00001	0.000084	< 0.00001	0.000462	< 0.00001	0.000088	< 0.00001	0.000096	< 0.00001
Thorium	mg/L	--	--	--	0.0009	0.00011	0.00053	0.0002	0.00032	< 0.0001	0.00058	< 0.0002	0.00061	< 0.0001	0.0001	< 0.0001	0.00016	< 0.0001	0.00397	< 0.0001	0.0279	0.00017	0.0046	< 0.0001	0.00407	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00038	< 0.0001	0.0002	0.00028	0.00036	< 0.0001	0.00018	< 0.0002	0.00036	0.00037	0.00165	0.00033	0.00126	< 0.0001	0.00037	< 0.0001	0.00456	0.00018	0.00141	< 0.0001	0.00098	< 0.0001
Titanium	mg/L	--	--	--	0.13	0.00127	0.118	0.00338	0.0214	0.00049	0.103	0.00418	0.107	< 0.0003	0.0191	< 0.0003	0.0329	< 0.0003	0.585	< 0.0003	1.72	0.00764	0.307	< 0.0003	0.51	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0002	0.00114	0.00202	< 0.0001	< 0.0001	< 0.0002	< 0.0002	0.00016	0.00021	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.002	< 0.0001	< 0.0002	0.00022	0.00023	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00161	0.000257	0.000436	0.000067	0.000093	0.000048	0.000132	0.000066	0.000188	0.000191	0.000226	0.00336	0.00348	0.000584	0.0016	0.00128	0.0107	0.00146	0.00244	0.000964	0.00207	0.0026
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00488	0.0005	**0.00623**	0.00154	0.00235	0.00063	0.00473	0.00372	**0.00888**	< 0.0005	0.0009	< 0.0005	0.00123	< 0.0005	**0.0217**	0.00056	**0.103**	0.00081	**0.0165**	< 0.0005	**0.0236**	< 0.0005
Zinc	mg/L	1.1	--	--	0.0077	< 0.001	0.0086	0.0016	0.0032	< 0.001	0.0051	< 0.002	0.0139	0.0032	0.0061	0.0026	0.0051	< 0.001	0.0328	0.0022	0.227	0.0021	0.0258	< 0.001	0.0362	0.0013
Zirconium	mg/L	--	--	--	0.00147	0.00044	0.00122	0.001	0.00141	0.00074	0.00146	0.00302	0.00296	< 0.0003	0.00057	< 0.0003	0.00044	< 0.0003	0.00225	< 0.0003	0.00854	0.00057	0.0025	< 0.0003	0.00212	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-05-02	MW22-12-01	MW22-12-01	MW22-12-04	MW22-12-04	MW22-14-01	MW22-14-01	MW22-14-02	MW22-14-02	MW22-19-01	MW22-19-01	MW22-19-02	MW22-19-02	MW22-20-01	MW22-20-01	MW22-20-02	MW22-20-02	MW22-01-01	MW22-01-01	MW22-01-02	MW22-01-02	MW22-15-01
					MW22-05-2_20230702	MW22-12-1_20230702	MW22-12-1_20230702	MW22-12-4_20230702	MW22-12-4_20230702	MW22-14-1_20230702	MW22-14-1_20230702	MW22-14-2_20230702	MW22-14-2_20230702	MW22-19-1_20230703	MW22-19-1_20230703	MW22-19-2_20230703	MW22-19-2_20230703	MW22-20-1_20230703	MW22-20-1_20230703	MW22-20-2_20230703	MW22-20-2_20230703	MW22-01-1_20230704	MW22-01-1_20230704	MW22-01-2_20230704	MW22-01-2_20230704	MW22-15-1_20230705
					2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-03	2023-07-03	2023-07-03	2023-07-03	2023-07-03	2023-07-03	2023-07-03	2023-07-03	2023-07-04	2023-07-04	2023-07-04	2023-07-04	2023-07-05
					TY2306289-001	TY2306289-003	TY2306289-003	TY2306289-004	TY2306289-004	TY2306289-006	TY2306289-006	TY2306289-007	TY2306289-007	TY2306289-009	TY2306289-009	TY2306289-010	TY2306289-010	TY2306289-011	TY2306289-011	TY2306289-012	TY2306289-012	TY2306508-005	TY2306508-005	TY2306508-006	TY2306508-006	TY2306508-010
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Parameter	**Units**	**Generic Ontario Standards** OREG 153/04 T2 SCS Potable (coarse)	**Human Health Based Guideline** CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	2.04	0.0022	0.254	0.0018	1.69	0.0164	**4.9**	0.002	1.18	0.182	2.13	0.0036	**4.76**	0.0014	1.71	0.0064	**19.9**	< 0.001	**3.78**	< 0.001	**5.37**	0.004
Antimony	mg/L	0.006	0.006	0.006	< 0.0002	0.00013	0.00014	< 0.0001	< 0.0001	0.00024	0.00037	< 0.0001	< 0.0001	0.0003	0.00038	< 0.0001	0.00023	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0001	< 0.0002	0.00014
Arsenic	mg/L	0.025	0.01	0.01	0.00378	0.00075	0.00112	0.00067	0.00138	0.0002	0.00144	0.00012	0.00051	0.00059	0.00106	0.00024	0.00222	0.00123	0.00201	0.00182	0.00655	0.0003	0.00126	0.00056	0.00162	0.00046
Barium	mg/L	1	2	1	0.0311	0.0322	0.0368	0.0171	0.0279	0.0264	0.0675	0.0207	0.0301	0.0159	0.0294	0.00988	0.0426	0.0307	0.0441	0.0598	0.205	0.0258	0.0534	0.0234	0.0682	0.0256
Beryllium	mg/L	0.004	--	--	0.000083	< 0.00002	< 0.00002	< 0.00002	0.000075	< 0.00002	0.000199	< 0.00002	0.000045	< 0.00002	0.000097	< 0.00002	0.000216	< 0.00002	0.000107	< 0.00002	0.000896	< 0.00002	0.000156	< 0.00002	0.000205	< 0.00002
Bismuth	mg/L	--	--	--	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	0.00011	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005
Boron	mg/L	5	5	5	< 0.02	0.012	0.014	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	0.01	< 0.02	0.086	0.143	0.043	0.046	0.014	0.067	0.016	0.02	0.019	0.029	0.015
Cadmium	mg/L	0.005	0.007	0.005	0.0000315	< 0.000005	0.0000079	< 0.000005	0.0000227	< 0.000005	0.0000316	< 0.000005	0.0000178	0.0000151	0.0000356	0.000151	0.000123	0.0000065	0.0000621	< 0.000005	0.000205	< 0.000005	0.0000487	< 0.000005	0.0000629	< 0.0000005
Calcium	mg/L	--	--	--	104	86.1	85.4	88.3	120	80.6	118	72.7	86.7	90	108	78.8	114	75	81.2	122	207	70.5	161	64	132	64.1
Cesium	mg/L	--	--	--	0.000203	< 0.00001	0.000032	< 0.00001	0.000188	< 0.00001	0.000587	< 0.00001	0.000124	0.000033	0.000228	< 0.00001	0.000472	0.000016	0.000295	< 0.00001	0.0021	< 0.00001	0.000349	< 0.00001	0.000553	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00439	< 0.0005	0.00078	< 0.0005	0.00355	< 0.0005	0.0098	0.00092	0.0031	0.00078	0.00517	< 0.0005	0.00993	< 0.0005	0.00596	< 0.0005	**0.0512**	< 0.0005	0.00801	< 0.0005	0.0112	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00091	0.0009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00192	< 0.0001	0.00021	< 0.0001	0.00119	0.00036	0.00293	< 0.0001	0.00071	0.00147	**0.00306**	0.0002	**0.00377**	0.00093	0.00216	0.0002	**0.0134**	0.00025	0.00251	0.0006	**0.00393**	< 0.0001
Copper	mg/L	0.087	2	--	0.00381	0.00045	< 0.0005	< 0.0002	0.00267	0.0003	0.00684	0.00041	0.00221	0.00344	0.00842	0.00159	0.0115	0.00136	0.0109	< 0.0002	0.0354	< 0.0002	0.00772	< 0.0002	0.00858	0.00158
Iron	mg/L	--	--	--	**3.08**	**1.12**	**2.46**	**1.35**	**3.49**	0.016	**5.59**	< 0.01	**1.3**	0.281	**2.65**	< 0.01	**6.09**	**1.27**	**4.63**	1.02	**30.6**	0.709	**5.39**	0.17	**6.44**	0.011
Lead	mg/L	0.01	0.005	0.01	0.00134	0.000073	0.000118	< 0.00005	0.00125	< 0.00005	0.00232	< 0.00005	0.000588	0.000354	0.00138	< 0.00005	0.00324	< 0.00005	0.00119	< 0.00005	**0.0135**	< 0.00005	0.00285	< 0.00005	0.00359	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0065	0.006	0.0065	0.001	0.0035	0.008	0.016	0.0057	0.0076	0.0113	0.0152	< 0.001	0.0077	0.0124	0.0157	0.0036	0.0384	0.0044	0.0089	0.0028	0.0103	0.0032
Magnesium	mg/L	--	--	--	24	15.3	16.1	12.3	21.4	21.6	30.7	16	20.1	16.8	23.4	14.7	24.8	17.4	19.8	11.6	36.1	17.4	34.9	18.5	31.2	15.7
Manganese	mg/L	--	--	--	0.471	0.15	0.158	0.284	0.358	0.132	0.257	0.00215	0.038	0.0916	0.154	0.0853	0.241	0.171	0.212	0.14	0.72	0.0595	0.232	0.187	0.381	0.00028
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	-	-	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00223	0.0035	0.00357	0.000229	0.00028	0.00172	0.00162	0.000257	0.000239	0.00516	0.00578	0.00519	0.00685	0.00442	0.0045	0.000682	0.000719	0.000442	0.000471	0.00278	0.00238	0.0137
Nickel	mg/L	0.1	--	--	0.0035	< 0.0005	< 0.0005	< 0.0005	0.00249	0.00085	0.00731	< 0.0005	0.00152	0.00179	0.00464	0.00182	0.00937	0.00139	0.00577	0.00051	0.0349	< 0.0005	0.00525	< 0.0005	0.00813	0.00179
Potassium	mg/L	--	--	--	2.12	1.2	1.38	0.345	0.921	1.21	2.72	0.341	0.635	1.12	1.9	1.48	2.74	3.64	4.26	0.503	5.04	2.11	2.9	2.69	4.33	4.95
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00394	0.00112	0.00153	0.00064	0.00363	< 0.0002	0.00846	0.00078	0.00257	0.00258	0.00609	0.00106	0.0083	0.00314	0.00718	0.00157	0.0378	0.00207	0.0082	0.0044	0.0153	0.00247
Selenium	mg/L	0.01	0.05	0.05	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000348	0.000268	0.000317	0.000312	0.000859	0.00077	0.000108	0.000172	< 0.00005	0.000054	< 0.00005	0.000252	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005
Silver	mg/L	0.0015	--	--	0.00002	< 0.00001	< 0.00001	< 0.00001	0.000018	< 0.00001	0.000022	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	0.000021	< 0.00001	0.000462	< 0.00001	0.000093	< 0.00001	0.000023	< 0.00001	0.00002	< 0.00001
Sodium	mg/L	490	--	--	2.26	3.58	3.73	1.18	1.44	6.88	7.66	4.63	4.76	13.6	14.1	2.47	3.44	39.5	41.3	5.32	7.48	4.46	4.68	2.57	3.24	3.84
Strontium	mg/L	--	7	--	0.0966	0.103	0.103	0.0725	0.0901	0.136	0.162	0.105	0.106	0.0956	0.104	0.073	0.102	0.314	0.311	0.188	0.274	0.144	0.191	0.0769	0.121	0.0717
Tellurium	mg/L	--	--	--	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000022	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	0.000066	< 0.00001	< 0.00001	< 0.00001	0.000119	< 0.00001	0.000057	< 0.00001	0.000089	< 0.00001
Thorium	mg/L	--	--	--	0.00081	< 0.0001	0.00013	< 0.0001	0.00081	< 0.0001	0.00205	< 0.0001	0.00058	0.00012	0.00087	< 0.0001	0.00134	< 0.0001	0.00086	< 0.0001	0.00456	< 0.0001	0.00221	< 0.0001	0.00182	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00042	< 0.0001	0.00022	< 0.0001	0.00015	0.00011	0.0009	0.00021	0.0005	0.00021	0.00057	0.00041	0.00158	< 0.0001	0.00041	< 0.0001	< 0.0005	< 0.0001	0.00023	< 0.0001	0.00074	0.00013
Titanium	mg/L	--	--	--	0.135	< 0.0003	0.0168	< 0.0003	0.132	0.00077	0.282	< 0.0003	0.0796	0.00942	0.15	< 0.0003	0.279	< 0.0003	0.0923	< 0.0003	0.847	< 0.0003	0.31	< 0.0003	0.323	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.0898	0.0955	0.00013	< 0.0002	0.0282	0.0331	< 0.0001	< 0.0005	0.00021	0.00068	< 0.0001	< 0.0002	0.0149
Uranium	mg/L	0.02	0.02	0.02	0.00288	0.000026	0.000042	0.00001	0.000142	0.00535	0.00639	0.000566	0.000599	**0.0408**	**0.0509**	0.000241	0.000442	0.00299	0.00358	0.000348	0.00251	0.00062	0.00183	0.00372	0.00456	0.000601
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00483	< 0.0005	0.00099	< 0.0005	0.0046	< 0.0005	**0.0109**	< 0.0005	0.00292	0.00111	0.00556	< 0.0005	**0.0104**	< 0.0005	0.00408	< 0.0005	**0.0491**	< 0.0005	**0.00904**	< 0.0005	**0.0127**	< 0.0005
Zinc	mg/L	1.1	--	--	0.0081	0.0012	0.0031	< 0.001	0.005	< 0.001	0.0145	< 0.001	0.0066	0.0055	0.0147	0.0049	0.0245	0.0038	0.017	0.0028	0.0698	< 0.001	0.0121	0.0011	0.0215	0.0011
Zirconium	mg/L	--	--	--	0.00058	0.00058	0.00092	0.00039	0.00145	< 0.0003	0.00137	< 0.0003	0.00091	0.00068	0.00098	0.00037	0.00316	0.00072	0.00119	< 0.0003	0.0029	< 0.0003	0.00185	< 0.0003	0.00314	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-15-01 MW22-15-1_20230705 2023-07-05 TY2306508-010 N T	MW22-15-03 MW22-15-3_20230705 2023-07-05 TY2306508-011 N D	MW22-15-03 MW22-15-3_20230705 2023-07-05 TY2306508-011 N T	MW22-16-01 MW22-16-1_20230705 2023-07-05 TY2306508-008 N D	MW22-16-01 MW22-16-1_20230705 2023-07-05 TY2306508-008 N T	MW22-16-02 MW22-16-2_20230705 2023-07-05 TY2306508-009 N D	MW22-16-02 MW22-16-2_20230705 2023-07-05 TY2306508-009 N T	MW22-17-01 MW22-17-1_20230704 2023-07-04 TY2306508-001 N D	MW22-17-01 MW22-17-1_20230704 2023-07-04 TY2306508-001 N T	MW22-17-02 MW22-17-2_20230704 2023-07-04 TY2306508-002 N D	MW22-17-02 MW22-17-2_20230704 2023-07-04 TY2306508-002 N T	MW22-18-01 MW22-18-1_20230704 2023-07-04 TY2306508-004 N D	MW22-18-01 MW22-18-1_20230704 2023-07-04 TY2306508-004 N T	MW22-18-02 MW22-18-2_20230704 2023-07-04 TY2306508-003 N D	MW22-18-02 MW22-18-2_20230704 2023-07-04 TY2306508-003 N T	MW22-01-01 MW22-01-1_20230809 2023-08-09 TY2307856-007 N D	MW22-01-01 MW22-01-1_20230809 2023-08-09 TY2307856-007 N T	MW22-01-02 MW22-01-2_20230809 2023-08-09 TY2307856-008 N D	MW22-01-02 MW22-01-2_20230809 2023-08-09 TY2307856-008 N T	MW22-05-01 MW22-05-1_20230808 2023-08-08 TY2307856-001 N D	MW22-05-01 MW22-05-1_20230808 2023-08-08 TY2307856-001 N T	MW22-05-02 MW22-05-2_20230808 2023-08-08 TY2307856-002 N D
Aluminum	mg/L	--	2.9	--	1.22	0.0017	1.33	0.0053	2.09	0.0069	**11.2**	0.0099	**3.79**	0.005	1.69	0.0468	1.68	0.429	**4.42**	0.0024	2.26	< 0.001	1.49	0.0022	0.271	0.0011
Antimony	mg/L	0.006	0.006	0.006	0.00017	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00045	0.00049	< 0.0001	0.00014	< 0.0001	< 0.0002	< 0.0001	0.00013	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00011	0.00052	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00078	0.00048	0.00092	0.00025	0.00179	0.00047	0.00199	0.00039	0.0014	0.00128	0.00186	0.0007	0.0013	0.00059	0.0022	0.00025	0.00087	0.00024	0.00054	0.00385	0.00395	< 0.0001
Barium	mg/L	1	2	1	0.0369	0.0427	0.052	0.042	0.0694	0.0377	0.136	0.0271	0.0739	0.0196	0.0321	0.0337	0.0526	0.0124	0.0632	0.0202	0.037	0.0203	0.0309	0.017	0.0191	0.0146
Beryllium	mg/L	0.004	--	--	0.000034	< 0.00002	0.000048	< 0.00002	0.000064	< 0.00002	0.000568	< 0.00002	0.000161	< 0.00002	0.000061	0.000375	0.000674	0.000069	0.000424	< 0.00002	0.000091	< 0.00002	0.000058	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.0001	< 0.00005	0.000132	< 0.00005	0.00031	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	0.00009	< 0.00005	0.00011	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.017	< 0.01	< 0.02	< 0.01	< 0.01	0.047	0.061	< 0.01	0.016	0.067	0.072	0.011	0.014	< 0.01	< 0.02	0.01	0.013	0.011	0.013	< 0.01	< 0.01	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000315	0.0000074	0.0000164	0.0000201	0.0000345	0.0000138	0.0000488	< 0.0000005	0.000334	< 0.0000005	0.0000223	0.0000116	0.0000203	0.0000318	0.000107	< 0.0000005	0.0000275	< 0.0000005	0.0000378	< 0.0000005	0.0000081	< 0.0000005
Calcium	mg/L	--	--	--	77.5	85.7	102	31.8	32.6	63.7	94.8	58.7	181	62.4	93.3	27.8	29.9	8.59	12.2	73	117	70.3	79.6	74.8	76	67.9
Cesium	mg/L	--	--	--	0.000114	< 0.00001	0.000164	0.000222	0.0011	0.000012	0.00742	< 0.00001	0.000369	< 0.00001	0.000157	0.000027	0.00019	0.000067	0.000998	< 0.00001	0.000159	< 0.00001	0.000162	< 0.00001	0.000029	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.0028	< 0.0005	0.0029	< 0.0005	0.0108	< 0.0005	0.0384	< 0.0005	0.0124	< 0.0005	0.0037	0.00091	0.00227	0.00131	0.00691	< 0.0005	0.00458	< 0.0005	0.00342	< 0.0005	0.00072	0.00109
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00082
Cobalt	mg/L	0.0038	--	--	0.00116	0.0008	0.00167	0.00043	0.00257	0.0011	**0.00973**	0.0007	**0.00491**	0.00021	0.00143	0.00022	0.00078	0.00177	**0.00521**	0.0001	0.00135	0.00022	0.00114	0.00044	0.00067	< 0.0001
Copper	mg/L	0.087	2	--	0.00311	0.00122	0.00248	0.00174	0.0152	0.00145	0.0179	0.00026	0.0295	0.00157	0.00566	0.00107	0.00984	0.0126	0.0396	< 0.0002	0.00372	< 0.0002	0.00269	0.00094	0.00063	0.00023
Iron	mg/L	--	**1.39**	--	**1.39**	< 0.01	**1.64**	< 0.01	**2.42**	< 0.01	**14.1**	0.401	**5.57**	0.064	**2.24**	0.5	**1.96**	0.339	**5.3**	0.485	**3.31**	0.198	**2.11**	0.406	0.981	< 0.01
Lead	mg/L	0.01	0.005	0.01	0.000598	< 0.00005	0.000764	< 0.00005	0.00369	< 0.00005	0.00367	< 0.00005	**0.00685**	< 0.00005	0.00124	0.000264	0.00251	0.000173	0.00405	< 0.00005	0.00153	< 0.00005	0.00098	< 0.00005	0.000238	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.005	0.004	0.0056	0.0099	0.0136	0.0085	0.0347	0.0035	0.0095	0.0014	0.0037	0.0167	0.0185	0.0025	0.0121	0.0035	0.0067	0.0027	0.0054	0.0029	0.0034	0.0026
Magnesium	mg/L	--	--	--	16.8	17.6	21.1	7.6	8.39	15.8	26.8	11	39.4	12.3	19.6	7.27	7.8	1.93	4.23	16.5	31.6	16.6	20.4	16.5	18	14.6
Manganese	mg/L	--	--	--	0.233	0.466	0.52	0.014	0.0478	0.53	0.791	0.628	0.899	0.282	0.328	0.445	0.478	0.0698	0.163	0.0406	0.146	0.0897	0.131	0.42	0.457	0.00048
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000131	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000065	< 0.000005	< 0.000005	0.0000054	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.0137	0.00719	0.00721	0.000634	0.000676	0.00511	0.00496	0.00199	0.00129	0.00581	0.00546	0.00451	0.00504	0.00155	0.00209	0.00058	0.000548	0.00113	0.00108	0.00252	0.00219	0.000362
Nickel	mg/L	0.1	--	--	0.0037	0.00065	0.0026	0.00354	0.0128	0.00363	0.0322	0.00212	0.0145	0.00113	0.00378	0.00114	0.00244	0.00492	0.00976	< 0.0005	0.00286	0.00072	0.0038	< 0.0005	0.00092	< 0.0005
Potassium	mg/L	--	--	--	5.21	6.78	6.98	3.77	4.26	6.38	11.3	3.11	4.73	2.64	2.78	2.1	2.59	1.81	3.21	1.71	2.56	1.97	2.61	1.4	1.63	0.858
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00441	0.00093	0.00317	0.0133	0.0172	0.00048	0.0343	0.00131	0.0121	0.00099	0.00414	0.00304	0.00461	0.00696	0.0166	0.00213	0.00512	0.00338	0.00644	0.0006	0.00111	0.00028
Selenium	mg/L	0.01	0.05	0.05	0.000056	0.00005	0.000114	0.000087	0.000104	0.000127	0.000167	0.000051	0.000062	0.000066	< 0.0001	0.000237	0.000257	0.000077	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000467
Silver	mg/L	0.0015	--	--	0.000671	< 0.00001	< 0.00002	< 0.00001	**0.0027**	< 0.00001	0.00006	< 0.00001	**0.00165**	< 0.00001	0.000102	< 0.00001	0.000522	0.000129	**0.00955**	< 0.00001	0.000015	< 0.00001	0.000011	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	4.07	13.3	13.9	1.67	1.9	6.01	6.5	1.69	2.09	5.49	5.27	8.08	9.11	1.62	2.4	2.76	3.52	2.02	2.39	1.8	2.19	1.43
Strontium	mg/L	--	7	--	0.0797	0.0784	0.088	0.0272	0.032	0.071	0.0954	0.0502	0.126	0.0572	0.0785	0.172	0.195	0.0411	0.107	0.0996	0.134	0.0685	0.0754	0.0759	0.0774	0.0596
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	0.000023	< 0.00001	0.000035	0.00004	0.000078	< 0.00001	0.000215	< 0.00001	0.000083	< 0.00001	0.000034	< 0.00001	0.000014	0.00002	0.000073	< 0.00001	0.00003	< 0.00001	0.000023	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	0.00039	< 0.0001	0.00036	< 0.0001	0.00052	< 0.0001	0.00213	< 0.0001	0.00175	< 0.0001	0.00061	0.00029	0.00127	0.00058	0.00381	< 0.0001	0.00121	< 0.0001	0.00055	< 0.0001	0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00055	0.00016	0.0005	< 0.0001	0.00023	0.00022	0.00114	0.00013	0.00032	0.00111	0.0015	0.00019	0.00049	0.00047	0.00089	< 0.0001	0.00016	< 0.0001	0.00078	0.0001	0.00017	< 0.0001
Titanium	mg/L	--	--	--	0.0804	< 0.0003	0.0758	< 0.0003	0.129	< 0.0003	0.742	< 0.0003	0.187	< 0.0003	0.122	0.00214	0.028	0.00265	0.163	< 0.0003	0.229	< 0.0003	0.098	< 0.0003	0.0187	< 0.0003
Tungsten	mg/L	--	--	--	0.0234	< 0.0001	< 0.0002	0.0335	0.034	< 0.0001	0.00074	0.0152	0.0115	0.0226	0.0198	0.0313	0.0359	0.0326	0.058	< 0.0001	0.00057	< 0.0001	0.00012	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.000718	0.00173	0.00193	0.00132	0.00184	0.0107	0.0131	0.00136	0.00276	0.00186	0.00213	0.00285	0.00457	0.000577	0.00159	0.00157	0.0021	0.00222	0.00255	0.00216	0.00236	0.00102
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00268	< 0.0005	0.0032	< 0.0005	0.00569	0.00061	**0.0288**	0.00098	**0.0116**	< 0.0005	0.00457	0.00437	**0.00717**	0.00055	**0.00968**	< 0.0005	0.00562	< 0.0005	0.00359	< 0.0005	0.00081	< 0.0005
Zinc	mg/L	1.1	--	--	0.005	0.0014	< 0.006	0.0014	0.0097	0.0017	0.0287	0.0174	0.0229	0.0012	0.0065	0.0012	0.0053	0.0043	0.0275	< 0.001	0.0066	0.0022	0.0113	< 0.001	0.0045	< 0.001
Zirconium	mg/L	--	--	--	0.00093	< 0.0003	0.00056	< 0.0003	0.0007	0.00039	0.00346	0.00092	0.00316	0.00076	0.0014	0.0028	0.00101	0.00063	0.00079	< 0.0003	0.00185	< 0.0003	0.001	< 0.0003	0.00022	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-05-02 MW22-05-2_20230808 2023-08-08 TY2307856-002 N T	MW22-06-01 MW22-06-1_20230808 2023-08-08 TY2307856-004 N D	MW22-06-01 MW22-06-1_20230808 2023-08-08 TY2307856-004 N T	MW22-06-02 MW22-06-2_20230808 2023-08-08 TY2307856-003 N D	MW22-06-02 MW22-06-2_20230808 2023-08-08 TY2307856-003 N T	MW22-11-01 MW22-11-1_20230808 2023-08-08 TY2307856-005 N D	MW22-11-01 MW22-11-1_20230808 2023-08-08 TY2307856-005 N T	MW22-16-01 MW22-16-1_20230809 2023-08-09 TY2307856-015 N D	MW22-16-01 MW22-16-1_20230809 2023-08-09 TY2307856-015 N T	MW22-17-01 MW22-17-01_20230809 2023-08-09 TY2307856-013 N D	MW22-17-01 MW22-17-01_20230809 2023-08-09 TY2307856-013 N T	MW22-17-02 MW22-17-2_20230809 2023-08-09 TY2307856-009 N D	MW22-17-02 MW22-17-2_20230809 2023-08-09 TY2307856-009 N T	MW22-18-01 MW22-18-1_20230809 2023-08-09 TY2307856-011 N D	MW22-18-01 MW22-18-1_20230809 2023-08-09 TY2307856-011 N T	MW22-18-02 MW22-18-2_20230809 2023-08-09 TY2307856-010 N D	MW22-18-02 MW22-18-2_20230809 2023-08-09 TY2307856-010 N T	MW22-12 MW22-12-1_20230811 2023-08-11 TY2308084-011 N D	MW22-12 MW22-12-1_20230811 2023-08-11 TY2308084-011 N T	MW22-02-01 MW22-02-1_20230812 2023-08-12 TY2308084-019 N D	MW22-02-01 MW22-02-1_20230812 2023-08-12 TY2308084-019 N T	MW22-02-02 MW22-02-2_20230812 2023-08-12 TY2308084-020 N D
Aluminum	mg/L	--	2.9	--	**8.21**	0.001	0.0247	0.0018	0.0918	0.1	0.57	0.0049	1.86	0.0076	**3.06**	0.0062	2.79	0.0091	0.89	0.206	**11.8**	0.0109	0.511	0.0011	0.179	0.0028
Antimony	mg/L	0.006	0.006	0.006	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00017	< 0.0002	0.00027	0.00011	< 0.0001	< 0.0002	0.00018	< 0.0001	< 0.0002	0.00049	0.00143	0.00065	0.0008	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.0038	0.00017	0.00018	0.00019	0.00028	0.00135	0.00137	0.00024	0.00136	0.00036	0.00094	0.0018	0.00317	0.00085	0.001	0.00066	0.00419	0.00048	0.00082	0.00051	0.00041	0.0003
Barium	mg/L	1	2	1	0.0703	0.0106	0.0112	0.0118	0.0128	0.013	0.0147	0.0411	0.0665	0.0239	0.0473	0.019	0.0361	0.0315	0.0468	0.0262	0.153	0.0337	0.0396	0.0403	0.0425	0.0305
Beryllium	mg/L	0.004	--	--	0.00034	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000032	0.000051	< 0.00002	0.000046	< 0.00004	0.000105	< 0.00002	0.000098	0.000396	0.000535	0.000164	0.000985	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	0.000079	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000103	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	0.000061	< 0.00005	0.0002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.018	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.011	0.074	0.089	< 0.02	0.01	< 0.01	< 0.02	0.012	0.013	0.018	0.019	0.014
Cadmium	mg/L	0.005	0.007	0.005	0.000108	< 0.000005	0.0000122	< 0.000005	0.0000051	< 0.000005	0.0000092	0.0000175	0.0000427	< 0.00001	0.000174	0.0000203	0.0000511	< 0.00001	0.0000471	0.0000345	0.000205	0.0000287	0.0000429	< 0.000005	0.0000074	0.0000121
Calcium	mg/L	--	--	--	280	66	58.2	62.2	58	64.4	65.6	35.8	32.8	60.4	89.6	58.7	149	24.8	26.6	18.2	21.4	79.8	95.5	64	73.3	62.1
Cesium	mg/L	--	--	--	0.000774	< 0.00001	< 0.00001	< 0.00001	0.000014	< 0.00001	0.000045	0.000241	0.000917	< 0.00002	0.000321	< 0.00001	0.000261	< 0.00002	0.000106	0.000067	0.00188	< 0.00001	0.000068	< 0.00001	0.000021	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.0183	< 0.0005	< 0.0005	< 0.0005	0.00078	0.00056	0.00208	< 0.0005	0.0104	< 0.001	0.00932	< 0.0005	0.00802	0.00108	0.00309	0.00113	0.0171	< 0.0005	0.00283	< 0.0005	0.00063	0.00087
Chromium (Hexavalent)	mg/L	0.025	--	--	0.00091	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00085
Cobalt	mg/L	0.0038	--	--	**0.00687**	< 0.0001	< 0.0001	< 0.0001	0.00032	0.00017	0.00052	0.00025	0.00221	0.00051	0.00284	0.00023	0.00249	< 0.0002	0.0009	0.00156	**0.0102**	0.00039	0.00079	0.00016	0.00031	< 0.0001
Copper	mg/L	0.087	2	--	0.0159	0.00028	< 0.0005	0.00038	0.0011	0.0005	0.00245	0.00138	0.0132	< 0.0004	0.0158	0.00052	0.00604	0.00086	0.00546	0.019	0.0857	0.00167	0.00132	< 0.0002	< 0.0005	0.00091
Iron	mg/L	--	--	--	**12.6**	< 0.01	0.04	< 0.01	0.157	**1.91**	**2.66**	< 0.01	**2.33**	0.569	**4.57**	0.127	**4.44**	0.693	**1.79**	0.318	**14.1**	0.828	**1.76**	**1.36**	**1.18**	< 0.01
Lead	mg/L	0.01	0.005	0.01	**0.00588**	< 0.00005	< 0.00005	< 0.00005	0.000163	< 0.00005	0.000321	< 0.00005	0.00276	< 0.0001	0.00286	< 0.00005	0.00237	< 0.0001	0.000842	< 0.00005	**0.00815**	0.000091	0.000416	< 0.00005	0.00017	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0152	0.0014	0.0016	0.0012	0.0016	< 0.001	0.0016	0.0077	0.0126	0.0034	0.0076	0.0013	0.006	0.0149	0.0195	0.0057	0.0296	0.0062	0.0056	0.01	0.01	0.0105
Magnesium	mg/L	--	--	--	59.9	11.3	11.1	11.4	11.5	9.67	10.8	8.41	9.16	11.2	21.1	11.9	31.6	7.2	7.67	2.64	9.15	15.6	17.9	21.1	23.1	21.2
Manganese	mg/L	--	--	--	0.475	0.0014	0.00601	0.00078	0.0223	0.15	0.171	0.00837	0.0424	0.556	0.74	0.282	0.463	0.39	0.492	0.308	0.485	0.15	0.178	0.0698	0.0835	0.0136
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000364	0.000216	0.000178	0.000083	0.000086	0.000121	0.000118	0.000572	0.000685	0.00326	0.00335	0.0066	0.00592	0.00511	0.00349	0.00937	0.00503	0.00578	0.00631	0.00263	0.0028	0.00492
Nickel	mg/L	0.1	--	--	0.0143	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00105	0.00276	0.0115	0.00152	0.0088	0.00244	0.00618	0.00133	0.00557	0.00369	0.0161	0.012	0.0164	< 0.0005	0.00084	< 0.0005
Potassium	mg/L	--	--	--	3.01	0.642	0.729	0.538	0.608	0.106	0.252	3.22	4.57	2.94	4.6	2.47	3.48	2.08	2.38	3.23	6.42	1.22	1.47	3.17	3.19	5.1
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.0121	0.00111	0.00123	0.00132	0.00145	< 0.0002	0.00096	0.0122	0.0166	0.00114	0.00858	0.00101	0.00687	0.00315	0.00428	0.0112	0.0314	0.00112	0.00197	0.0008	0.00111	0.0015
Selenium	mg/L	0.01	0.05	0.05	0.000352	0.000055	0.00006	0.000103	0.000073	0.000256	0.000072	0.000106	0.000096	0.000661	0.000104	0.00007	0.000073	0.000269	0.000167	0.000086	0.000101	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000671
Silver	mg/L	0.0015	--	--	0.000042	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	**0.00211**	< 0.00002	**0.00468**	< 0.00001	0.000057	< 0.00002	**0.00191**	0.00003	**0.0213**	< 0.00001	0.000021	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	2.55	1.09	1.3	0.955	1.05	1.55	1.92	2.03	3.53	3.37	4.28	8.65	10.2	8.58	5.88	2.4	4.97	3.6	4.02	7.39	8.12	8.96
Strontium	mg/L	--	7	--	0.204	0.0525	0.051	0.0509	0.0486	0.0542	0.0576	0.0294	0.0318	0.0531	0.0784	0.0569	0.119	0.18	0.185	0.098	0.258	0.099	0.104	0.119	0.12	0.0966
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	0.000126	< 0.00001	< 0.00001	0.000011	< 0.00001	< 0.00001	< 0.00001	0.00003	0.000074	< 0.00002	0.000058	< 0.00001	0.000087	< 0.00002	0.000019	0.000023	0.000122	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000013
Thorium	mg/L	--	--	--	0.00405	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00021	0.00037	< 0.0001	0.00044	< 0.0002	0.00101	< 0.0001	0.00084	0.00026	0.00099	0.00056	0.00637	< 0.0001	0.00022	< 0.0001	< 0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00044	< 0.0001	0.00018	< 0.0001	< 0.0001	0.00012	< 0.0001	< 0.0001	0.00058	< 0.0002	0.00046	0.00031	0.00023	< 0.0002	0.00082	< 0.0001	0.00096	0.00024	0.00059	0.00029	0.00076	< 0.0001
Titanium	mg/L	--	--	--	0.549	< 0.0003	0.00144	< 0.0003	0.00518	0.00343	0.029	< 0.0003	0.124	< 0.0006	0.224	< 0.0003	0.261	0.0016	0.0414	0.0018	0.389	0.00047	0.0324	< 0.0003	0.0149	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00057	0.0015	0.0152	0.021	0.0133	0.0222	0.0201	0.0184	0.0361	0.0247	0.011	0.0667	< 0.0001	0.00012	0.00014	0.00016	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00166	0.000228	0.000236	0.000236	0.000246	0.000071	0.000102	0.0016	0.0021	0.00114	0.0016	0.0015	0.00197	0.00339	0.00249	0.00102	0.00238	0.000047	0.000096	0.000103	0.000138	0.00263
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	**0.0207**	< 0.0005	< 0.0005	< 0.0005	0.00054	0.00153	0.00284	< 0.0005	0.00526	< 0.001	**0.00819**	0.00053	**0.0089**	0.00454	**0.00703**	0.00114	**0.0272**	< 0.0005	0.0015	< 0.0005	0.00062	< 0.0005
Zinc	mg/L	1.1	--	--	0.0276	< 0.001	0.0042	< 0.001	< 0.003	0.0017	< 0.003	< 0.001	0.0092	< 0.002	0.0168	0.0015	0.0128	< 0.002	0.0064	0.0028	0.053	0.194	0.253	0.0011	0.0035	0.0013
Zirconium	mg/L	--	--	--	0.00293	< 0.0003	< 0.0002	< 0.0003	< 0.0002	0.0011	0.00146	< 0.0003	0.00069	0.00081	0.00251	0.00085	0.00195	0.00248	0.0018	0.00086	0.00095	0.00049	0.00103	< 0.0003	0.00033	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-02-02	MW22-03-01	MW22-03-01	MW22-03-02	MW22-03-02	MW22-04-01	MW22-04-01	MW22-08-01	MW22-08-01	MW22-08-02	MW22-08-02	MW22-09-01	MW22-09-01	MW22-09-02	MW22-09-02	MW22-10-01	MW22-10-01	MW22-10-04	MW22-10-04	MW22-12-04	MW22-12-04	MW22-13-01
					MW22-02-2_20230812	MW22-03-1_20230810	MW22-03-1_20230810	MW22-03-2_20230810	MW22-03-2_20230810	MW22-04-1_20230811	MW22-04-1_20230811	MW22-08-1_20230811	MW22-08-1_20230811	MW22-08-2_20230811	MW22-08-2_20230811	MW22-09-1_20230811	MW22-09-1_20230811	MW22-09-2_20230811	MW22-09-2_20230811	MW22-10-1_20230811	MW22-10-1_20230811	MW22-10-4_20230811	MW22-10-4_20230811	MW22-12-4_20230811	MW22-12-4_20230811	MW22-13-1_20230810
					2023-08-12	2023-08-10	2023-08-10	2023-08-10	2023-08-10	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-10
					TY2308084-020	TY2308084-008	TY2308084-008	TY2308084-009	TY2308084-009	TY2308084-010	TY2308084-010	TY2308084-017	TY2308084-017	TY2308084-018	TY2308084-018	TY2308084-015	TY2308084-015	TY2308084-016	TY2308084-016	TY2308084-013	TY2308084-013	TY2308084-014	TY2308084-014	TY2308084-012	TY2308084-012	TY2308084-002
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.412	0.0018	1.22	0.0028	1.94	< 0.001	0.418	0.0014	**20.6**	0.0049	1.23	0.0013	**15.5**	0.0282	**4.93**	0.0239	**21.2**	0.0692	**5.1**	0.0012	2.22	0.0013
Antimony	mg/L	0.006	0.006	0.006	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	0.00016	< 0.0001	< 0.0005	< 0.0001	0.00025	< 0.0001	< 0.0005	< 0.0002	< 0.0005	< 0.0001	< 0.0005	0.00012	0.00021	< 0.0001	< 0.0002	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00045	0.00211	0.00237	0.00054	0.00096	< 0.0001	0.00046	**0.0139**	**0.0195**	**0.0123**	0.00985	**0.0152**	**0.0227**	0.00193	0.00284	0.00376	**0.0113**	0.00605	0.00878	0.00068	0.00171	0.0016
Barium	mg/L	1	2	1	0.0367	0.0471	0.0561	0.0617	0.0712	0.0156	0.0187	0.0406	0.205	0.0331	0.0455	0.0753	0.181	0.00931	0.0455	0.0504	0.213	0.0263	0.069	0.0167	0.0318	0.023
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	0.000049	< 0.00002	0.000168	< 0.00002	< 0.00002	< 0.00002	0.000824	< 0.00002	< 0.00004	< 0.00002	0.000682	< 0.00004	0.000159	< 0.00002	0.00094	< 0.00002	0.000234	< 0.00002	0.000081	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.0001	< 0.00005	< 0.00025	< 0.0001	< 0.00025	< 0.00005	0.000254	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005
Boron	mg/L	5	5	5	0.015	0.015	0.016	0.023	0.029	< 0.01	< 0.01	0.111	0.134	0.04	0.045	0.074	0.107	< 0.02	< 0.05	0.012	0.059	0.022	0.032	< 0.01	< 0.02	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000734	< 0.000005	0.0000108	0.0000082	0.0000301	< 0.000005	0.0000161	< 0.000005	0.000133	< 0.000005	0.0000149	0.0000051	0.000165	< 0.00001	0.0000426	0.0000051	0.000332	< 0.000005	0.0000641	< 0.000005	0.0000343	< 0.000005
Calcium	mg/L	--	--	--	77.8	89.8	112	89.4	109	67.6	85.6	53.8	286	73.8	89.8	70.7	403	23.1	43.8	92.9	942	58	105	82.1	160	69.8
Cesium	mg/L	--	--	--	0.000049	< 0.00001	0.000148	< 0.00001	0.00024	< 0.00001	0.000043	< 0.00001	0.0026	< 0.00001	0.000162	< 0.00001	0.00175	< 0.00002	0.000578	< 0.00001	0.00263	< 0.00001	0.000664	< 0.00001	0.00024	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00193	< 0.0005	0.00287	< 0.0005	0.00283	0.00133	0.00233	< 0.0005	0.0493	< 0.0005	0.0023	< 0.0005	0.0399	< 0.001	0.00981	< 0.0005	**0.054**	< 0.0005	0.0109	< 0.0005	0.00523	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	0.00081	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0012	0.00131	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00036	0.00015	0.00088	0.00019	0.00119	< 0.0001	0.00066	0.00026	**0.0146**	0.00021	0.00084	0.00018	**0.0108**	< 0.0002	0.0027	0.00037	**0.0174**	0.00022	**0.00318**	< 0.0001	0.0017	< 0.0001
Copper	mg/L	0.087	2	--	0.00106	0.00275	0.00167	0.00032	0.00249	0.00027	0.00199	0.00058	0.0294	< 0.0002	0.00162	< 0.0002	0.0224	< 0.0004	0.00583	0.00031	0.0468	0.00041	0.00738	< 0.0002	0.00368	< 0.0002
Iron	mg/L	--	--	--	0.563	0.908	**2.31**	0.011	**1.73**	< 0.01	0.906	1.05	**29**	0.648	**1.65**	**2.53**	**24.7**	0.974	**6.29**	0.451	**33.1**	**2.01**	**8.22**	**1.44**	**4.67**	**2.2**
Lead	mg/L	0.01	0.005	0.01	0.000361	0.000093	0.00073	< 0.00005	0.00159	< 0.00005	0.000682	< 0.00005	**0.0128**	< 0.00005	0.00056	< 0.00005	**0.0106**	< 0.0001	0.0026	0.000053	**0.0169**	< 0.00005	0.00294	< 0.00005	0.002	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0097	0.0052	0.0058	0.0084	0.0092	0.0041	0.0038	0.0055	0.0415	0.0048	0.0055	0.0088	0.0354	< 0.002	0.006	0.0035	0.0442	0.0034	0.0108	0.0011	0.0035	0.0038
Magnesium	mg/L	--	--	--	23.1	17.5	21.1	18.7	21.5	17.5	20.4	19.8	65.9	18.6	20.9	31.8	109	3.78	10.2	17.4	191	9.16	18	12.5	31.2	16.3
Manganese	mg/L	--	--	--	0.0383	0.214	0.252	0.223	0.284	0.00038	0.0296	0.166	0.845	0.218	0.245	0.0409	0.714	0.0591	0.137	0.387	**1.71**	0.124	0.251	0.295	0.41	0.111
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000063	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00461	0.0005	0.000482	0.000937	0.000881	0.000318	0.000316	0.00644	0.00461	0.00551	0.00481	0.00257	0.00245	< 0.0001	< 0.00025	0.000815	0.000987	0.00124	0.00144	0.00026	0.000328	0.000659
Nickel	mg/L	0.1	--	--	0.00134	< 0.0005	0.00206	0.00062	0.00261	< 0.0005	0.00114	< 0.0005	0.0365	< 0.0005	0.00204	< 0.0005	0.0267	< 0.001	0.00726	0.0011	0.0412	0.00083	0.00881	< 0.0005	0.00411	< 0.0005
Potassium	mg/L	--	--	--	5.16	1.72	2.28	1.58	2.05	1.09	1.26	2.18	8.06	1.19	1.62	2.7	6.84	0.129	1.49	1.01	6.21	0.618	2.35	0.353	1.09	0.551
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00231	0.0012	0.00372	0.0008	0.00363	0.00067	0.00128	0.00068	0.0432	0.00044	0.00294	0.00112	0.0278	< 0.0004	0.0092	0.00123	0.0373	0.0004	0.0111	0.00059	0.00434	0.00069
Selenium	mg/L	0.01	0.05	0.05	0.000727	0.00008	< 0.00005	< 0.00005	< 0.0001	0.000054	0.000057	< 0.00005	< 0.00025	0.000132	< 0.0001	< 0.00005	< 0.00025	0.000123	< 0.00025	< 0.00005	0.00029	0.00015	0.000187	0.00035	< 0.0001	0.000361
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000025	< 0.00001	< 0.00001	< 0.00001	0.000078	< 0.00001	< 0.00002	< 0.00001	0.000073	< 0.00002	< 0.00005	< 0.00001	0.000157	< 0.00001	0.000021	< 0.00001	0.000027	< 0.00001
Sodium	mg/L	490	--	--	10	5.91	6.53	12	14.1	1.67	1.76	29.6	30.5	14.6	12.9	17.9	20.1	0.782	1.49	3.93	5.75	8.06	9.42	1.28	1.51	2.39
Strontium	mg/L	--	7	--	0.098	0.127	0.142	0.16	0.18	0.0615	0.0669	0.446	0.627	0.328	0.318	0.471	0.678	0.0462	0.0636	0.113	0.616	0.0904	0.131	0.0715	0.111	0.076
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0004	< 0.0002	< 0.001	< 0.0004	< 0.001	< 0.0002	< 0.001	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002
Thallium	mg/L	0.002	--	--	0.00002	< 0.00001	0.000016	< 0.00001	< 0.00002	< 0.00001	0.000016	< 0.00001	0.000264	< 0.00001	< 0.00002	< 0.00001	0.000188	< 0.00002	< 0.00005	< 0.00001	0.000369	< 0.00001	0.000073	< 0.00001	0.000036	< 0.00001
Thorium	mg/L	--	--	--	0.00016	< 0.0001	0.00055	< 0.0001	0.00093	< 0.0001	0.00028	< 0.0001	0.00891	< 0.0001	0.0002	< 0.0001	0.00766	< 0.0002	0.00116	< 0.0001	0.0155	< 0.0001	0.0009	< 0.0001	0.00118	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00071	0.0001	0.0006	< 0.0001	0.00021	< 0.0001	0.00055	0.00023	< 0.0005	< 0.0001	< 0.0002	< 0.0001	0.00069	< 0.0002	< 0.0005	< 0.0001	0.00078	0.00014	0.0003	< 0.0001	0.00025	< 0.0001
Titanium	mg/L	--	--	--	0.0293	< 0.0003	0.088	< 0.0003	0.0535	< 0.0003	0.0331	< 0.0003	1.03	< 0.0003	0.0533	< 0.0003	1.02	0.00063	0.243	< 0.00207	1.71	0.00082	0.215	< 0.0003	0.207	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0002	< 0.0005	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00297	0.000279	0.000526	0.00152	0.00206	0.00136	0.00146	0.0002	0.00186	0.000979	0.00126	< 0.00001	0.0014	< 0.00002	0.000286	0.00123	0.00336	0.00026	0.000793	0.00001	0.00025	0.000037
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00126	< 0.0005	0.00302	< 0.0005	0.00346	< 0.0005	0.00153	< 0.0005	**0.048**	< 0.0005	0.00266	< 0.0005	**0.0399**	< 0.001	**0.01**	0.00054	**0.0614**	< 0.0005	**0.0114**	< 0.0005	**0.00653**	< 0.0005
Zinc	mg/L	1.1	--	--	0.0058	0.002	0.0042	< 0.001	0.0069	< 0.001	0.0033	< 0.001	0.0712	< 0.001	< 0.006	< 0.001	0.053	< 0.002	0.0159	0.0052	0.0986	0.0043	0.0367	< 0.001	0.0246	< 0.001
Zirconium	mg/L	--	--	--	0.00034	< 0.0003	0.001	< 0.0003	< 0.0004	< 0.0003	0.0006	< 0.0003	0.00328	< 0.0003	0.00041	< 0.0003	0.00376	< 0.0006	0.00214	< 0.0003	0.00505	0.00041	0.00178	0.00035	0.0014	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-13-01 MW22-13-1_20230810 2023-08-10 TY2308084-002 N T	MW22-13-02 MW22-13-2_20230810 2023-08-10 TY2308084-001 N D	MW22-13-02 MW22-13-2_20230810 2023-08-10 TY2308084-001 N T	MW22-14-02 MW22-14-2_20230810 2023-08-10 TY2308084-003 N D	MW22-14-02 MW22-14-2_20230810 2023-08-10 TY2308084-003 N T	MW22-19-01 MW22-19-1_20230810 2023-08-10 TY2308084-004 N D	MW22-19-01 MW22-19-1_20230810 2023-08-10 TY2308084-004 N T	MW22-20-01 MW22-20-1_20230810 2023-08-10 TY2308084-005 N D	MW22-20-01 MW22-20-1_20230810 2023-08-10 TY2308084-005 N T	MW22-20-02 MW22-20-2_20230810 2023-08-10 TY2308084-007 N D	MW22-20-02 MW22-20-2_20230810 2023-08-10 TY2308084-007 N T	MW22-01-01 MW22-01-01_20230924 2023-09-24 TY2309741-010 N D	MW22-01-01 MW22-01-01_20230924 2023-09-24 TY2309741-010 N T	MW22-01-02 MW22-01-02_20230924 2023-09-24 TY2309741-012 N D	MW22-01-02 MW22-01-02_20230924 2023-09-24 TY2309741-012 N T	MW22-02-01 MW22-02-01_20230924 2023-09-24 TY2309741-002 N D	MW22-02-01 MW22-02-01_20230924 2023-09-24 TY2309741-002 N T	MW22-02-02 MW22-02-02_20230924 2023-09-24 TY2309741-001 N D	MW22-02-02 MW22-02-02_20230924 2023-09-24 TY2309741-001 N T	MW22-03-01 MW22-03-01_20230924 2023-09-24 TY2309741-004 N D	MW22-03-01 MW22-03-01_20230924 2023-09-24 TY2309741-004 N T	MW22-03-02 MW22-03-02_20230924 2023-09-24 TY2309741-005 N D
Aluminum	mg/L	--	2.9	--	1.91	0.0502	2.84	0.003	1.33	0.0018	**19**	0.0141	0.418	0.0123	0.944	0.0012	0.18	0.0014	0.737	0.0017	0.352	0.004	0.276	0.0017	0.355	0.002
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00037	< 0.0005	< 0.0001	< 0.0001	< 0.0001	0.00029	< 0.0001	< 0.0001	0.00016	0.00029	0.0009	0.00092	0.00026	0.0009	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00218	0.00393	0.00477	0.00019	0.00066	0.00039	0.00624	0.00088	0.0012	0.00123	0.00168	0.00029	0.00028	0.00019	0.00053	0.0004	0.00055	0.00027	0.00042	0.00195	0.00216	0.00041
Barium	mg/L	1	2	1	0.0358	0.0317	0.0524	0.0317	0.0428	0.0163	0.141	0.0344	0.0373	0.0322	0.0436	0.023	0.0229	0.0179	0.0241	0.0374	0.0414	0.0318	0.0337	0.0479	0.053	0.0539
Beryllium	mg/L	0.004	--	--	0.000078	< 0.00002	0.00012	< 0.00002	0.000042	< 0.00002	0.00106	< 0.00002	0.000034	< 0.00002	0.000035	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.01	< 0.01	< 0.02	< 0.01	0.014	< 0.01	< 0.05	0.038	0.042	< 0.01	< 0.01	0.013	0.011	0.01	0.014	0.017	0.018	0.014	0.015	0.013	0.015	0.023
Cadmium	mg/L	0.005	0.007	0.005	0.0000131	< 0.000005	0.0000458	< 0.000005	0.0000207	0.0000082	0.00032	< 0.000005	0.000013	0.0000051	0.0000571	< 0.000005	< 0.000005	< 0.000005	0.0000201	< 0.000005	0.0000148	0.0000074	0.0000316	< 0.000005	0.0000063	0.0000063
Calcium	mg/L	--	--	--	95.4	75.9	99.4	71.9	92	83.6	550	71.7	87.6	101	119	71.4	70.5	69.9	73	66.3	70.5	69.8	70.8	102	96.5	102
Cesium	mg/L	--	--	--	0.000232	0.000014	0.000342	< 0.00001	0.000158	< 0.00001	0.00198	0.00001	0.000081	< 0.00001	0.00012	< 0.00001	0.000016	< 0.00001	0.000093	< 0.00001	0.000035	< 0.00001	0.000031	< 0.00001	0.000047	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00459	0.00082	0.00778	0.0012	0.00385	< 0.0005	**0.0502**	< 0.0005	0.00186	0.00059	0.00329	< 0.0005	< 0.0005	< 0.0005	0.0017	< 0.0005	0.00092	0.00099	0.0017	< 0.0005	0.00085	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	0.00078	0.00089	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	0.00088	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00115	< 0.0001	0.0019	< 0.0001	0.00085	0.00204	**0.018**	0.00059	0.00087	0.00033	0.00094	< 0.0001	0.00017	0.00018	0.00073	0.00018	0.00031	< 0.0001	0.00021	0.00014	0.00037	< 0.0001
Copper	mg/L	0.087	2	--	0.00303	< 0.0002	0.00626	0.00028	0.00286	0.00143	0.0679	< 0.0002	0.00171	< 0.0002	0.00181	< 0.0002	< 0.0005	< 0.0002	0.00137	< 0.0002	0.00057	0.00031	0.00083	0.00069	0.0005	0.00055
Iron	mg/L	--	--	--	**4.64**	**5.68**	**9.69**	< 0.01	**1.65**	0.014	**27.4**	**3.84**	**4.4**	**1.88**	**3.17**	0.637	0.787	0.134	**1.15**	**1.24**	**2.01**	< 0.01	0.345	0.985	**1.46**	< 0.01
Lead	mg/L	0.01	0.005	0.01	0.00114	0.000056	0.00222	< 0.00005	0.000801	< 0.00005	**0.0156**	< 0.00005	0.00033	< 0.00005	0.000564	< 0.00005	0.000131	< 0.00005	0.000495	< 0.00005	0.000243	< 0.00005	0.000268	< 0.00005	0.000245	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0058	0.0034	0.0064	0.0079	0.007	0.0092	0.0347	0.0118	0.0113	0.0028	0.0034	0.0039	0.0041	0.0035	0.0042	0.0092	0.0103	0.0099	0.0097	0.0049	0.0056	0.0081
Magnesium	mg/L	--	--	--	21.2	11.6	16.2	18.5	21.6	15.8	126	17	18.3	10.2	12.1	17.6	16.5	18.3	17.6	23.2	22	22.4	22.2	20.4	19.4	20.2
Manganese	mg/L	--	--	--	0.161	0.266	0.338	0.00875	0.0456	0.0851	0.945	0.242	0.258	0.121	0.15	0.0462	0.049	0.0757	0.124	0.0628	0.0702	0.00943	0.0224	0.208	0.225	0.0321
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000121	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000696	0.000569	0.000623	0.000556	0.000507	0.00308	0.00239	0.00531	0.0058	0.00109	0.00169	0.000471	0.000509	0.000866	0.00129	0.0026	0.00277	0.00398	0.00384	0.000441	0.000479	0.000723
Nickel	mg/L	0.1	--	--	0.00296	< 0.0005	0.00492	< 0.0005	0.00225	0.00245	0.0339	0.00314	0.00455	0.0051	0.0104	< 0.0005	< 0.0005	0.00138	0.00266	< 0.0005	0.00085	0.00051	0.0012	< 0.0005	0.00078	0.00053
Potassium	mg/L	--	--	--	1.17	0.837	1.72	1.12	1.61	1.07	5.07	3.34	3.53	0.289	0.612	1.9	1.8	2.06	2.34	3.07	3.04	5.25	4.56	1.83	1.85	1.57
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00443	0.00124	0.00667	0.0016	0.00406	0.00264	0.0311	0.00265	0.00357	0.00053	0.0022	0.00172	0.00206	0.00339	0.00491	0.00078	0.0014	0.00147	0.00181	0.00127	0.002	0.00067
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	0.00144	< 0.0001	0.00258	0.00025	0.00109	0.00123	< 0.00005	< 0.00005	0.000072	0.000081	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00052	0.000543	< 0.00005	< 0.00005	< 0.00005
Silver	mg/L	0.0015	--	--	0.000013	< 0.00001	0.000051	< 0.00001	0.000013	< 0.00001	0.000127	< 0.00001	0.000077	< 0.00001	0.000033	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	2.84	4.59	5.68	5.18	5.7	10.7	15.2	34.4	35.6	3.66	4.49	3.54	2.82	2.14	1.96	8.28	6.92	7.79	6.43	6.74	6.52	13.2
Strontium	mg/L	--	7	--	0.0885	0.0864	0.103	0.114	0.125	0.0848	0.374	0.322	0.328	0.146	0.157	0.114	0.104	0.0648	0.0726	0.119	0.118	0.0973	0.0958	0.137	0.136	0.176
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	0.000025	< 0.00001	0.000065	< 0.00001	0.000031	0.000016	0.000292	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000011	< 0.00001	< 0.00001	0.000013	0.000023	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	0.00062	< 0.0001	0.00097	< 0.0001	0.00062	< 0.0001	0.0094	< 0.0001	0.00031	< 0.0001	0.00017	< 0.0001	0.00011	< 0.0001	0.00029	< 0.0001	0.00014	< 0.0001	0.00011	< 0.0001	0.00018	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00028	< 0.0001	0.00025	< 0.0001	0.0001	< 0.0001	0.00304	< 0.0001	0.00014	0.00015	0.00051	< 0.0001	< 0.0001	< 0.0001	0.00042	0.00041	0.00116	0.00011	0.00039	< 0.0001	< 0.0001	< 0.0001
Titanium	mg/L	--	--	--	0.114	0.00369	0.159	< 0.0003	0.0902	< 0.0003	1.39	0.00052	0.0214	< 0.0003	0.045	< 0.0003	0.016	< 0.0003	0.0483	< 0.0003	0.0238	< 0.0003	0.0208	< 0.0003	0.026	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.0576	0.0341	0.0178	0.0225	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00018	0.00011	0.00014	0.00018	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.000156	0.000053	0.000256	0.000799	0.000912	**0.0468**	0.019	0.00211	0.00242	0.000079	0.000335	0.00123	0.00152	0.00211	0.00278	0.000107	0.00014	0.00238	0.00248	0.000228	0.000377	0.00173
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00476	0.00134	**0.00836**	< 0.0005	0.00324	0.00073	**0.0496**	< 0.0005	0.00104	< 0.0005	0.00241	< 0.0005	< 0.0005	< 0.0005	0.00168	< 0.0005	0.00094	< 0.0005	0.00092	< 0.0005	0.00097	0.00063
Zinc	mg/L	1.1	--	--	0.0064	< 0.001	0.0106	< 0.001	0.0057	0.0016	0.0897	0.0322	0.0436	0.0194	0.0383	< 0.001	< 0.003	0.0017	0.0045	< 0.001	0.0031	0.0016	0.0036	0.001	< 0.003	< 0.001
Zirconium	mg/L	--	--	--	0.00112	0.00136	0.00161	< 0.0003	0.00104	< 0.0003	0.00364	0.00175	0.00107	< 0.0003	0.00056	< 0.0003	0.00022	< 0.0003	0.00043	< 0.0003	0.00042	< 0.0003	0.00029	< 0.0003	0.0005	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-03-02	MW22-16-01	MW22-16-01	MW22-16-02	MW22-16-02	MW22-17-01	MW22-17-01	MW22-17-02	MW22-17-02	MW22-18-01	MW22-18-01	MW22-18-02	MW22-18-02	MW22-04-01	MW22-04-01	MW22-05-01	MW22-05-01	MW22-05-02	MW22-05-02	MW22-06-01	MW22-06-01	MW22-06-02
					MW22-03-02_20230924	MW22-16-01_20230925	MW22-16-01_20230925	MW22-16-02_20230925	MW22-16-02_20230925	MW22-17-01_20230924	MW22-17-01_20230924	MW22-17-02_20230924	MW22-17-02_20230924	MW22-18-01_20230924	MW22-18-01_20230924	MW22-18-02_20230924	MW22-18-02_20230924	MW22-04-01_20230923	MW22-04-01_20230923	MW22-05-01_20230920	MW22-05-01_20230920	MW22-05-02_20230920	MW22-05-02_20230920	MW22-06-01_20230920	MW22-06-01_20230920	MW22-06-02_20230920
					2023-09-24	2023-09-25	2023-09-25	2023-09-25	2023-09-25	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-23	2023-09-23	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20
					TY2309741-005	TY2309741-007	TY2309741-007	TY2309741-006	TY2309741-006	TY2309741-008	TY2309741-008	TY2309741-009	TY2309741-009	TY2309741-013	TY2309741-013	TY2309741-014	TY2309741-014	TY2309749-028	TY2309749-028	TY2309749-010	TY2309749-010	TY2309749-009	TY2309749-009	TY2309749-005	TY2309749-005	TY2309749-006
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Parameter	**Units**	**Generic Ontario Standards** OREG 153/04 T2 SCS Potable (coarse)	**Human Health Based Guideline** CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.23	0.0044	0.77	0.0052	**11.4**	0.0051	0.493	0.0085	2.27	0.0206	0.293	0.403	0.543	0.0024	**146**	0.002	0.0696	0.002	**3.42**	0.0016	0.0072	0.0019
Antimony	mg/L	0.006	0.006	0.006	0.0002	< 0.0001	0.00012	0.00045	0.00097	< 0.0001	< 0.0001	0.00012	0.0003	0.00046	0.00055	< 0.0001	< 0.0001	< 0.0001	0.00201	0.00019	0.00036	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00052	0.00022	0.00073	0.00019	0.00168	0.00037	0.00049	0.00206	0.00327	0.0005	0.0009	0.00046	0.00057	< 0.0001	**0.0793**	0.0044	0.00466	< 0.0001	0.0017	0.00017	0.00019	0.00017
Barium	mg/L	1	2	1	0.0582	0.0414	0.0573	0.0256	0.132	0.0236	0.0292	0.0193	0.0382	0.029	0.0393	0.0205	0.0252	0.0151	0.764	0.0179	0.0198	0.013	0.0389	0.0108	0.0113	0.0117
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	0.000026	< 0.00002	0.000592	< 0.00002	< 0.00002	< 0.00002	0.000104	0.000386	0.000373	0.00007	0.000082	< 0.00002	**0.00568**	< 0.00002	< 0.00002	< 0.00002	0.000149	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000348	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00132	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.024	< 0.01	< 0.01	0.023	0.033	< 0.01	< 0.01	0.071	0.076	< 0.01	0.011	< 0.01	0.01	< 0.01	0.335	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000169	0.0000158	0.0000349	0.0000263	0.0000973	< 0.0000005	0.0000286	0.0000212	0.0000952	0.0000191	0.0000444	0.0000341	0.0000466	< 0.0000005	0.00212	0.0000065	0.0000541	< 0.0000005	0.0000662	< 0.0000005	< 0.0000005	< 0.0000005
Calcium	mg/L	--	--	--	93.3	36.9	35.3	51	66.9	57.6	59.4	55.4	133	30	28.1	11.7	13.3	72.6	4780	73.1	70.9	66.6	135	61.1	60.5	60.9
Cesium	mg/L	--	--	--	0.000035	0.000284	0.000626	< 0.00001	0.008	< 0.00001	0.000052	< 0.00001	0.000158	0.00001	0.000048	0.000154	0.000206	< 0.00001	0.0108	< 0.00001	< 0.00001	< 0.00001	0.0004	< 0.00001	< 0.00001	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.0005	< 0.0005	0.00452	0.00187	0.0436	< 0.0005	0.00156	< 0.0005	0.00588	0.00128	0.00151	0.00116	0.00136	0.00117	**0.431**	< 0.0005	< 0.0005	0.0009	0.00802	< 0.0005	< 0.0005	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	0.00149	0.00207	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00101	0.00104	< 0.0005	< 0.0005	0.00083	0.00082	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00014	0.00015	0.00109	0.00011	**0.00944**	0.00051	0.0009	0.0002	0.00212	0.00019	0.00048	0.00274	0.00282	< 0.0001	**0.158**	0.00048	0.0006	< 0.0001	**0.00316**	< 0.0001	< 0.0001	< 0.0001
Copper	mg/L	0.087	2	--	0.00072	0.00124	0.00646	0.00171	0.0196	< 0.0002	0.00242	0.00111	0.00638	0.00077	0.0024	0.0202	0.0228	0.0003	**0.366**	< 0.0002	0.00057	0.00027	0.00783	0.0003	< 0.0005	0.00042
Iron	mg/L	--	--	--	0.207	< 0.01	0.958	< 0.01	**15.5**	0.436	1.06	0.175	**3.44**	0.667	0.894	0.287	0.445	< 0.01	**304**	0.714	1.05	< 0.01	**5.32**	< 0.01	< 0.01	< 0.01
Lead	mg/L	0.01	0.005	0.01	0.000204	< 0.00005	0.00122	< 0.00005	0.0038	< 0.00005	0.000466	< 0.00005	0.00212	0.000087	0.000314	0.000054	0.000153	< 0.00005	**0.109**	< 0.00005	0.000122	< 0.00005	0.00268	< 0.00005	< 0.00005	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0081	0.0071	0.0095	0.0067	0.037	0.0034	0.0045	0.0018	0.005	0.0166	0.0178	0.0042	0.0046	0.0038	0.272	0.0028	0.0031	0.0027	0.0079	0.0016	0.0018	0.0016
Magnesium	mg/L	--	--	--	18.7	9.82	9.38	9.84	19.1	12.2	11.4	11.3	31.9	7.79	7.21	2.16	2.36	18.5	763	16.2	15.4	14.8	28.3	11.7	11.1	11.6
Manganese	mg/L	--	--	--	0.0298	0.00742	0.0219	0.0313	0.293	0.6	0.603	0.263	0.42	0.49	0.465	0.104	0.119	0.00114	**7.71**	0.429	0.439	0.00145	0.179	0.00264	0.00346	0.00067
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000053	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000197	< 0.000005	< 0.000005	< 0.000005	0.0000065	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000736	0.000429	0.000502	0.00287	0.00236	0.00117	0.0016	0.00735	0.00756	0.00174	0.00478	0.00485	0.00549	0.000288	0.0051	0.00184	0.00175	0.000348	0.000359	0.000202	0.000212	0.000102
Nickel	mg/L	0.1	--	--	0.00168	0.00197	0.00564	0.00135	0.0324	0.00122	0.00262	0.00153	0.00586	0.00111	0.00258	0.0106	0.0116	< 0.0005	**0.317**	0.00074	0.00104	< 0.0005	0.00626	< 0.0005	< 0.0005	< 0.0005
Potassium	mg/L	--	--	--	1.5	2.86	3.24	5.08	9.38	3.11	3.03	2.71	3.24	1.99	2.71	3.08	3.24	1.08	24.4	1.57	1.5	0.935	1.78	0.688	0.659	0.562
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00098	0.0117	0.0148	0.00133	0.0386	0.00087	0.00194	0.00103	0.0043	0.0028	0.0045	0.0108	0.0115	0.00072	0.15	0.00074	0.00085	0.0003	0.00566	0.00115	0.00119	0.00123
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	0.000105	0.00009	0.000082	0.000115	0.000461	0.000062	0.000106	< 0.0001	0.000215	0.000221	0.000059	0.000092	0.000058	0.00111	< 0.00005	< 0.00005	0.000398	0.000459	0.00006	0.000082	0.000085
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	0.000885	< 0.00001	0.000103	< 0.00001	0.000602	< 0.00001	0.000234	< 0.00001	0.000218	0.000138	0.000604	< 0.00001	0.000737	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	11.1	1.65	1.53	3.84	3.28	1.77	1.61	19.1	19.4	4.48	6.51	2.68	2.42	1.63	11	2.18	1.81	1.74	1.98	1.19	1.22	0.979
Strontium	mg/L	--	7	--	0.166	0.029	0.0315	0.0497	0.0608	0.0511	0.0545	0.0537	0.107	0.164	0.189	0.0739	0.0792	0.0624	3.28	0.0715	0.0696	0.059	0.106	0.0502	0.0497	0.0488
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	0.000028	0.000045	< 0.00001	0.000245	< 0.00001	< 0.00001	< 0.00001	0.000034	< 0.00001	< 0.00001	0.000019	0.000026	< 0.00001	**0.00228**	< 0.00001	< 0.00001	< 0.00001	0.000057	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	0.00012	< 0.0001	0.00019	< 0.0001	0.0021	< 0.0001	0.0002	< 0.0001	0.00105	0.00031	0.00045	0.0005	0.0006	< 0.0001	0.0798	< 0.0001	< 0.0001	< 0.0001	0.00148	< 0.0001	< 0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00012	< 0.0001	0.00022	0.00037	0.00227	< 0.0001	0.00031	0.00078	0.00146	0.0011	0.00224	< 0.0001	0.0001	< 0.0001	0.00676	0.00015	0.00059	< 0.0001	0.00032	< 0.0001	< 0.0001	< 0.0001
Titanium	mg/L	--	--	--	0.00759	< 0.0003	0.0545	< 0.0003	0.828	< 0.0003	0.0352	0.00041	0.266	0.00191	0.0142	0.00372	0.0101	< 0.0003	15	< 0.0003	0.00421	< 0.0003	0.223	< 0.0003	0.00037	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	0.00666	0.00794	0.00016	0.00095	0.00294	0.00594	0.0221	0.0197	0.00914	0.0277	0.0763	0.0867	< 0.0001	< 0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00188	0.00145	0.0019	0.00711	0.00874	0.00122	0.00148	0.00172	0.00229	0.00181	0.00337	0.000758	0.000929	0.00132	0.0196	0.00226	0.00254	0.000995	0.00132	0.000236	0.000251	0.000237
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00097	0.0005	0.0026	< 0.0005	**0.0315**	0.00075	0.00193	0.00082	**0.00778**	0.00484	0.00511	0.0006	0.00092	< 0.0005	**0.507**	< 0.0005	< 0.0005	< 0.0005	**0.00824**	< 0.0005	< 0.0005	< 0.0005
Zinc	mg/L	1.1	--	--	< 0.003	< 0.001	0.0042	0.0018	0.038	< 0.001	0.0031	0.0032	0.0108	0.0024	0.0032	0.0051	0.0054	< 0.001	0.617	0.0022	0.004	< 0.001	0.0139	< 0.001	< 0.003	< 0.001
Zirconium	mg/L	--	--	--	0.00033	< 0.0003	0.00039	< 0.0003	0.00232	0.0008	0.00125	0.00121	0.00187	0.00306	0.00214	0.00066	0.00069	< 0.0003	0.0821	< 0.0003	< 0.0002	< 0.0003	0.0009	< 0.0003	< 0.0002	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-06-02	MW22-07-01	MW22-07-01	MW22-07-02	MW22-07-02	MW22-08-01	MW22-08-01	MW22-08-02	MW22-08-02	MW22-09-01	MW22-09-01	MW22-09-02	MW22-09-02	MW22-10-01	MW22-10-01	MW22-10-04	MW22-10-04	MW22-11-01	MW22-11-01	MW22-12-01	MW22-12-01	MW22-12-04
					MW22-06-2_20230920	MW22-07-1_20230923	MW22-07-1_20230923	MW22-07-2_20230923	MW22-07-2_20230923	MW22-08-1_20230923	MW22-08-1_20230923	MW22-08-2_20230923	MW22-08-2_20230923	MW22-09-1_20230920	MW22-09-1_20230920	MW22-09-2_20230920	MW22-09-2_20230920	MW22-10-1_20230920	MW22-10-1_20230920	MW22-10-4_20230920	MW22-10-4_20230920	MW22-11-1_20230920	MW22-11-1_20230920	MW22-12-01_20230923	MW22-12-01_20230923	MW22-12-04_20230923
					2023-09-20	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23	2023-09-23
					TY2309749-006	TY2309749-022	TY2309749-022	TY2309749-021	TY2309749-021	TY2309749-020	TY2309749-020	TY2309749-019	TY2309749-019	TY2309749-001	TY2309749-001	TY2309749-002	TY2309749-002	TY2309749-008	TY2309749-008	TY2309749-007	TY2309749-007	TY2309749-003	TY2309749-003	TY2309749-024	TY2309749-024	TY2309749-023
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Aluminum	mg/L	--	2.9	--	0.0086	0.0104	0.306	0.0083	**3.41**	0.0015	1.47	0.0027	2.01	0.0012	0.725	0.03	1.03	0.0019	**7.29**	0.0176	1.18	0.105	0.272	0.0049	0.674	0.002
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	0.00059	0.00318	0.00045	0.00116	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	0.00013	< 0.0002	0.00024	< 0.0001	0.00037	< 0.0001	< 0.0001	< 0.0002	< 0.0002	0.0002	0.00095	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00018	0.00359	0.00445	0.00238	0.00397	**0.0136**	**0.0155**	**0.0145**	0.00829	**0.013**	**0.0156**	**0.00202**	**0.00227**	**0.00553**	**0.00632**	**0.0155**	**0.0137**	0.00119	**0.00133**	0.00117	0.00125	0.00067
Barium	mg/L	1	2	1	0.0119	0.0309	0.0385	0.0284	0.0588	0.0374	0.0501	0.0346	0.0518	0.0688	0.071	0.00841	0.017	0.0403	0.0989	0.0383	0.045	0.0116	0.0139	0.0349	0.0414	0.0169
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000154	< 0.00002	0.000056	< 0.00002	0.000072	< 0.00002	0.000023	< 0.00004	< 0.00004	< 0.00002	0.000347	< 0.00002	0.000054	< 0.00004	< 0.00004	< 0.00002	0.000038	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.0001	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	< 0.01	0.091	0.102	0.033	0.045	0.088	0.092	0.036	0.037	0.073	0.072	< 0.02	< 0.02	0.014	0.041	0.034	0.033	< 0.02	< 0.02	0.011	0.014	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	< 0.000005	0.0000214	0.00013	0.0000139	0.000126	< 0.000005	0.000017	< 0.000005	0.0000277	< 0.000005	0.000019	< 0.00001	0.0000253	0.0000055	0.000206	< 0.000005	0.0000195	< 0.00001	0.0000168	< 0.000005	0.0000298	< 0.000005
Calcium	mg/L	--	--	--	56.2	53.3	54.4	61.5	113	61.5	77.8	82.4	90	75.7	81.2	22.6	30	95.9	350	89.7	88.1	63.7	66.3	84.6	89.3	93.2
Cesium	mg/L	--	--	--	< 0.00001	< 0.00001	0.000028	< 0.00001	0.000408	< 0.00001	0.000197	< 0.00001	0.00027	< 0.00001	0.000084	< 0.00002	0.000119	< 0.00001	0.000894	< 0.00001	0.00017	< 0.00002	< 0.00002	< 0.00001	0.000079	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00053	< 0.0005	0.00314	< 0.0005	0.00859	< 0.0005	0.00346	< 0.0005	0.0038	< 0.0005	0.00179	< 0.001	0.00208	< 0.0005	0.0179	< 0.0005	0.00249	< 0.001	< 0.001	0.00095	0.00281	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	< 0.0001	0.00082	0.00114	0.00037	0.00264	0.00028	0.00124	0.00023	0.00125	< 0.0001	0.00055	< 0.0002	0.00068	0.00038	**0.00609**	0.00036	0.001	< 0.0002	0.00026	0.0003	0.00073	< 0.0001
Copper	mg/L	0.087	2	--	< 0.0005	0.00121	0.00291	0.00122	0.00684	0.0004	0.0017	< 0.0002	0.00244	< 0.0002	0.00098	< 0.0004	0.0012	< 0.0002	0.0142	0.00057	0.00142	< 0.0004	0.00106	< 0.0002	0.00125	< 0.0002
Iron	mg/L	--	--	--	0.011	0.123	0.807	< 0.01	**4.39**	**1.24**	**3.11**	0.801	**2.57**	**2.35**	**3.59**	0.948	**2.18**	0.853	**11.4**	**4.58**	**5.94**	**1.8**	**2.26**	**3.06**	**3.7**	**1.37**
Lead	mg/L	0.01	0.005	0.01	< 0.00005	< 0.00005	0.000415	< 0.00005	0.00212	< 0.00005	0.000792	< 0.00005	0.000935	< 0.00005	0.000428	< 0.0001	0.000492	< 0.00005	**0.00583**	< 0.00005	0.000586	< 0.0001	0.000162	< 0.00005	0.000468	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0014	0.0071	0.0057	0.0065	0.0093	0.0049	0.0073	0.0046	0.0072	0.0086	0.009	< 0.002	< 0.002	0.0033	0.0159	0.0057	0.0068	< 0.002	< 0.002	0.0053	0.0061	< 0.001
Magnesium	mg/L	--	--	--	10.9	21.1	20.5	15.8	27.7	20.4	22.3	19.8	21.9	35.8	33.6	3.58	5.7	17.4	70.1	16.2	16	10.1	9.78	16.3	17.9	13.8
Manganese	mg/L	--	--	--	0.00203	0.203	0.221	0.193	0.331	0.177	0.254	0.258	0.257	0.0312	0.0585	0.0536	0.074	0.389	0.796	0.202	0.22	0.138	0.15	0.155	0.174	0.268
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000065	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000098	0.0105	0.0117	0.00228	0.00223	0.00645	0.00659	0.00494	0.00392	0.00219	0.00249	< 0.0001	< 0.0001	0.000843	0.000693	0.00138	0.00135	< 0.0001	0.000122	0.00456	0.00457	0.000282
Nickel	mg/L	0.1	--	--	< 0.0005	0.0146	0.0198	0.00315	0.0101	< 0.0005	0.00251	< 0.0005	0.00323	< 0.0005	0.00126	< 0.001	0.00161	0.00105	0.0147	0.00062	0.00232	< 0.001	< 0.001	0.0103	0.0128	< 0.0005
Potassium	mg/L	--	--	--	0.539	4.08	3.96	2.13	3	1.92	2.22	1.26	1.66	2.8	2.76	0.147	0.43	0.99	2.78	1.13	1.37	< 0.1	0.166	1.17	1.37	0.361
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00118	0.00152	0.00191	0.00142	0.00772	0.00057	0.00343	0.00043	0.00415	0.00088	0.00216	< 0.0004	0.00211	0.00105	0.0127	0.0005	0.00307	< 0.0004	0.00047	0.00108	0.00225	0.00064
Selenium	mg/L	0.01	0.05	0.05	0.00011	0.000081	0.000098	< 0.00005	0.000138	0.000074	0.000063	0.000414	< 0.0001	0.000059	< 0.00005	0.00026	< 0.0001	0.000617	0.000126	0.000135	< 0.00005	0.000556	< 0.0001	< 0.00005	< 0.00005	0.000281
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	0.000033	< 0.00001	0.000026	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00002	< 0.00002	< 0.00001	0.000042	< 0.00001	< 0.00001	< 0.00002	< 0.00002	< 0.00001	0.000012	< 0.00001
Sodium	mg/L	490	--	--	0.983	23.6	21	7.72	7.43	26.8	21.6	12.4	12.6	19.3	16	0.883	1.05	3.93	3.87	6.4	5.56	1.64	1.74	3.46	3.15	1.18
Strontium	mg/L	--	7	--	0.0461	0.243	0.247	0.194	0.234	0.434	0.437	0.319	0.317	0.473	0.451	0.0412	0.051	0.115	0.282	0.151	0.144	0.0514	0.0533	0.105	0.106	0.0729
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0004	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	0.000012	< 0.00001	< 0.00001	< 0.00001	0.000096	< 0.00001	0.000014	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00002	< 0.00002	< 0.00001	0.000124	< 0.00001	0.000014	< 0.00002	< 0.00002	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00148	< 0.0001	0.00064	< 0.0001	0.00043	< 0.0001	0.00035	< 0.0002	0.00032	< 0.0001	0.00515	< 0.0001	0.00034	0.00022	0.0003	< 0.0001	0.00029	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	< 0.0001	0.00214	0.00592	0.00138	0.00291	< 0.0001	0.00018	< 0.0001	< 0.0002	< 0.0001	0.00018	< 0.0002	< 0.0002	< 0.0001	0.00064	0.0001	< 0.0001	< 0.0002	< 0.0002	0.0004	0.00059	< 0.0001
Titanium	mg/L	--	--	--	0.00062	< 0.0003	0.0149	< 0.0003	0.208	< 0.0003	0.0842	< 0.0003	0.0819	< 0.0003	0.0492	0.00073	0.0489	< 0.0003	0.621	< 0.0003	0.0506	0.00406	0.0142	0.00046	0.0455	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	0.00016	0.00027	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	0.0009	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.000271	0.000516	0.000577	0.000838	0.00109	0.00018	0.000418	0.000852	0.00136	< 0.00001	0.00006	< 0.00002	0.000062	0.00094	0.00208	0.00021	0.000342	0.000071	0.000088	0.00003	0.000088	< 0.00001
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	< 0.0005	0.00086	0.00056	**0.00795**	< 0.0005	0.00342	< 0.0005	0.00426	< 0.0005	0.00176	< 0.001	0.00207	< 0.0005	**0.0213**	< 0.0005	0.00255	0.00162	0.0021	0.00051	0.00212	< 0.0005
Zinc	mg/L	1.1	--	--	< 0.003	0.0269	0.0475	0.0153	0.086	< 0.001	0.0055	< 0.001	0.0073	< 0.001	0.0042	< 0.002	< 0.006	0.0028	0.038	0.002	0.0076	< 0.002	< 0.006	0.0622	0.0717	< 0.001
Zirconium	mg/L	--	--	--	< 0.0002	< 0.0003	0.00053	< 0.0003	0.0015	< 0.0003	0.00126	< 0.0003	0.00075	< 0.0003	0.00092	< 0.0006	0.00081	< 0.0003	0.0031	< 0.0003	0.00074	0.00117	0.00117	0.00091	0.00139	0.00033

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-12-04	MW22-13-01	MW22-13-01	MW22-13-02	MW22-13-02	MW22-14-01	MW22-14-01	MW22-14-02	MW22-14-02	MW22-15-01	MW22-15-01	MW22-15-03	MW22-15-03	MW22-19-01	MW22-19-01	MW22-20-01	MW22-20-01	MW22-20-02	MW22-20-02	MW22-01-01	MW22-01-01	MW22-01-02
					MW22-12-04_20230923	MW22-13-01_20230923	MW22-13-01_20230923	MW22-13-2_20230923	MW22-13-2_20230923	MW22-14-01_20230921	MW22-14-01_20230921	MW22-14-2_20230921	MW22-14-2_20230921	MW22-15-01_20230921	MW22-15-01_20230921	MW22-15-03_20230921	MW22-15-03_20230921	MW22-19-1_20230921	MW22-19-1_20230921	MW22-20-01_20230921	MW22-20-01_20230921	MW22-20-02_20230921	MW22-20-02_20230921	MW22-01-1_20240605	MW22-01-1_20240605	MW22-01-2_20240605
					2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2024-06-05	2024-06-05	2024-06-05
					TY2309749-023	TY2309749-025	TY2309749-025	TY2309749-027	TY2309749-027	TY2309749-017	TY2309749-017	TY2309749-018	TY2309749-018	TY2309749-014	TY2309749-014	TY2309749-015	TY2309749-015	TY2309749-016	TY2309749-016	TY2309749-011	TY2309749-011	TY2309749-013	TY2309749-013	TY2405789-004	TY2405789-004	TY2405789-005
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.68	0.0028	0.15	0.0213	0.131	0.0018	0.87	0.0027	0.941	0.0027	0.754	0.0108	2.75	0.0021	**5.02**	0.0024	0.357	0.0161	1.17	< 0.001	0.137	0.0016
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00015	0.00049	0.00082	< 0.0001	0.00034	0.00017	0.00063	< 0.0001	0.00087	0.00013	0.00027	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	0.00012	0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.00094	**0.00176**	**0.00206**	**0.00338**	**0.00323**	0.00022	0.00047	0.00029	0.00056	0.00034	0.00071	0.00055	**0.00184**	0.00029	0.00333	0.00042	0.00058	0.00103	**0.00132**	0.00026	0.00037	< 0.0001
Barium	mg/L	1	2	1	0.0217	0.0238	0.0253	0.0374	0.0382	0.0256	0.034	0.0295	0.0319	0.0307	0.039	0.0431	0.0685	0.0136	0.0472	0.0389	0.047	0.0271	0.0401	0.023	0.026	0.0136
Beryllium	mg/L	0.004	--	--	0.000033	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000036	< 0.00002	0.000031	< 0.00002	0.000048	< 0.00002	0.000126	< 0.00002	0.000274	< 0.00002	< 0.00002	< 0.00002	0.000043	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.012	< 0.01	0.01	0.012	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.012	< 0.02	< 0.01	< 0.02	< 0.01	0.024	0.034	0.038	< 0.01	< 0.02	0.013	0.013	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000128	< 0.000005	< 0.000005	< 0.000005	0.0000074	0.0000119	0.000032	< 0.000005	0.0000905	< 0.000005	0.0000441	0.0000238	0.000204	0.000014	0.000177	< 0.000005	0.0000115	0.0000054	0.0000439	< 0.000005	0.0000091	< 0.0000005
Calcium	mg/L	--	--	--	99.2	76	72.1	88.5	83.6	80.4	88	78	92.5	75	77	89.2	104	92	417	79.9	72.8	96.5	101	66.6	71.6	64.8
Cesium	mg/L	--	--	--	0.000089	< 0.00001	0.000023	< 0.00001	0.000024	< 0.00001	0.000109	< 0.00001	0.000109	< 0.00001	0.000079	< 0.00001	0.000286	< 0.00001	0.000353	< 0.00001	0.000061	< 0.00001	0.000155	< 0.00001	0.000013	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00179	< 0.0005	0.00055	0.00131	0.0017	< 0.0005	0.00224	0.00097	0.00319	< 0.0005	0.00338	< 0.0005	0.00753	0.00072	0.0157	< 0.0005	0.00182	< 0.0005	0.00312	< 0.0005	< 0.0005	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00079	0.00079	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00055	0.00073	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00046	< 0.0001	0.00012	< 0.0001	0.00014	0.00028	0.00084	< 0.0001	0.00071	0.00037	0.00094	0.00104	0.00211	0.00044	**0.00756**	0.00027	0.00064	0.00022	0.00086	< 0.0001	0.00011	< 0.0001
Copper	mg/L	0.087	2	--	0.00114	< 0.0002	< 0.0005	< 0.0002	< 0.0005	0.00026	0.00193	0.00085	0.00299	< 0.0002	0.00243	0.00132	0.00654	0.002	0.0218	< 0.0002	0.00159	0.0006	0.00194	< 0.0002	< 0.0005	< 0.0002
Iron	mg/L	--	--	--	**2.38**	**2.35**	**2.83**	**7.25**	**7.37**	0.012	**1.12**	< 0.01	**1.24**	0.112	**1.1**	< 0.01	**3.52**	< 0.01	**9.18**	**4.17**	**4.59**	**1.87**	**3.39**	0.691	**1.59**	0.092
Lead	mg/L	0.01	0.005	0.01	0.000528	< 0.00005	0.000102	< 0.00005	0.000087	< 0.00005	0.000566	< 0.00005	0.000627	< 0.00005	0.000604	< 0.00005	0.00226	< 0.00005	**0.00536**	< 0.00005	0.000261	< 0.00005	0.000623	< 0.00005	0.000135	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**<3**	-
Lithium	mg/L	--	--	--	0.0021	0.0033	0.0034	0.0034	0.0034	0.0089	0.0102	0.0054	0.0068	0.0037	0.0048	0.0037	0.0085	0.0164	0.013	0.0127	0.0137	0.0016	0.0036	0.0043	0.0039	0.0032
Magnesium	mg/L	--	--	--	16.2	17.2	16.2	12.6	12.1	24.7	25.9	19.3	21.6	17.7	18.4	18.7	23.8	17.9	92.6	18.3	15.5	10.3	11.2	15.8	17.4	15.1
Manganese	mg/L	--	--	--	0.294	0.122	0.135	0.284	0.279	0.0673	0.0925	0.00553	0.0393	0.194	0.208	0.636	0.446	0.0393	0.561	0.388	0.531	0.11	0.141	0.0458	0.0522	0.0392
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000106	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000292	0.000706	0.000753	0.000341	0.000394	0.00118	0.000989	0.000412	0.000308	0.00739	0.0113	0.00675	0.0111	0.00124	0.00119	0.00375	0.00564	0.000344	0.00035	0.000424	0.000504	0.000751
Nickel	mg/L	0.1	--	--	0.00136	< 0.0005	< 0.0005	< 0.0005	0.00058	0.0006	0.00208	< 0.0005	0.00301	0.00308	0.0109	0.00221	0.0133	0.00116	0.0118	0.00055	0.00201	0.00097	0.00317	< 0.0005	0.018	< 0.0005
Potassium	mg/L	--	--	--	0.577	0.611	0.646	0.979	0.966	1.23	1.43	0.914	0.987	5.85	5.27	7.94	7.95	1.05	1.95	3.22	3.33	0.234	0.516	1.97	2.04	1.87
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**<3**	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-
Rubidium	mg/L	--	--	--	0.00191	0.00082	0.00115	0.00149	0.00166	0.00032	0.00192	0.00146	0.00294	0.0024	0.00394	0.00106	0.0052	0.00199	0.00755	0.00234	0.00303	0.00046	0.00242	0.00161	0.00191	0.00387
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00057	0.000054	0.000379	0.000392	0.000159	0.000131	< 0.00005	< 0.0001	< 0.00005	0.000439	0.000312	0.000061	< 0.00005	0.000059	< 0.0001	< 0.00005	< 0.00005	< 0.00005
Silver	mg/L	0.0015	--	--	0.000011	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000011	< 0.00001	0.000599	< 0.00001	0.000048	< 0.00001	0.000036	< 0.00001	0.000071	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	1.27	3.99	4.44	13.6	12.3	7.16	6.46	5.26	4.64	3.68	4.11	12.9	24.5	5.58	3.92	38	47.6	3.21	2.97	3.88	3.88	1.96
Strontium	mg/L	--	7	--	0.0801	0.0808	0.0781	0.0945	0.094	0.129	0.136	0.118	0.121	0.0769	0.0811	0.0808	0.0957	0.092	0.295	0.427	0.464	0.132	0.143	0.122	0.12	0.061
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000011	< 0.00001	0.000019	< 0.00001	< 0.00002	< 0.00001	0.000038	< 0.00001	0.000098	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	0.0003	< 0.0001	< 0.0001	< 0.0001	0.00013	< 0.0001	0.0004	< 0.0001	0.00046	< 0.0001	0.00038	< 0.0001	0.00102	< 0.0001	0.00318	< 0.0001	0.00018	< 0.0001	< 0.0002	< 0.0001	0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-
Tin	mg/L	--	--	--	0.00023	< 0.0001	0.00016	< 0.0001	0.00024	0.00033	0.00066	0.00033	0.0004	0.00015	0.00138	0.00028	0.00293	0.00015	0.0011	< 0.0001	0.00027	0.00015	0.00036	< 0.0001	< 0.0001	< 0.0001
Titanium	mg/L	--	--	--	0.0534	< 0.0003	0.00936	0.00313	0.0104	< 0.0003	0.0594	< 0.0003	0.0692	< 0.0003	0.0509	< 0.0003	0.146	< 0.0003	0.659	< 0.0003	0.021	0.00031	0.0528	< 0.0003	0.0114	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0176	0.0165	< 0.0001	< 0.0002	0.0306	0.0315	0.00804	0.0147	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.000068	0.000034	0.000048	0.000053	0.000068	0.00302	0.00331	0.000682	0.000609	0.000467	0.000713	0.00139	0.00308	0.0129	0.0111	0.00124	0.0025	0.000045	0.000363	0.000955	0.0012	0.00277
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.018	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0009	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.018	-
Vanadium	mg/L	0.0062	--	--	0.00197	< 0.0005	0.00079	0.0026	0.00308	< 0.0005	0.00243	< 0.0005	0.00243	< 0.0005	0.00151	< 0.0005	**0.00623**	< 0.0005	**0.0183**	< 0.0005	0.001	< 0.0005	0.00283	< 0.0005	< 0.0005	< 0.0005
Zinc	mg/L	1.1	--	--	0.0058	< 0.001	< 0.003	< 0.001	0.0031	0.0015	0.0049	< 0.001	0.0089	0.003	0.022	0.0272	0.192	0.0021	0.0295	< 0.001	0.0083	0.0084	0.0172	< 0.001	< 0.003	< 0.001
Zirconium	mg/L	--	--	--	0.00095	0.00038	0.00059	0.00226	0.00231	< 0.0003	0.00075	< 0.0003	0.00082	< 0.0003	0.00057	< 0.0003	0.00136	< 0.0003	0.0024	0.00192	0.00192	< 0.0003	0.00056	< 0.0003	< 0.0002	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-01-02 MW22-01-2_20240605 2024-06-05 TY2405789-005 N T	MW22-02-01 MW22-02-1_20240604 2024-06-04 TY2405789-001 N D	MW22-02-01 MW22-02-1_20240604 2024-06-04 TY2405789-001 N T	MW22-02-02 MW22-02-2_20240604 2024-06-04 TY2405789-002 N D	MW22-02-02 MW22-02-2_20240604 2024-06-04 TY2405789-002 N T	MW22-03-01 MW22-03-1_20240604 2024-06-04 TY2405789-023 N D	MW22-03-01 MW22-03-1_20240604 2024-06-04 TY2405789-023 N T	MW22-03-02 MW22-03-2_20240604 2024-06-04 TY2405789-024 N D	MW22-03-02 MW22-03-2_20240604 2024-06-04 TY2405789-024 N T	MW22-04-01 MW22-04-1_20240603 2024-06-03 TY2405789-013 N D	MW22-04-01 MW22-04-1_20240603 2024-06-03 TY2405789-013 N T	MW22-13-01 MW22-13-1_20240603 2024-06-03 TY2405789-014 N D	MW22-13-01 MW22-13-1_20240603 2024-06-03 TY2405789-014 N T	MW22-13-02 MW22-13-2_20240603 2024-06-03 TY2405789-015 N D	MW22-13-02 MW22-13-2_20240603 2024-06-03 TY2405789-015 N T	MW22-14-01 MW22-14-1_20240603 2024-06-03 TY2405789-016 N D	MW22-14-01 MW22-14-1_20240603 2024-06-03 TY2405789-016 N T	MW22-14-02 MW22-14-2_20240603 2024-06-03 TY2405789-017 N D	MW22-14-02 MW22-14-2_20240603 2024-06-03 TY2405789-017 N T	MW22-15-01 MW22-15-1_20240605 2024-06-05 TY2405789-007 N D	MW22-15-01 MW22-15-1_20240605 2024-06-05 TY2405789-007 N T	MW22-15-03 MW22-15-3_20240605 2024-06-05 TY2405789-008 N D
Aluminum	mg/L	--	2.9	--	0.821	0.0014	0.122	0.0017	0.1	0.0036	**535**	0.0023	0.331	0.0021	**64.1**	0.0204	0.206	0.0664	0.145	< 0.001	1.81	0.003	0.378	0.0026	0.712	0.0122
Antimony	mg/L	0.006	0.006	0.006	< 0.0002	0.00047	0.00066	< 0.0001	0.00024	< 0.0001	< 0.01	< 0.0001	0.0005	< 0.0001	< 0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00013	0.00041	< 0.0001	0.0002	< 0.0001	0.00027	0.00021
Arsenic	mg/L	0.025	0.01	0.01	0.00037	0.00026	0.00031	0.00027	0.0003	**0.00168**	**0.12**	0.00062	0.00073	< 0.0001	**0.0457**	**0.00678**	**0.00644**	**0.00577**	**0.00529**	0.00015	0.00064	0.00016	0.00025	0.00022	0.00056	0.00035
Barium	mg/L	1	2	1	0.0209	0.0371	0.0398	0.0274	0.0285	0.0419	**4.3**	0.048	0.0541	0.0154	0.552	0.0311	0.0325	0.0298	0.0302	0.0259	0.0432	0.02	0.023	0.0271	0.035	0.0447
Beryllium	mg/L	0.004	--	--	< 0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	**0.0195**	< 0.00002	0.000023	< 0.00002	0.00277	0.000026	0.000036	0.00003	0.000038	< 0.00002	0.000072	< 0.00002	< 0.00002	< 0.00002	0.00005	< 0.00002
Bismuth	mg/L	--	--	--	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	0.00107	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005
Boron	mg/L	5	5	5	< 0.02	0.017	0.02	< 0.01	< 0.01	0.01	< 1	0.021	0.022	< 0.01	< 0.2	0.017	0.016	0.011	0.011	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000183	< 0.000005	0.000005	< 0.000005	0.000016	< 0.000005	0.0034	0.0000172	0.0000521	< 0.000005	0.00124	< 0.000005	0.0000081	< 0.000005	0.0000051	< 0.000005	0.000193	< 0.000005	0.0000233	0.0000103	0.000057	0.0000893
Calcium	mg/L	--	--	--	72.7	61.8	68.8	65.5	70.8	88.4	5560	108	102	72.8	2360	92.7	92.1	93.3	93.9	77.5	99.3	72.5	75.8	61.2	75.1	76.4
Cesium	mg/L	--	--	--	0.000096	< 0.00001	0.000014	< 0.00001	0.000011	< 0.00001	0.0638	< 0.00001	0.000049	< 0.00001	0.00551	< 0.00001	0.000026	0.000012	0.000021	< 0.00001	0.00022	< 0.00001	0.000051	< 0.00001	0.000068	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	0.00188	< 0.0005	< 0.0005	0.00083	0.00138	< 0.0005	**1.1**	< 0.0005	0.00092	0.00145	**0.157**	0.00152	0.00221	0.00352	0.00403	< 0.0005	0.00401	0.0009	0.00179	< 0.0005	0.00228	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	0.00082	0.00105	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00144	0.00138	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00094	0.00085	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00065	< 0.0001	0.00012	< 0.0001	0.0001	0.00013	**0.311**	0.00018	0.00036	< 0.0001	**0.0703**	0.00016	0.0003	0.00023	0.00032	< 0.0001	0.00127	< 0.0001	0.00022	0.0002	0.00072	0.00081
Copper	mg/L	0.087	2	--	0.00146	< 0.0002	< 0.0005	< 0.0002	0.0005	0.00056	**0.666**	< 0.0002	0.00095	0.00028	**0.199**	< 0.0002	< 0.0005	< 0.0002	< 0.0005	< 0.0002	0.00315	< 0.0002	0.00098	< 0.0002	0.00311	0.00033
Iron	mg/L	--	--	--	**1.28**	**1.64**	**1.9**	0.013	0.136	0.814	**616**	0.03	0.377	< 0.01	**124**	**5.9**	**6.46**	**14.4**	**15.2**	0.025	**2.19**	< 0.01	0.461	0.112	**1.13**	< 0.01
Lead	mg/L	0.01	0.005	0.01	0.000546	< 0.00005	0.000106	< 0.00005	0.000094	< 0.00005	**0.297**	< 0.00005	0.000278	< 0.00005	**0.07**	< 0.00005	0.000128	< 0.00005	0.000063	< 0.00005	0.0011	< 0.00005	0.000223	< 0.00005	0.000723	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0036	0.01	0.0098	0.008	0.0074	0.005	0.683	0.008	0.0075	0.0036	0.0869	0.0053	0.0048	0.0018	0.0016	0.0092	0.011	0.0047	0.0047	0.0034	0.0036	0.0043
Magnesium	mg/L	--	--	--	17.8	20	21.8	19.7	21.5	16.5	1420	20.2	22.5	17.2	458	11.8	12.9	9.62	10.2	22	29.4	16.2	17.5	14.3	17.6	17
Manganese	mg/L	--	--	--	0.0903	0.0435	0.0493	0.00642	0.0109	0.2	**15.5**	0.306	0.28	0.00026	**3.9**	0.379	0.41	0.255	0.263	0.0279	0.103	0.00069	0.0102	0.127	0.224	0.561
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000067	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000779	0.00305	0.00328	0.00214	0.00242	0.00039	0.00821	0.0007	0.000709	0.000288	0.00272	0.000436	0.00045	0.000322	0.000315	0.00106	0.00109	0.000157	0.000139	0.00742	0.00815	0.00712
Nickel	mg/L	0.1	--	--	0.00182	< 0.0005	< 0.0005	< 0.0005	0.00103	< 0.0005	**0.748**	0.00077	0.00158	< 0.0005	**0.129**	< 0.0005	0.00067	< 0.0005	0.00055	< 0.0005	0.00328	< 0.0005	0.00081	0.00118	0.00304	0.00456
Potassium	mg/L	--	--	--	2.13	3.16	3.12	3.88	4.19	1.81	182	1.51	1.76	1.03	17.1	1.11	1.17	0.629	0.67	1.13	1.78	0.181	0.308	5.05	5.03	7.02
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00531	0.00087	0.00102	0.00092	0.00124	0.0015	1.04	0.0008	0.00141	0.00079	0.0897	0.00103	0.00144	0.00088	0.0011	0.00025	0.0036	0.00032	0.00113	0.00163	0.00301	0.00085
Selenium	mg/L	0.01	0.05	0.05	< 0.0001	0.000277	< 0.00005	0.000466	0.000421	< 0.00005	0.00508	< 0.00005	< 0.00005	0.000269	< 0.001	0.000599	0.000061	0.00114	0.000114	0.000461	0.000243	0.000317	0.000279	< 0.00005	< 0.0001	< 0.00005
Silver	mg/L	0.0015	--	--	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	**0.00227**	< 0.00001	< 0.00001	< 0.00001	0.000451	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	0.000094	< 0.00001	< 0.00001	< 0.00001	**0.00175**	< 0.00001
Sodium	mg/L	490	--	--	1.92	7.72	7.77	6.32	6.73	5.72	72.3	11.6	12.3	1.85	8.1	12.3	12.4	11.9	12.2	6.54	7.17	3.89	4.01	4.89	5.7	23.4
Strontium	mg/L	--	7	--	0.0674	0.117	0.122	0.094	0.0947	0.12	4.63	0.179	0.182	0.0595	1.54	0.124	0.124	0.0871	0.09	0.127	0.148	0.0931	0.0997	0.0647	0.076	0.0756
Tellurium	mg/L	--	--	--	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.02	< 0.0002	< 0.0002	< 0.0002	< 0.004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00002	< 0.00001	< 0.00001	< 0.00001	0.000011	< 0.00001	**0.00737**	< 0.00001	< 0.00001	< 0.00001	0.00132	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000025	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001
Thorium	mg/L	--	--	--	0.00028	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.254	< 0.0001	0.00014	< 0.0001	0.0555	0.00011	0.00019	0.00028	0.00036	< 0.0001	0.00085	< 0.0001	0.00018	< 0.0001	0.00041	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00035	0.00021	0.00052	< 0.0001	0.0002	< 0.0001	0.0191	< 0.0001	0.00075	< 0.0001	0.00431	< 0.0001	0.00014	< 0.0001	0.00011	0.00017	0.00105	0.00011	0.00026	< 0.0001	0.00118	0.00039
Titanium	mg/L	--	--	--	0.0559	< 0.0003	0.00877	< 0.0003	0.00864	< 0.0003	39	< 0.0003	0.0135	< 0.0003	7.7	0.00418	0.0171	0.00937	0.0162	< 0.0003	0.129	< 0.0003	0.0264	< 0.0003	0.0491	< 0.0003
Tungsten	mg/L	--	--	--	< 0.0002	0.00019	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.01	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00843	0.0151	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00264	0.000056	0.000073	0.00208	0.00218	0.000324	**0.0698**	0.00134	0.00157	0.00141	0.0116	0.000029	0.000044	0.000098	0.000118	0.00277	0.00337	0.000464	0.00051	0.000274	0.000424	0.00168
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.002	< 0.0005	< 0.0005	< 0.0005	0.00058	< 0.0005	**1.25**	< 0.0005	0.00085	< 0.0005	**0.218**	0.00393	0.00465	**0.00846**	**0.00921**	< 0.0005	0.00452	< 0.0005	0.00123	< 0.0005	0.00145	< 0.0005
Zinc	mg/L	1.1	--	--	< 0.006	< 0.001	< 0.003	< 0.001	< 0.003	< 0.001	**1.33**	0.0011	0.0062	< 0.001	0.24	< 0.001	< 0.003	< 0.001	< 0.003	< 0.001	0.0104	< 0.001	< 0.003	0.001	0.0082	0.0092
Zirconium	mg/L	--	--	--	< 0.0004	< 0.0003	0.00023	< 0.0003	< 0.0002	< 0.0003	0.309	< 0.0003	0.00026	< 0.0003	0.0378	0.0039	0.00381	0.00559	0.00531	< 0.0003	0.00086	< 0.0003	0.00035	< 0.0003	< 0.0004	< 0.0003

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-15-03	MW22-17-01	MW22-17-01	MW22-17-02	MW22-17-02	MW22-18-01	MW22-18-01	MW22-18-02	MW22-18-02	MW22-19-01	MW22-19-01	MW22-19-02	MW22-20-01	MW22-20-01	MW22-20-02	MW22-20-02	MW22-07-01	MW22-07-01	MW22-07-02	MW22-07-02	MW22-08-01	MW22-08-01
					MW22-15-3_20240605	MW22-17-1_20240605	MW22-17-1_20240605	MW22-17-2_20240605	MW22-17-2_20240605	MW22-18-1_20240605	MW22-18-1_20240605	MW22-18-2_20240605	MW22-18-2_20240605	MW22-19-1_20240604	MW22-19-1_20240604	MW22-19-2_20240604	MW22-20-1_20240604	MW22-20-1_20240604	MW22-20-2_20240604	MW22-20-2_20240604	MW22-07-1_20240610	MW22-07-1_20240610	MW22-07-2_20240610	MW22-07-2_20240610	MW22-08-1_20240610	MW22-08-1_20240610
					2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04	2024-06-04	2024-06-04	2024-06-04	2024-06-04	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10
					TY2405789-008	TY2405789-011	TY2405789-011	TY2405789-025	TY2405789-025	TY2405789-009	TY2405789-009	TY2405789-010	TY2405789-010	TY2405789-019	TY2405789-019	TY2405789-020	TY2405789-021	TY2405789-021	TY2405789-022	TY2405789-022	TY2405941-001	TY2405941-001	TY2405941-002	TY2405941-002	TY2405941-005	TY2405941-005
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Parameter	**Units**	**Generic Ontario Standards** OREG 153/04 T2 SCS Potable (coarse)	**Human Health Based Guideline** CDWQ MAC	**Human Health Based Guideline** OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	1.54	0.0055	0.0446	0.0083	0.308	0.0103	0.0773	0.674	1.02	0.0017	0.552	0.0258	0.0018	0.22	0.0094	1.85	0.0054	0.101	0.0057	0.236	0.002	1.3
Antimony	mg/L	0.006	0.006	0.006	0.00043	< 0.0001	< 0.0001	< 0.0001	0.0004	0.00021	0.00037	< 0.0001	0.00021	0.00038	0.00114	0.0002	< 0.0001	0.00017	< 0.0001	< 0.0005	< 0.0001	0.00042	0.00022	0.0003	< 0.0001	< 0.0002
Arsenic	mg/L	0.025	0.01	0.01	0.00083	0.00021	0.00026	**0.00165**	**0.00178**	0.00117	0.00102	0.00066	0.00075	0.00016	0.0003	0.00018	0.00036	0.00048	0.00118	**0.00138**	**0.00273**	**0.00257**	**0.00448**	**0.00481**	**0.0212**	**0.0186**
Barium	mg/L	1	2	1	0.0598	0.0238	0.0247	0.0157	0.0191	0.0367	0.0378	0.0104	0.0169	0.0141	0.0198	0.00752	0.0471	0.0511	0.0321	0.0457	0.0255	0.0261	0.029	0.0281	0.0403	0.0479
Beryllium	mg/L	0.004	--	--	0.000054	< 0.00002	< 0.00002	< 0.00002	0.000025	0.00036	0.000381	0.000073	0.000104	< 0.00002	0.000061	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00006
Bismuth	mg/L	--	--	--	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001
Boron	mg/L	5	5	5	< 0.02	< 0.01	< 0.01	0.052	0.056	0.011	0.01	< 0.01	< 0.02	< 0.01	< 0.02	0.014	0.034	0.038	< 0.01	< 0.05	0.026	0.022	0.114	0.108	0.079	0.081
Cadmium	mg/L	0.005	0.007	0.005	0.00014	< 0.000005	0.000051	0.0000141	0.0000572	< 0.000005	0.0000204	0.0000246	0.0000306	0.0000151	0.0000363	0.0000172	< 0.000005	0.0000212	< 0.000005	0.00003	0.0000138	0.0000369	0.0000074	0.0000269	< 0.000005	0.0000199
Calcium	mg/L	--	--	--	104	55	57.9	47.6	54.1	27.2	29.2	5.49	7.22	81.7	90.4	69	78.8	80.3	117	119	60.3	64.1	50.2	53.2	68.9	77.1
Cesium	mg/L	--	--	--	0.000139	< 0.00001	< 0.00001	< 0.00001	0.000031	< 0.00001	0.000018	0.000074	0.000159	< 0.00001	0.000067	< 0.00001	< 0.00001	0.000045	< 0.00001	0.000215	< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	0.000167
Chromium	mg/L	0.05	0.05	0.05	0.00414	< 0.0005	< 0.0005	< 0.0005	0.001	0.00102	0.0014	0.00109	0.00177	0.00066	0.00168	0.00068	< 0.0005	0.00132	< 0.0005	0.00446	< 0.0005	0.0005	0.00095	0.00201	< 0.0005	0.00301
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00067	0.0006	0.00052	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00218	0.00044	0.00049	0.00022	0.00046	0.00038	0.00038	0.00209	0.00156	0.00015	0.00074	0.00012	0.00017	0.00034	0.00023	0.00119	0.0003	0.00039	0.00068	0.00076	0.00035	0.00104
Copper	mg/L	0.087	2	--	0.00334	< 0.0002	0.0009	0.00041	0.00161	< 0.0002	0.0008	0.0169	0.0203	0.00081	0.0036	0.00237	0.00063	0.00118	0.00072	0.0034	0.00079	0.00085	< 0.0002	0.00111	< 0.0002	0.00173
Iron	mg/L	--	--	--	**1.79**	0.26	0.309	0.173	0.583	0.798	0.86	0.482	0.858	< 0.01	0.585	0.066	**4.54**	**5.07**	**2.56**	**4.76**	0.021	0.122	0.55	0.939	**1.76**	**3.14**
Lead	mg/L	0.01	0.005	0.01	0.00104	< 0.00005	< 0.00005	< 0.00005	0.000321	< 0.00005	0.000161	< 0.00005	0.00027	< 0.00005	0.000679	< 0.00005	< 0.00005	0.000172	< 0.00005	0.00104	< 0.00005	0.000124	< 0.00005	0.000197	< 0.00005	0.000846
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	**< 4**	-	**< 4**	-	**< 3**	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0056	0.0036	0.0033	0.0018	0.0015	0.0165	0.0151	0.0024	0.003	0.0023	0.0026	< 0.001	0.0094	0.0088	0.0028	0.0056	0.0033	0.0038	0.0036	0.0037	0.0045	0.0066
Magnesium	mg/L	--	--	--	23.5	10.1	11.1	9	11.2	6.9	7.32	1.29	1.65	14.4	17.2	12.6	18.7	20.2	10.7	13.8	15.3	14.7	20.2	19.6	20.4	21.3
Manganese	mg/L	--	--	--	0.757	0.522	0.559	0.282	0.29	0.639	0.644	0.0136	0.0219	0.00303	0.021	0.0027	0.306	0.326	0.129	0.166	0.228	0.215	0.209	0.211	0.248	0.254
Mercury	mg/L	0.001	0.001	0.001	0.0000152	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000087	0.0000079	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00681	0.000808	0.000816	0.00691	0.00761	0.00546	0.00436	0.00102	0.00136	0.00108	0.00118	0.000768	0.000994	0.00112	0.000331	0.000384	0.00156	0.00175	0.0109	0.00997	0.00828	0.00766
Nickel	mg/L	0.1	--	--	0.00703	0.00107	0.00123	0.0016	0.00245	0.00205	0.0024	0.00516	0.0065	0.00095	0.00187	0.00063	< 0.0005	0.00189	0.00085	0.0037	0.00139	0.00232	0.0108	0.0109	0.00072	0.00251
Potassium	mg/L	--	--	--	7.59	2.76	2.86	2.47	2.65	2.27	2.2	1.2	1.44	0.762	0.929	1.13	3.4	3.46	0.328	0.792	1.52	1.47	3.83	3.33	1.7	2.06
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	< 2	-	< 5	-	< 5	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	**< 8**	-	**< 7**	-	**< 4**	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	< 1	-	< 0.8	-	< 0.25	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00313	0.0007	0.00072	0.00097	0.0016	0.00315	0.00311	0.00494	0.00584	0.00135	0.00229	0.00061	0.00254	0.00308	0.00051	0.00368	0.00099	0.00115	0.00126	0.00149	0.00052	0.00332
Selenium	mg/L	0.01	0.05	0.05	< 0.0001	0.000272	< 0.00005	0.000101	0.000088	0.000144	0.000071	0.00009	0.000111	0.000575	0.000518	0.000108	0.000122	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.00005	0.000074	0.000075	< 0.00005	< 0.0001
Silver	mg/L	0.0015	--	--	< 0.00002	< 0.00001	0.000035	< 0.00001	0.00006	< 0.00001	0.000074	0.000106	0.000922	< 0.00001	< 0.00002	< 0.00001	< 0.00001	0.000049	< 0.00001	< 0.00005	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002
Sodium	mg/L	490	--	--	21.5	1.12	1.15	22.8	24	6.99	5.96	0.892	1.02	16.8	16.6	1.44	18.4	19	4.32	4.24	5.94	5.65	23.8	23.4	17.7	18.1
Strontium	mg/L	--	7	--	0.0895	0.0472	0.0489	0.0466	0.0542	0.182	0.183	0.0292	0.0384	0.0746	0.0823	0.0568	0.457	0.477	0.162	0.168	0.187	0.178	0.28	0.259	0.47	0.464
Tellurium	mg/L	--	--	--	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004
Thallium	mg/L	0.002	--	--	0.000027	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000018	0.000025	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002
Thorium	mg/L	--	--	--	0.00038	< 0.0001	< 0.0001	< 0.0001	0.00018	0.00027	0.00037	0.00042	0.00057	< 0.0001	0.00033	< 0.0001	< 0.0001	0.00014	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00055
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	< 0.4	-	< 0.4	-	< 0.12	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	**< 40**	-	**< 30**	-	**< 20**	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	< 4	-	< 5	-	< 4	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00152	< 0.0001	0.00018	0.00147	0.00278	0.00246	0.00345	0.0001	0.00034	0.00067	0.00207	0.00037	< 0.0001	0.00068	< 0.0001	< 0.0005	0.00019	0.0009	0.00123	0.00202	< 0.0001	0.00025
Titanium	mg/L	--	--	--	0.085	< 0.0003	0.00271	0.0005	0.024	0.00179	0.00668	0.00517	0.0227	< 0.0003	0.0266	0.00132	< 0.0003	0.0132	0.00032	0.09	< 0.0003	0.00504	< 0.0003	0.00946	< 0.0003	0.0736
Tungsten	mg/L	--	--	--	< 0.0002	0.00169	0.00165	0.0158	0.0174	0.0123	0.0108	0.0204	0.0265	0.0049	0.00777	< 0.0001	0.00307	0.0037	< 0.0001	< 0.0005	< 0.0001	0.00011	0.00016	0.00014	< 0.0001	< 0.0002
Uranium	mg/L	0.02	0.02	0.02	0.00197	0.00137	0.00134	0.00129	0.00149	0.00194	0.00189	0.00063	0.0008	0.00216	0.00303	0.000207	0.000447	0.000573	0.000045	0.00041	0.000658	0.000675	0.000379	0.000399	0.000386	0.000403
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	0.02	-	0.009	-	0.13	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	0.001	-	0.0005	-	0.0065	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	0.02	-	0.009	-	0.13	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00354	0.00059	0.00074	0.00092	0.00178	0.00545	0.00585	0.0005	0.00121	< 0.0005	0.00124	< 0.0005	< 0.0005	0.00061	< 0.0005	0.00469	< 0.0005	< 0.0005	< 0.0005	0.00085	< 0.0005	0.00297
Zinc	mg/L	1.1	--	--	0.0328	< 0.001	< 0.003	0.0011	0.0048	0.0012	< 0.003	0.0041	< 0.006	0.0034	0.0149	0.0047	0.0035	0.0093	0.002	< 0.015	0.004	0.0086	0.0015	0.0148	< 0.001	0.0062
Zirconium	mg/L	--	--	--	0.00052	0.00075	0.00077	0.00164	0.00173	0.0032	0.00282	0.00052	0.00048	< 0.0003	< 0.0004	0.0004	0.00153	0.00145	< 0.0003	< 0.001	< 0.0003	< 0.0002	< 0.0003	0.00036	< 0.0003	0.00107

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-08-02	MW22-08-02	MW22-09-01	MW22-09-01	MW22-09-02	MW22-09-02	MW22-12-01	MW22-12-01	MW22-12-04	MW22-12-04	MW22-01-01	MW22-01-01	MW22-01-02	MW22-01-02	MW22-02-01	MW22-02-01	MW22-02-02	MW22-02-02	MW22-08-01	MW22-08-01	MW22-08-02	MW22-08-02
					MW22-08-2_20240610	MW22-08-2_20240610	MW22-09-1_20240610	MW22-09-1_20240610	MW22-09-2_20240610	MW22-09-2_20240610	MW22-12-1_20240610	MW22-12-1_20240610	MW22-12-4_20240610	MW22-12-4_20240610	MW22-01-1_20240813	MW22-01-1_20240813	MW22-01-2_20240813	MW22-01-2_20240813	MW22-02-1_20240811	MW22-02-1_20240811	MW22-02-2_20240813	MW22-02-2_20240813	MW22-08-1_20240812	MW22-08-1_20240812	MW22-08-2_20240812	MW22-08-2_20240812
					2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-11	2024-08-11	2024-08-13	2024-08-13	2024-08-12	2024-08-12	2024-08-12	2024-08-12
					TY2405941-006	TY2405941-006	TY2405941-003	TY2405941-003	TY2405941-004	TY2405941-004	TY2405941-007	TY2405941-007	TY2405941-008	TY2405941-008	TY2408880-017	TY2408880-017	TY2408880-018	TY2408880-018	TY2408880-006	TY2408880-006	TY2408880-019	TY2408880-019	TY2408880-014	TY2408880-014	TY2408880-013	TY2408880-013
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Aluminum	mg/L	--	2.9	--	0.0049	0.169	0.0028	1.57	0.0228	**4.51**	0.0042	0.542	0.0022	0.487	0.0011	0.0293	0.0014	0.659	0.0016	**14.3**	0.0035	**4.35**	0.0012	0.149	0.0092	**5.35**
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	0.00016	0.00053	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0007	0.00015	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.001
Arsenic	mg/L	0.025	0.01	0.01	**0.0111**	**0.0121**	**0.0173**	**0.0168**	**0.00193**	**0.00322**	0.00103	0.00116	0.00064	0.00086	0.00026	0.00027	0.00025	0.00036	0.0002	**0.00506**	0.00053	**0.00227**	**0.0159**	**0.0152**	**0.0276**	**0.0254**
Barium	mg/L	1	2	1	0.0297	0.0328	0.068	0.0791	0.0107	0.047	0.0363	0.0402	0.0176	0.022	0.0217	0.0211	0.0255	0.0245	0.0405	0.162	0.0484	0.0818	0.0408	0.0409	0.0343	0.0817
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00004	< 0.00002	0.000066	< 0.00002	0.000191	< 0.00002	< 0.00004	< 0.00002	< 0.00004	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	0.000685	< 0.00002	0.000178	< 0.00002	< 0.00002	< 0.00002	< 0.0002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.0005
Boron	mg/L	5	5	5	0.031	0.033	0.075	0.078	< 0.01	< 0.02	0.013	< 0.02	< 0.01	< 0.02	0.012	0.012	0.011	0.013	0.014	< 0.05	0.013	< 0.05	0.109	0.116	0.038	< 0.1
Cadmium	mg/L	0.005	0.007	0.005	0.0000096	0.0000319	< 0.0000005	0.0000339	0.0000053	0.0000578	< 0.000005	0.0000319	< 0.0000005	< 0.00001	< 0.0000005	< 0.0000005	0.0000053	0.0000078	< 0.0000005	0.000234	0.0000075	0.0000928	< 0.0000005	< 0.0000005	< 0.0000005	0.0000683
Calcium	mg/L	--	--	--	69.9	77.9	78	107	33.3	89.8	86.1	95.9	68	103	76.6	68.6	72.6	70.1	78.2	566	75.4	186	65.3	62.1	83.1	128
Cesium	mg/L	--	--	--	< 0.00001	0.00002	< 0.00001	0.000184	< 0.00001	0.000516	< 0.00001	0.000064	< 0.00001	0.000056	< 0.00001	< 0.00001	< 0.00001	0.000074	< 0.00001	0.00118	< 0.00001	0.000378	< 0.00001	0.000018	< 0.00001	0.000633
Chromium	mg/L	0.05	0.05	0.05	< 0.0005	< 0.001	< 0.0005	0.00391	< 0.0005	0.0101	0.00212	0.0041	< 0.0005	0.0013	< 0.0005	< 0.0005	< 0.0005	0.00153	< 0.0005	0.0407	< 0.0005	0.0102	< 0.0005	< 0.0005	< 0.0005	0.011
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00021	0.00032	0.00015	0.00115	0.00023	**0.00305**	0.0003	0.00059	< 0.0001	0.00038	< 0.0001	< 0.0001	0.00038	0.00079	< 0.0001	**0.0102**	0.00018	**0.00339**	0.00022	0.0003	0.00025	**0.00343**
Copper	mg/L	0.087	2	--	0.00021	< 0.001	< 0.0002	0.0026	< 0.0002	0.00627	< 0.0002	0.00217	< 0.0002	0.00148	< 0.0002	< 0.0005	0.00302	0.00099	< 0.0002	0.0244	0.00294	0.00764	0.00101	< 0.0005	0.00093	0.00771
Iron	mg/L	--	--	--	0.693	1.03	**3.06**	**4.98**	**1.4**	**7.01**	**2.9**	**3.64**	**1.42**	**2.2**	0.51	0.547	0.092	**1.12**	**1.29**	**23.7**	0.015	**5.99**	**1.38**	**1.66**	**1.2**	**6.97**
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000457	< 0.00005	0.00112	< 0.00005	0.0031	< 0.00005	0.000506	< 0.00005	0.000494	< 0.00005	< 0.00005	0.000107	0.000376	< 0.00005	**0.00994**	0.000177	0.00327	< 0.00005	0.000082	< 0.00005	0.00271
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0037	0.0045	0.0081	0.0102	< 0.001	0.0069	0.0044	0.0054	< 0.001	< 0.002	0.0038	0.0036	0.003	0.0038	0.0078	0.0294	0.0077	0.0146	0.0051	0.0052	0.0041	0.0111
Magnesium	mg/L	--	--	--	16.4	16.3	32.5	38.7	6.18	21.3	17	17.6	13.1	16.2	17.5	16.8	17.5	18.1	22.8	138	23.1	50.2	20.7	20.2	19.1	29.7
Manganese	mg/L	--	--	--	0.217	0.228	0.0443	0.104	0.0779	0.215	0.17	0.189	0.298	0.328	0.0408	0.0428	0.119	0.158	0.038	0.955	0.068	0.32	0.15	0.165	0.241	0.426
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000063	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00434	0.00456	0.00315	0.00264	< 0.00005	0.000149	0.00466	0.00462	0.000211	0.000283	0.000528	0.000593	0.00122	0.00123	0.00118	0.00189	0.00409	0.00328	0.00684	0.00717	0.00566	0.00481
Nickel	mg/L	0.1	--	--	0.00072	0.00101	< 0.0005	0.00269	< 0.0005	0.00709	0.00945	0.00935	< 0.0005	0.00105	< 0.0005	< 0.0005	< 0.0005	0.00122	< 0.0005	0.0245	< 0.0005	0.00742	< 0.0005	< 0.0005	< 0.0005	0.00911
Potassium	mg/L	--	--	--	1.22	1.2	2.82	3.17	0.155	1.49	1.16	1.27	0.395	0.549	1.94	1.87	2.35	2.47	2.83	6.65	3.78	4.84	1.97	1.95	1.4	2.94
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00037	0.00072	0.00109	0.00375	0.00042	0.00875	0.00112	0.00207	0.00066	0.00154	0.00196	0.00187	0.00398	0.00511	0.00072	0.0232	0.00106	0.00688	0.00058	0.00077	0.00039	0.0105
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	< 0.0001	< 0.00005	< 0.0001	0.000051	0.000105	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000214	< 0.00025	0.000493	0.000342	< 0.00005	< 0.00005	0.000155	< 0.0005
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00002	< 0.00001	< 0.00002	< 0.00001	0.000022	< 0.00001	< 0.00002	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000098	< 0.00001	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.0001
Sodium	mg/L	490	--	--	20.5	20.2	18.4	18.4	1.08	1.84	3.47	3.51	1.33	1.37	3.25	2.93	2.03	1.97	6.98	8.6	6.39	6.88	23.8	21.5	11.9	12.5
Strontium	mg/L	--	7	--	0.294	0.297	0.495	0.502	0.0644	0.116	0.107	0.108	0.0573	0.0825	0.104	0.0947	0.0682	0.0708	0.123	0.45	0.105	0.178	0.45	0.435	0.342	0.39
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00002	< 0.00001	0.000023	< 0.00001	0.000061	< 0.00001	< 0.00002	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	0.0002	0.000013	0.000087	< 0.00001	< 0.00001	< 0.00001	< 0.0001
Thorium	mg/L	--	--	--	< 0.0001	< 0.0002	< 0.0001	0.00079	< 0.0001	0.00149	< 0.0001	< 0.0002	< 0.0001	0.00024	< 0.0001	< 0.0001	< 0.0001	0.00027	< 0.0001	0.00679	< 0.0001	0.00212	< 0.0001	< 0.0001	< 0.0001	< 0.001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00031	0.00034	< 0.0001	0.00023	< 0.0001	0.00035	0.00059	0.00078	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	0.00011	< 0.0001	0.00292	0.00027	0.00066	0.00011	< 0.0001	0.00024	< 0.001
Titanium	mg/L	--	--	--	< 0.0003	0.00827	< 0.0003	0.115	0.00044	0.241	0.00067	0.0352	< 0.0003	0.0426	< 0.0003	0.00257	< 0.0003	0.0458	< 0.0003	1.22	< 0.0003	0.354	< 0.0003	0.00963	0.00038	0.234
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00285	0.00013	0.00062	0.00111	< 0.0001	< 0.0005	0.00011	< 0.0001	< 0.0001	< 0.001
Uranium	mg/L	0.02	0.02	0.02	0.00042	0.000465	< 0.00001	0.000168	0.000015	0.000548	0.000014	0.000057	< 0.00001	0.000061	0.00158	0.00163	0.00298	0.0029	0.000019	0.00172	0.00436	0.00472	0.000088	0.000099	0.000358	0.00112
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	< 0.001	< 0.0005	0.004	< 0.0005	**0.0106**	0.00059	0.0019	< 0.0005	0.00151	< 0.0005	< 0.0005	< 0.0005	0.00168	< 0.0005	**0.0373**	0.00086	**0.0119**	< 0.0005	< 0.0005	< 0.0005	**0.0108**
Zinc	mg/L	1.1	--	--	0.0011	< 0.006	< 0.001	< 0.006	< 0.001	0.0184	0.0045	0.0224	< 0.001	< 0.006	< 0.001	< 0.003	0.0021	0.0031	0.0017	0.0693	0.0041	0.019	0.002	< 0.003	0.0014	< 0.03
Zirconium	mg/L	--	--	--	< 0.0003	< 0.0004	< 0.0003	0.0013	< 0.0003	0.0022	0.00102	0.00116	0.00031	0.00087	< 0.0003	< 0.0002	< 0.0003	0.0004	< 0.0003	0.00797	< 0.0003	0.00181	< 0.0003	0.00025	< 0.0003	< 0.002

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-09-01	MW22-09-01	MW22-09-02	MW22-09-02	MW22-12-01	MW22-12-01	MW22-12-04	MW22-12-04	MW22-13-01	MW22-13-01	MW22-13-02	MW22-13-02	MW22-14-01	MW22-14-01	MW22-14-02	MW22-14-02	MW22-15-01	MW22-15-01	MW22-15-03	MW22-15-03	MW22-17-01	MW22-17-01
					MW22-09-1_20240812	MW22-09-1_20240812	MW22-09-2_20240812	MW22-09-2_20240812	MW22-12-1_20240812	MW22-12-1_20240812	MW22-12-4_20240812	MW22-12-4_20240812	MW22-13-1_20240811	MW22-13-1_20240811	MW22-13-2_20240811	MW22-13-2_20240811	MW22-14-1_20240811	MW22-14-1_20240811	MW22-14-2_20240812	MW22-14-2_20240812	MW22-15-1_20240813	MW22-15-1_20240813	MW22-15-3_20240813	MW22-15-3_20240813	MW22-17-1_20240813	MW22-17-1_20240813
					2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-12	2024-08-12	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13
					TY2408880-011	TY2408880-011	TY2408880-012	TY2408880-012	TY2408880-009	TY2408880-009	TY2408880-010	TY2408880-010	TY2408880-001	TY2408880-001	TY2408880-002	TY2408880-002	TY2408880-003	TY2408880-003	TY2408880-015	TY2408880-015	TY2408880-020	TY2408880-020	TY2408880-021	TY2408880-021	TY2408880-022	TY2408880-022
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.0027	0.712	0.0314	1.07	0.0029	1.19	0.0018	0.163	0.0174	0.0613	0.0609	0.0702	0.034	1.77	0.0046	0.213	0.003	0.558	0.009	0.408	0.0056	0.0227
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0009	0.00126	< 0.0001	< 0.0001	< 0.0001	0.00019	< 0.0001	0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	**0.0146**	**0.0123**	**0.00212**	**0.00267**	0.00115	0.00121	0.00075	0.00074	**0.00576**	**0.00539**	**0.00622**	**0.0056**	0.00051	0.00092	0.00019	0.00023	0.00039	0.00046	0.00041	0.00054	0.00027	0.00026
Barium	mg/L	1	2	1	0.0683	0.073	0.00887	0.0162	0.0362	0.0423	0.0182	0.0183	0.0334	0.0315	0.0293	0.0275	0.022	0.0374	0.02	0.021	0.032	0.0342	0.0482	0.0476	0.0333	0.0238
Beryllium	mg/L	0.004	--	--	< 0.00002	0.000026	< 0.00002	< 0.00004	< 0.00002	0.000057	< 0.00002	< 0.00002	0.000035	0.000023	0.000046	0.000039	< 0.00002	0.000063	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.082	0.093	< 0.01	< 0.02	0.012	0.015	< 0.01	< 0.01	0.018	0.018	0.013	0.013	0.011	< 0.02	< 0.01	< 0.01	0.013	0.013	0.01	0.012	< 0.01	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	< 0.000005	0.0000088	< 0.000005	< 0.00001	< 0.000005	0.0000137	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.0001	0.0000761	< 0.000005	< 0.000005	< 0.000005	0.0000284	< 0.000005	0.0000157	< 0.000005	< 0.000005
Calcium	mg/L	--	--	--	81.7	83.7	23.9	33	90.2	94.3	98.8	92.2	100	95.1	103	97.8	50.7	72.6	75.8	70.1	72.2	72.6	87.5	85.1	60.4	56.7
Cesium	mg/L	--	--	--	< 0.00001	0.000078	< 0.00001	0.000113	< 0.00001	0.000138	< 0.00001	0.000017	< 0.00001	0.000013	0.000013	0.000014	< 0.00001	0.000195	< 0.00001	0.00003	< 0.00001	0.000048	< 0.00001	0.000038	< 0.00001	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	< 0.0005	0.00178	< 0.0005	0.00212	< 0.0005	0.00346	< 0.0005	< 0.0005	0.00148	0.0018	0.0036	0.00374	< 0.0005	0.00398	0.00088	0.00133	< 0.0005	0.00189	< 0.0005	0.00112	< 0.0005	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00106	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00011	0.00054	0.00022	0.00076	< 0.0001	0.00082	< 0.0001	0.00011	0.00014	0.00018	0.00021	0.00024	< 0.0001	0.00113	< 0.0001	0.00013	0.00034	0.00061	0.00088	0.00127	0.00042	0.00043
Copper	mg/L	0.087	2	--	0.00147	0.001	0.00246	0.00122	< 0.0002	0.00196	0.0007	< 0.0005	< 0.0002	< 0.0005	< 0.0002	< 0.0005	0.0009	0.00327	0.00038	0.00072	0.00274	0.00192	< 0.0002	0.00074	0.00152	< 0.0005
Iron	mg/L	--	--	--	**2.5**	**3.45**	**1.22**	**2.38**	**2.59**	**4.42**	**1.41**	**1.64**	**6.26**	**6.3**	**13.8**	**14**	< 0.01	**2.03**	< 0.01	0.246	0.241	0.828	< 0.01	0.441	0.262	0.284
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000464	0.000218	0.000553	< 0.00005	0.0008	< 0.00005	0.000129	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.001	< 0.00005	0.000107	0.000058	0.000452	< 0.00005	0.000257	< 0.00005	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0083	0.0089	< 0.001	< 0.002	0.0046	0.0064	< 0.001	0.0011	0.0046	0.0044	0.0017	0.0017	0.0044	0.0077	0.0056	0.0056	0.0031	0.0037	0.004	0.0046	0.0034	0.0035
Magnesium	mg/L	--	--	--	34.7	35.8	3.97	6.98	16	18.8	13.1	14.1	13.1	13.4	10.6	10.4	12.9	18.9	17.4	16.8	15.6	17.7	18.7	19.3	11.4	11.4
Manganese	mg/L	--	--	--	0.0321	0.0582	0.0556	0.0869	0.16	0.206	0.291	0.315	0.411	0.424	0.271	0.278	0.011	0.0709	0.00044	0.00545	0.217	0.21	0.889	0.944	0.524	0.541
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00252	0.00242	0.000094	< 0.0001	0.00353	0.00282	0.000306	0.000256	0.000418	0.000469	0.000222	0.000246	**0.0844**	**0.0815**	0.000144	0.000158	0.00934	0.00916	0.00718	0.00727	0.00083	0.000811
Nickel	mg/L	0.1	--	--	< 0.0005	0.00116	< 0.0005	0.00161	0.00103	0.00289	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00057	0.00312	< 0.0005	< 0.0005	0.00069	0.00281	0.00225	0.00316	0.00111	0.00116
Potassium	mg/L	--	--	--	2.87	3.02	0.147	0.445	1.16	1.52	0.385	0.424	1.15	1.14	0.686	0.665	1.07	1.6	0.181	0.249	5.88	5.09	7.68	7.01	3.03	2.88
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00091	0.002	0.00039	0.0021	0.00105	0.00307	0.00069	0.00092	0.00108	0.00119	0.0009	0.00093	0.00036	0.00334	0.00046	0.00084	0.00174	0.00269	0.00086	0.00129	0.00064	0.00068
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	< 0.00005	< 0.00005	0.000114	< 0.0001	< 0.00005	< 0.00005	0.000081	< 0.00005	0.000252	0.00009	0.000347	0.000088	0.000526	0.000281	0.000271	0.000219	< 0.00005	< 0.00005	0.000064	0.000078	< 0.00005
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	0.000026	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	0.000576	< 0.00001	< 0.00001	< 0.00001	0.000012
Sodium	mg/L	490	--	--	18.8	17.3	0.945	1.11	3.26	3.17	1.24	1.24	12.2	11.7	12.4	12.3	8.16	8.19	4.54	4.25	5.34	5.39	20.3	19.4	1.11	1.11
Strontium	mg/L	--	7	--	0.486	0.482	0.0463	0.0536	0.103	0.112	0.0718	0.0701	0.129	0.128	0.0938	0.0939	0.0863	0.105	0.0983	0.0937	0.0685	0.0706	0.0809	0.0806	0.0513	0.0498
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	0.000013	< 0.00001	< 0.00001	< 0.00001	0.000019	< 0.00001	< 0.00001	< 0.00001	0.000025	< 0.00001	< 0.00001	< 0.00001	0.000012	< 0.00001	0.000022	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	< 0.0001	0.00037	< 0.0001	0.00033	< 0.0001	0.00057	< 0.0001	< 0.0001	0.00011	0.00016	0.00031	0.00032	< 0.0001	0.00066	< 0.0001	< 0.0001	< 0.0001	0.00034	< 0.0001	0.00013	< 0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00015	< 0.0001	0.00031	< 0.0002	< 0.0001	0.00016	0.00017	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00157	0.00305	< 0.0001	< 0.0001	0.00027	0.0007	0.00031	0.00054	< 0.0001	< 0.0001
Titanium	mg/L	--	--	--	< 0.0003	0.0515	0.00066	0.054	0.00045	0.0875	< 0.0003	0.0159	0.00405	0.00758	0.00978	0.0108	< 0.0003	0.109	< 0.0003	0.0127	< 0.0003	0.0475	< 0.0003	0.0202	< 0.0003	0.00122
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00038	0.00034	< 0.0001	< 0.0001	0.014	0.0135	< 0.0001	< 0.0001	0.00121	0.00114
Uranium	mg/L	0.02	0.02	0.02	< 0.00001	0.000061	< 0.00001	0.000082	0.000013	0.000097	< 0.00001	0.000026	0.000028	0.000031	0.000078	0.000077	0.00168	0.00197	0.000479	0.000485	0.000331	0.000392	0.00146	0.00142	0.00136	0.00128
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	0.00183	< 0.0005	0.0023	< 0.0005	0.00347	< 0.0005	0.00073	0.00426	0.00456	**0.0084**	**0.0084**	0.00077	0.00469	< 0.0005	0.00096	< 0.0005	0.00132	< 0.0005	0.00096	0.00058	0.00068
Zinc	mg/L	1.1	--	--	0.0016	< 0.003	0.0049	< 0.006	0.0011	0.008	0.0011	< 0.003	< 0.001	< 0.003	< 0.001	< 0.003	0.0046	0.012	< 0.001	< 0.003	0.0023	0.0054	0.0028	0.0112	0.0012	< 0.003
Zirconium	mg/L	--	--	--	< 0.0003	0.00089	< 0.0003	0.00075	0.00078	0.00179	0.00039	0.00059	0.00435	0.00436	0.00553	0.00547	< 0.0003	0.00113	< 0.0003	0.00025	< 0.0003	0.0004	< 0.0003	0.00033	0.00086	0.00082

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-17-02	MW22-17-02	MW22-18-01	MW22-18-01	MW22-18-02	MW22-18-02	MW22-19-01	MW22-19-01	MW22-19-02	MW22-19-02	MW-BD	MW-BD	MW-BD	MW-BD	MW22-04-01	MW22-04-01	MW22-05-01	MW22-05-01	MW22-05-02	MW22-05-02	MW22-06-01	MW22-06-01
					MW22-17-2_20240813	MW22-17-2_20240813	MW22-18-1_20240813	MW22-18-1_20240813	MW22-18-2_20240813	MW22-18-2_20240813	MW22-19-1_20240811	MW22-19-1_20240811	MW22-19-2_20240811	MW22-19-2_20240811	MWBD1_2024 0811	MWBD1_2024 0811	MWBD2_2024 0812	MWBD2_2024 0812	MW22-04-1_20240815	MW22-04-1_20240815	MW22-05-1_20240814	MW22-05-1_20240814	MW22-05-2_20240814	MW22-05-2_20240814	MW22-06-1_20240814	MW22-06-1_20240814
					2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-11	2024-08-12	2024-08-12	2024-08-15	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-14
					TY2408880-023	TY2408880-023	TY2408880-024	TY2408880-024	TY2408880-025	TY2408880-025	TY2408880-004	TY2408880-004	TY2408880-005	TY2408880-005	TY2408880-008	TY2408880-008	TY2408880-016	TY2408880-016	TY2409020-010	TY2409020-010	TY2409020-001	TY2409020-001	TY2409020-002	TY2409020-002	TY2409020-003	TY2409020-003
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Parameter	**Units**	**Generic Ontario Standards** OREG 153/04 T2 SCS Potable (coarse)	**Human Health Based Guideline** CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.0084	0.517	0.0101	0.0618	1.04	1.13	0.0221	0.101	0.0043	**5.95**	0.0646	0.0713	0.0027	0.148	0.0107	**9.51**	0.0026	1.61	0.0023	**6.65**	0.0017	0.0045
Antimony	mg/L	0.006	0.006	0.006	0.00013	< 0.0002	0.00017	0.00021	< 0.0001	0.00013	0.00013	0.00013	0.00012	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00035	0.00082	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	**0.00149**	**0.0016**	0.00054	0.00055	0.00093	0.00096	0.0002	0.00022	0.00026	**0.00251**	**0.00621**	**0.00549**	0.00074	0.00075	0.00016	**0.00852**	**0.00436**	**0.00533**	0.00013	**0.00283**	0.00022	0.00019
Barium	mg/L	1	2	1	0.0176	0.0217	0.04	0.0383	0.014	0.0144	0.016	0.0156	0.0104	0.048	0.0288	0.0277	0.018	0.018	0.0166	0.0856	0.0181	0.0309	0.0146	0.0623	0.0106	0.0106
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00004	0.00051	0.000554	0.000114	0.000121	< 0.00002	< 0.00002	< 0.00002	0.000256	0.000042	0.000039	< 0.00002	< 0.00002	< 0.00002	0.00046	< 0.00002	0.00006	< 0.00002	0.000279	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	< 0.00005	< 0.0001	< 0.00005	< 0.0001	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.063	0.072	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.022	< 0.05	0.012	0.014	< 0.01	< 0.01	< 0.01	< 0.05	0.012	< 0.02	< 0.01	< 0.02	< 0.01	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	0.0000441	0.0000726	0.0000108	0.0000206	0.000029	0.0000294	0.0000096	0.0000098	0.0000149	0.0000829	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000098	0.000173	< 0.000005	0.0000346	< 0.000005	0.0000815	< 0.000005	< 0.000005
Calcium	mg/L	--	--	--	54	60	31.2	29.7	6.56	6.63	91.6	81.2	78.9	154	105	94.4	97.7	87.8	71.6	184	72.5	119	68.4	250	60	66.3
Cesium	mg/L	--	--	--	< 0.00001	0.00005	0.00001	0.000016	0.000129	0.000136	< 0.00001	0.000012	< 0.00001	0.00057	0.000012	0.000014	< 0.00001	0.000015	< 0.00001	0.000943	< 0.00001	0.000163	< 0.00001	0.000712	< 0.00001	< 0.00001
Chromium	mg/L	0.05	0.05	0.05	< 0.0005	0.00153	0.00107	0.0013	0.00171	0.002	0.00081	0.001	0.00086	0.0141	0.0037	0.00384	< 0.0005	< 0.0005	0.00144	0.0247	0.00055	0.00393	0.00102	0.0149	< 0.0005	< 0.0005
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	0.00066	0.00103	0.0009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00141	0.00128	< 0.0005	< 0.0005	0.00089	0.00111	0.00052	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00022	0.00059	0.00014	0.00018	0.00089	0.00091	0.00015	0.00026	< 0.0001	**0.00481**	0.00024	0.00025	< 0.0001	0.00011	0.00023	**0.0135**	0.00042	0.00171	< 0.0001	**0.00486**	< 0.0001	< 0.0001
Copper	mg/L	0.087	2	--	0.00161	0.00247	0.00038	0.0006	0.0168	0.0168	0.00126	0.00153	0.00286	0.0151	< 0.0002	< 0.0005	< 0.0002	< 0.0005	0.00412	0.0419	< 0.0002	0.00347	0.00158	0.0116	0.00294	< 0.0005
Iron	mg/L	--	--	--	0.153	0.8	0.793	0.986	0.741	0.844	0.027	0.123	0.012	**8.45**	**14.1**	**14.2**	**1.4**	**1.58**	0.025	**20.9**	0.598	**3.4**	< 0.01	**9.59**	< 0.01	< 0.01
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000491	< 0.00005	0.000099	0.000088	0.00016	0.000071	0.000088	< 0.00005	0.00459	< 0.00005	< 0.00005	< 0.00005	0.000128	0.000071	**0.0138**	< 0.00005	0.00136	< 0.00005	0.00456	< 0.00005	< 0.00005
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0011	< 0.002	0.0149	0.0147	0.0033	0.0035	0.0021	0.0025	< 0.001	0.0075	0.0017	0.0019	< 0.001	0.0011	0.0034	0.0165	0.0025	0.0046	0.0025	0.013	0.0016	0.0014
Magnesium	mg/L	--	--	--	10.6	12.4	7.46	7.59	1.38	1.5	16.5	16.3	15.7	33.3	10.5	10.5	13.3	13.4	18.3	43.2	15.6	24.2	14.6	49.8	11.4	11.2
Manganese	mg/L	--	--	--	0.275	0.331	0.493	0.535	0.0206	0.0258	0.0036	0.00754	0.00068	0.252	0.272	0.282	0.289	0.305	0.00348	0.565	0.329	0.425	0.00086	0.325	0.00074	0.00126
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000009	< 0.000005	< 0.000005	< 0.000005	0.0000249	< 0.00005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000499	< 0.000005	< 0.000005	< 0.000005	0.0000064	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00648	0.00716	0.00179	0.00196	0.000773	0.000824	0.0011	0.00117	0.00123	0.00176	0.000224	0.00024	0.00027	0.000247	0.000345	0.000676	0.00255	0.0022	0.000426	0.000421	0.000288	0.000194
Nickel	mg/L	0.1	--	--	0.00186	0.00308	0.00252	0.00284	0.00566	0.0059	< 0.0005	0.00051	0.0006	0.0103	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00698	0.0284	0.00378	0.0033	< 0.0005	0.011	< 0.0005	0.00132
Potassium	mg/L	--	--	--	2.67	2.93	1.67	1.66	1.29	1.32	0.791	0.807	1.45	2.83	0.699	0.683	0.383	0.415	1.09	3.3	1.17	1.68	0.867	2.73	0.639	0.657
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00105	0.0019	0.00233	0.00238	0.00652	0.00647	0.00164	0.00179	0.00063	0.00925	0.00093	0.00088	0.00065	0.00081	0.00083	0.015	0.00054	0.00309	0.00031	0.0101	0.00096	0.00106
Selenium	mg/L	0.01	0.05	0.05	0.000191	0.000134	0.00025	< 0.00005	0.000158	0.000143	0.000772	0.000524	0.000178	< 0.00025	0.000227	0.000074	0.000139	< 0.00005	0.000066	0.000313	0.000055	< 0.0001	0.000382	0.000508	0.00006	0.000077
Silver	mg/L	0.0015	--	--	0.00001	0.000033	0.000011	0.000035	0.000065	0.000223	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00002	< 0.00001	0.000038	< 0.00001	< 0.00001
Sodium	mg/L	490	--	--	18.2	18.7	2.81	2.84	1.06	1.11	14.7	15	1.63	2.09	12.9	12.2	1.26	1.23	1.68	2.64	1.69	2.02	1.51	2.44	1.08	1.12
Strontium	mg/L	--	7	--	0.0522	0.0576	0.16	0.16	0.0319	0.034	0.0795	0.0737	0.067	0.122	0.0927	0.0902	0.073	0.0704	0.0602	0.141	0.0698	0.0956	0.0589	0.179	0.05	0.049
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0004	< 0.0002	< 0.0004	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00002	< 0.00001	< 0.00001	0.000015	0.000015	< 0.00001	< 0.00001	< 0.00001	0.000102	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000279	< 0.00001	0.000022	< 0.00001	0.000095	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	< 0.0001	0.00089	0.00031	0.00038	0.00059	0.00054	< 0.0001	< 0.0001	< 0.0001	0.00216	0.0003	0.00032	< 0.0001	0.00013	< 0.0001	0.00552	< 0.0001	0.00057	< 0.0001	0.00363	< 0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00098	0.00155	0.00093	0.00137	0.00013	0.00015	0.00053	0.00036	0.00036	0.0017	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0033	0.00663	0.0002	0.00049	< 0.0001	0.00027	0.0002	< 0.0001
Titanium	mg/L	--	--	--	0.00045	0.0374	0.00182	0.00535	0.00889	0.012	0.00088	0.00799	< 0.0003	0.371	0.00947	0.0113	< 0.0003	0.0149	0.00059	0.563	< 0.0003	0.107	< 0.0003	0.52	< 0.0003	< 0.0003
Tungsten	mg/L	--	--	--	0.0169	0.0167	0.00299	0.00291	0.00921	0.00955	0.00411	0.00464	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	0.00043	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00152	0.00158	0.00154	0.00143	0.000893	0.000921	0.00129	0.0012	0.000224	0.000573	0.000076	0.000078	0.000011	0.000022	0.00144	0.00222	0.00183	0.00223	0.00104	0.00165	0.000227	0.000226
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00096	0.00232	0.00544	0.00613	0.00068	0.00084	< 0.0005	0.00055	< 0.0005	**0.0133**	**0.00851**	**0.00863**	< 0.0005	0.00064	< 0.0005	**0.0278**	< 0.0005	0.00426	< 0.0005	**0.0171**	< 0.0005	< 0.0005
Zinc	mg/L	1.1	--	--	0.0044	0.0094	0.0021	< 0.003	0.0029	0.005	0.0023	< 0.003	0.0026	0.0326	< 0.001	< 0.003	< 0.001	< 0.003	0.0036	0.0529	0.0016	0.0076	0.0012	0.0208	0.0018	< 0.003
Zirconium	mg/L	--	--	--	0.00152	0.00188	0.0033	0.00306	0.00073	0.00062	< 0.0003	0.00022	0.00035	0.00307	0.00551	0.00538	0.00039	0.00055	< 0.0003	0.00359	< 0.0003	0.0005	< 0.0003	0.0025	< 0.0003	< 0.0002

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-06-02	MW22-06-02	MW22-07-01	MW22-07-01	MW22-07-02	MW22-07-02	MW22-10-01	MW22-10-01	MW22-10-04	MW22-10-04	MW22-11-01	MW22-11-01	MW22-16-01	MW22-16-01	MW22-16-02	MW22-16-02	MW22-20-01	MW22-20-01	MW22-20-02	MW22-20-02	MW-BD	MW-BD
					MW22-06-2_20240814	MW22-06-2_20240814	MW22-07-01_20240815	MW22-07-01_20240815	MW22-07-2_20240815	MW22-07-2_20240815	MW22-10-1_20240814	MW22-10-1_20240814	MW22-10-4_20240814	MW22-10-4_20240814	MW22-11-1_20240814	MW22-11-1_20240814	MW22-16-1_20240815	MW22-16-1_20240815	MW22-16-2_20240815	MW22-16-2_20240815	MW22-20-1_20240815	MW22-20-1_20240815	MW22-20-2_20240815	MW22-20-2_20240815	MWBD3_20240814	MWBD3_20240814
					2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-15	2024-08-14	2024-08-14
					TY2409020-004	TY2409020-004	TY2409020-018	TY2409020-018	TY2409020-011	TY2409020-011	TY2409020-005	TY2409020-005	TY2409020-006	TY2409020-006	TY2409020-007	TY2409020-007	TY2409020-012	TY2409020-012	TY2409020-013	TY2409020-013	TY2409020-014	TY2409020-014	TY2409020-015	TY2409020-015	TY2409020-008	TY2409020-008
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Aluminum	mg/L	--	2.9	--	0.0028	0.0867	0.0082	0.418	0.0024	0.0189	0.0016	1.01	0.167	2.06	0.0997	0.234	0.007	0.415	0.0034	1.49	0.0252	< 0.003	0.0042	**8.5**	0.102	0.227
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0001	0.00028	0.00048	0.0001	0.00014	< 0.0001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	0.00018	0.00034	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.0002	< 0.0001
Arsenic	mg/L	0.025	0.01	0.01	0.0002	0.00029	**0.00394**	**0.00503**	**0.00238**	**0.0025**	**0.00195**	**0.00325**	**0.00328**	**0.0046**	**0.00131**	**0.0014**	0.00025	0.00051	0.00024	0.00047	0.00021	0.00022	**0.00205**	**0.00377**	0.00125	**0.00139**
Barium	mg/L	1	2	1	0.011	0.0123	0.0289	0.0334	0.0228	0.0242	0.0328	0.0428	0.0171	0.0322	0.00952	0.0116	0.027	0.0314	0.0361	0.0498	0.0416	0.0418	0.0405	0.106	0.00981	0.0113
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00004	< 0.00004	< 0.0002	< 0.00004	0.000035	< 0.00002	0.000024	< 0.00002	0.000086	< 0.00002	< 0.00002	< 0.00002	0.000277	< 0.00004	0.000038
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.0001	< 0.00005
Boron	mg/L	5	5	5	< 0.01	< 0.01	0.118	0.104	0.022	0.022	0.012	< 0.02	< 0.02	< 0.1	< 0.02	< 0.01	< 0.01	< 0.01	0.026	0.024	0.04	0.036	0.017	< 0.1	< 0.02	< 0.01
Cadmium	mg/L	0.005	0.007	0.005	< 0.000005	< 0.000005	0.0000108	0.0000304	0.0000264	0.0000204	< 0.000005	0.0000347	< 0.00001	< 0.00005	< 0.00001	0.0000051	0.0000108	0.0000234	0.0000304	0.0000529	0.0000108	< 0.000005	< 0.000005	0.000142	< 0.00001	< 0.000005
Calcium	mg/L	--	--	--	60.9	67.2	48.1	60.5	59.3	67.3	96.6	136	43.8	53.8	60.5	71.5	33.2	35	58	66.4	79.9	86.7	116	164	60.9	70.7
Cesium	mg/L	--	--	--	< 0.00001	0.000014	< 0.00001	0.000039	< 0.00001	< 0.00001	< 0.00001	0.000121	< 0.00002	0.000216	< 0.00002	0.000013	0.000261	0.000477	0.000011	0.000962	0.000016	0.000012	< 0.00001	0.00102	< 0.00002	0.000012
Chromium	mg/L	0.05	0.05	0.05	0.0005	0.00099	< 0.0005	0.0022	< 0.0005	< 0.0005	< 0.0005	0.00294	< 0.001	< 0.005	< 0.001	0.0008	< 0.0005	0.00261	< 0.0005	0.00521	< 0.0005	< 0.0005	< 0.0005	0.0204	< 0.001	0.00077
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	< 0.0001	0.00025	0.00058	0.00088	0.00024	0.0003	0.00027	0.00097	< 0.0002	0.00107	< 0.0002	0.00022	< 0.0001	0.00073	< 0.0001	0.00134	0.0001	< 0.0001	0.00027	**0.00505**	< 0.0002	0.00023
Copper	mg/L	0.087	2	--	0.00042	0.00089	0.00052	0.00162	0.0008	< 0.0005	0.0032	0.00267	0.00134	< 0.005	< 0.0004	0.00096	0.00205	0.00422	0.00442	0.00334	< 0.0002	0.00114	< 0.0002	0.0128	< 0.0004	0.00102
Iron	mg/L	--	--	--	< 0.01	0.156	0.3	0.993	< 0.01	0.045	0.337	**1.86**	1.07	**3.77**	**1.7**	**1.92**	0.011	0.539	0.01	**1.95**	**3.82**	**4.07**	**3.28**	**14.7**	**1.67**	**1.93**
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000107	< 0.00005	0.000323	< 0.00005	0.000522	0.000201	0.000729	< 0.0001	0.000909	< 0.0001	0.000108	< 0.00005	0.000643	0.00012	0.000535	< 0.00005	< 0.00005	< 0.00005	0.00483	< 0.0001	0.000112
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0013	0.0011	0.0032	0.0034	0.0031	0.003	0.0026	0.004	0.0024	< 0.01	< 0.002	< 0.001	0.0039	0.0044	0.0083	0.0116	0.0093	0.009	0.004	0.0113	< 0.002	< 0.001
Magnesium	mg/L	--	--	--	11.6	12.8	19.7	22.2	14.4	15.3	17.2	23.2	7.58	9.27	9.34	10.7	8.44	8.52	13.6	15.6	20.1	20.6	12.2	22.7	9.22	10.5
Manganese	mg/L	--	--	--	0.00084	0.0175	0.209	0.228	0.204	0.211	0.37	0.422	0.0555	0.0877	0.131	0.144	0.00048	0.0173	0.28	0.358	0.185	0.18	0.155	0.346	0.133	0.141
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	-	-	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000072	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000415	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000087	0.000091	0.0105	0.00996	0.00103	0.001	0.000584	0.000495	0.000546	< 0.0005	< 0.0001	0.000084	0.000501	0.000395	0.00462	0.00405	0.000666	0.000709	0.000568	0.000596	< 0.0001	0.000074
Nickel	mg/L	0.1	--	--	< 0.0005	0.00084	0.00878	0.0106	< 0.0005	0.00059	0.00091	0.00266	< 0.001	< 0.005	< 0.001	< 0.0005	0.0015	0.00356	0.00209	0.00613	< 0.0005	< 0.0005	0.00093	0.0147	< 0.001	< 0.0005
Potassium	mg/L	--	--	--	0.493	0.514	3.26	3.36	1.26	1.29	0.871	1.19	0.704	1.36	< 0.1	0.127	1.54	1.63	5.96	7.4	3.25	3.18	0.533	2.59	< 0.1	0.125
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00124	0.00138	0.00138	0.00198	0.00092	0.00101	0.00084	0.0025	0.00054	0.00435	< 0.0004	0.00039	0.00647	0.00754	0.00054	0.00505	0.00246	0.00256	0.00089	0.0152	< 0.0004	0.00038
Selenium	mg/L	0.01	0.05	0.05	0.00013	0.000118	0.000072	0.000065	< 0.00005	< 0.00005	< 0.00005	< 0.0001	0.000109	< 0.0005	0.000167	0.000087	< 0.00005	0.000103	0.000087	0.000074	0.000153	< 0.00005	0.000072	< 0.0005	0.000222	0.00011
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00001	< 0.00001	0.000729	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.0001	< 0.00002	< 0.00001
Sodium	mg/L	490	--	--	1.04	1.05	22.4	25.2	4.99	5.79	3.31	3.9	5.92	6.67	1.29	1.47	1.55	1.51	16.5	18.4	18.4	21.3	5.4	6.33	1.32	1.44
Strontium	mg/L	--	7	--	0.0494	0.0519	0.262	0.281	0.165	0.176	0.108	0.131	0.0653	0.0683	0.0492	0.0569	0.0266	0.0287	0.0617	0.0655	0.439	0.453	0.178	0.218	0.0504	0.0578
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0004	< 0.002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.002	< 0.0004	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00001	0.000029	0.00004	< 0.00001	0.000031	< 0.00001	< 0.00001	< 0.00001	< 0.0001	< 0.00002	< 0.00001
Thorium	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	0.00012	< 0.0001	< 0.0001	< 0.0001	0.00057	< 0.0002	< 0.001	0.00022	0.00032	< 0.0001	< 0.0001	< 0.0001	0.00033	< 0.0001	< 0.0001	< 0.0001	0.00157	0.00024	0.0003
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	< 0.0001	< 0.0001	0.00193	0.00468	0.00014	0.00024	0.00042	0.00032	< 0.0002	< 0.001	< 0.0002	< 0.0001	0.0005	0.00024	0.00084	0.00144	< 0.0001	0.00014	0.00012	< 0.001	< 0.0002	< 0.0001
Titanium	mg/L	--	--	--	< 0.0003	0.00707	< 0.0003	0.0203	< 0.0009	0.00112	< 0.0003	0.0824	0.00239	0.0741	0.00334	0.0125	< 0.0003	0.0294	< 0.0003	0.112	0.00153	< 0.0003	< 0.0003	0.392	0.0037	0.012
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	0.0001	0.00012	0.00022	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.00079	0.00211	0.00253	0.00012	0.00024	0.00136	0.00142	< 0.0001	< 0.001	< 0.0002	0.00079
Uranium	mg/L	0.02	0.02	0.02	0.000228	0.000231	0.000466	0.000529	0.000431	0.00046	0.0011	0.00118	0.000113	0.00025	0.000071	0.00009	0.000937	0.00101	0.0117	0.0117	0.000312	0.000313	0.000042	0.00147	0.000071	0.000085
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	0.00062	< 0.0005	0.00144	< 0.0005	< 0.0005	< 0.0005	0.00282	< 0.001	< 0.005	0.0015	0.00226	< 0.0005	0.00169	< 0.0005	0.0041	< 0.0005	< 0.0005	< 0.0005	**0.0208**	0.00158	0.00222
Zinc	mg/L	1.1	--	--	< 0.001	< 0.003	0.0078	0.0233	0.0044	0.0048	0.006	0.0085	< 0.002	< 0.03	< 0.002	< 0.003	0.0016	< 0.003	0.0061	0.0068	0.0015	< 0.003	0.0026	0.0454	< 0.002	< 0.003
Zirconium	mg/L	--	--	--	< 0.0003	< 0.0002	< 0.0003	0.00064	< 0.0003	< 0.0002	< 0.0003	0.0009	0.00064	< 0.002	0.00115	0.00142	< 0.0003	0.0002	< 0.0003	0.00104	0.00191	0.00199	< 0.0003	0.00205	0.00117	0.00135

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW-BD	MW-BD	MW22-04-01	MW22-04-01	MW22-05-01	MW22-05-01	MW22-05-02	MW22-05-02	MW22-06-01	MW22-06-01	MW22-06-02	MW22-06-02	MW22-07-01	MW22-07-01	MW22-07-02	MW22-07-02	MW22-08-01	MW22-08-01	MW22-08-02	MW22-08-02	MW22-09-01	MW22-09-01
					MWBD4_2024 0815	MWBD4_2024 0815	MW22-04-01_20240930	MW22-04-01_20240930	MW22-05-01_20240929	MW22-05-01_20240929	MW22-05-02_20240929	MW22-05-02_20240929	MW22-06-01_20240929	MW22-06-01_20240929	MW22-06-02_20240929	MW22-06-02_20240929	MW22-07-01_20240930	MW22-07-01_20240930	MW22-07-02_20240930	MW22-07-02_20240930	MW22-08-01_20240930	MW22-08-01_20240930	MW22-08-02_20240930	MW22-08-02_20240930	MW22-09-01_20240930	MW22-09-01_20240930
					2024-08-15	2024-08-15	2024-09-30	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30
					TY2409020-017	TY2409020-017	TY2411036-018	TY2411036-018	TY2411036-004	TY2411036-004	TY2411036-009	TY2411036-009	TY2411036-008	TY2411036-008	TY2411036-003	TY2411036-003	TY2411036-016	TY2411036-016	TY2411036-010	TY2411036-010	TY2411036-017	TY2411036-017	TY2411036-011	TY2411036-011	TY2411036-019	TY2411036-019
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	< 0.001	0.0555	0.0012	**9.33**	0.01	0.0282	0.0015	1.3	< 0.001	0.013	0.003	0.0185	0.0104	0.524	0.0025	0.0357	0.0015	0.925	0.002	0.953	0.0022	**24.1**
Antimony	mg/L	0.006	0.006	0.006	< 0.0001	< 0.0001	< 0.0001	0.00025	0.00032	0.00023	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00098	0.0015	0.00011	0.00026	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005
Arsenic	mg/L	0.025	0.01	0.01	0.0002	0.00024	< 0.0001	**0.00943**	**0.0015**	**0.00166**	< 0.0001	0.00074	0.00016	0.00019	0.00021	0.00021	0.00469	0.00621	0.00208	0.00223	**0.0145**	**0.0168**	**0.0224**	0.00744	**0.0124**	**0.0243**
Barium	mg/L	1	2	1	0.0394	0.0429	0.0147	0.12	0.0152	0.0169	0.0128	0.0237	0.00994	0.0107	0.0112	0.0126	0.0324	0.0341	0.0231	0.0245	0.0368	0.0461	0.0312	0.0433	0.0655	0.247
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	< 0.00002	0.000531	< 0.00002	< 0.00002	< 0.00002	0.000051	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000025	< 0.00002	< 0.00002	< 0.00002	0.000034	< 0.00002	0.000042	< 0.00002	0.00114
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	0.000177	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00025
Boron	mg/L	5	5	5	0.04	0.035	0.011	0.041	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.103	0.118	0.023	0.024	0.095	0.109	0.043	0.054	0.078	0.142
Cadmium	mg/L	0.005	0.007	0.005	< 0.000005	< 0.000005	< 0.000005	0.000398	0.0000159	0.0000169	0.000006	0.0000298	< 0.000005	< 0.000005	0.0000089	< 0.000005	0.0000318	0.0000863	0.0000119	0.0000129	< 0.000005	0.00001	< 0.000005	0.000014	< 0.000005	0.000282
Calcium	mg/L	--	--	--	78.9	88.6	73.6	954	75.2	73.4	71.2	95	63.6	62.9	65.7	64.8	48	57	63.8	62.7	63.9	70.3	76.7	84.1	76.9	710
Cesium	mg/L	--	--	--	0.000011	0.00002	< 0.00001	0.000803	< 0.00001	< 0.00001	< 0.00001	0.000136	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000043	< 0.00001	< 0.00001	< 0.00001	0.000123	< 0.00001	0.000121	< 0.00001	0.00252
Chromium	mg/L	0.05	0.05	0.05	< 0.0005	< 0.0005	0.00134	0.0247	< 0.0005	< 0.0005	0.00082	0.00335	< 0.0005	< 0.0005	0.00056	0.00058	< 0.0005	0.00269	< 0.0005	< 0.0005	< 0.0005	0.002	< 0.0005	0.00172	< 0.0005	**0.0711**
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	0.00121	0.00126	< 0.0005	< 0.0005	0.00075	0.00072	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00054	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	< 0.0001	0.00013	< 0.0001	**0.0144**	0.00014	0.00017	< 0.0001	0.00114	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00047	0.00084	0.00016	0.00018	0.0002	0.00075	0.00015	0.0006	< 0.0001	**0.0181**
Copper	mg/L	0.087	2	--	< 0.0002	< 0.0005	0.00053	0.0402	0.0002	< 0.0005	< 0.0002	0.00287	0.00028	< 0.0005	0.00471	< 0.0005	0.00081	0.00243	0.00037	0.00064	< 0.0002	0.00107	< 0.0002	0.0014	< 0.0002	0.0368
Iron	mg/L	--	--	--	**3.81**	**4.17**	< 0.01	**21.8**	0.205	0.303	< 0.01	**1.94**	< 0.01	0.02	< 0.01	0.026	0.326	**1.12**	< 0.01	0.051	**1.34**	**2.73**	**1.17**	**1.37**	**2.48**	**39.4**
Lead	mg/L	0.01	0.005	0.01	< 0.00005	< 0.00005	< 0.00005	**0.013**	< 0.00005	< 0.00005	< 0.00005	0.000956	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000079	0.00061	< 0.00005	< 0.00005	< 0.00005	0.000473	< 0.00005	0.000435	< 0.00005	**0.0177**
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium	mg/L	--	--	--	0.0094	0.0096	0.0032	0.0215	0.0024	0.0029	0.0028	0.0049	0.0017	0.0018	0.0063	0.0014	0.003	0.0038	0.0031	0.0036	0.0048	0.0068	0.0042	0.0062	0.0084	0.0523
Magnesium	mg/L	--	--	--	20.4	20.9	17.5	110	15.1	15.3	13.9	19.2	10.5	10.6	11.5	11.7	18.6	20.5	14.1	14.2	18.9	20.6	18.6	19.1	31.6	182
Manganese	mg/L	--	--	--	0.18	0.186	0.00013	1.08	0.248	0.278	0.00299	0.0656	0.00091	0.00321	0.00022	0.00322	0.187	0.209	0.177	0.182	0.156	0.197	0.191	0.211	0.0299	**1.25**
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.000005	0.0000458	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000135	< 0.000005	< 0.000005	0.0000154	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.00069	0.000629	0.000267	0.000554	0.0016	0.00163	0.000319	0.000326	0.000181	0.000183	0.00007	0.000077	0.00895	0.00885	0.00113	0.00102	0.00658	0.00704	0.00581	0.00432	0.00228	0.00252
Nickel	mg/L	0.1	--	--	< 0.0005	< 0.0005	< 0.0005	0.0214	< 0.0005	0.00054	< 0.0005	0.00228	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00628	0.00843	0.00065	0.00094	< 0.0005	0.00157	< 0.0005	0.00197	< 0.0005	0.043
Potassium	mg/L	--	--	--	3.16	3.27	0.927	3.26	1.19	1.22	0.868	1.29	0.626	0.656	0.491	0.519	3.41	3.35	1.32	1.37	1.81	2.06	1.3	1.48	2.73	8.64
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.0024	0.00249	0.00062	0.0143	0.00061	0.00068	0.00025	0.00228	0.001	0.00097	0.0013	0.00121	0.00136	0.00186	0.00089	0.00099	0.00052	0.00242	0.00038	0.00226	0.00091	0.0396
Selenium	mg/L	0.01	0.05	0.05	0.000068	< 0.00005	< 0.00005	0.000192	< 0.00005	< 0.00005	0.000411	0.000365	0.000058	0.000084	0.000297	0.000112	0.000073	0.000084	< 0.00005	< 0.00005	0.000087	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00025
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00001	0.000048	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	0.00016
Sodium	mg/L	490	--	--	18.7	21.3	1.6	2.64	1.82	1.72	1.56	1.7	1.1	1.08	1.52	1.08	22.5	22	5.94	5.22	22.2	20	12.4	17.1	17.7	20.5
Strontium	mg/L	--	7	--	0.43	0.467	0.0576	0.601	0.0641	0.0688	0.0572	0.0749	0.048	0.0489	0.0488	0.0486	0.247	0.267	0.169	0.164	0.426	0.455	0.352	0.31	0.448	0.884
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.001
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	< 0.00001	0.000224	< 0.00001	< 0.00001	< 0.00001	0.000039	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00002	< 0.00001	0.000309
Thorium	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	0.00799	< 0.0001	< 0.0001	< 0.0001	0.00058	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00013	< 0.0001	< 0.0001	< 0.0001	0.00042	< 0.0001	0.0003	< 0.0001	0.0133
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	0.00099	0.00018	0.00034	< 0.0001	< 0.0002	< 0.0001	0.00013	0.00013	< 0.0001	0.00195	0.00306	0.00014	0.00032	< 0.0001	0.00013	< 0.0001	< 0.0002	< 0.0001	0.00085
Titanium	mg/L	--	--	--	< 0.0003	0.00418	< 0.0003	0.65	0.00031	0.00152	< 0.0003	0.0831	< 0.0003	0.00079	< 0.0003	0.00107	< 0.0003	0.0201	< 0.0003	0.00178	< 0.0003	0.0508	< 0.0003	0.0377	< 0.0003	1.48
Tungsten	mg/L	--	--	--	0.00139	0.00144	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	0.00012	0.00012	0.00019	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005
Uranium	mg/L	0.02	0.02	0.02	0.000287	0.000338	0.00145	0.0039	0.00174	0.00182	0.00103	0.00116	0.000238	0.000236	0.00024	0.000246	0.000823	0.000822	0.000491	0.00045	0.000066	0.000206	0.00043	0.00108	< 0.00001	0.00258
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	< 0.0005	< 0.0005	**0.0315**	< 0.0005	< 0.0005	< 0.0005	0.00313	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00068	0.00149	< 0.0005	< 0.0005	< 0.0005	0.00212	< 0.0005	0.00219	< 0.0005	**0.0638**
Zinc	mg/L	1.1	--	--	< 0.001	< 0.003	< 0.001	0.045	0.0017	< 0.003	< 0.001	< 0.006	< 0.001	< 0.003	0.0165	< 0.003	0.0052	0.0236	0.0038	0.0043	< 0.001	0.0031	< 0.001	< 0.006	< 0.001	0.0816
Zirconium	mg/L	--	--	--	0.00189	0.00205	< 0.0003	0.00426	< 0.0003	< 0.0002	< 0.0003	0.00051	< 0.0003	< 0.0002	< 0.0003	< 0.0002	< 0.0003	0.00071	< 0.0003	< 0.0002	< 0.0003	0.00096	< 0.0003	0.00098	< 0.0003	0.00576

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ	MW22-09-02	MW22-09-02	MW22-10-01	MW22-10-01	MW22-10-02	MW22-10-02	MW22-11-01	MW22-11-01	MW22-12-01	MW22-12-01	MW22-12-04	MW22-12-04	MW22-01-01	MW22-01-01	MW22-01-02	MW22-01-02	MW22-02-01	MW22-02-01	MW22-02-02	MW22-02-02	MW22-03-01	MW22-03-01
					MW22-09-02_20240930	MW22-09-02_20240930	MW22-10-01_20240929	MW22-10-01_20240929	MW22-10-02_20240929	MW22-10-02_20240929	MW22-11-01_20240929	MW22-11-01_20240929	MW22-12-01_20240929	MW22-12-01_20240929	MW22-12-04_20240929	MW22-12-04_20240929	MW22-01-01_20241002	MW22-01-01_20241002	MW22-01-02_20241002	MW22-01-02_20241002	MW22-02-01_20241001	MW22-02-01_20241001	MW22-02-02_20241001	MW22-02-02_20241001	MW22-03-01_20241003	MW22-03-01_20241003
					2024-09-30	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-10-02	2024-10-02	2024-10-02	2024-10-02	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-03	2024-10-03
					TY2411036-012	TY2411036-012	TY2411036-007	TY2411036-007	TY2411036-001	TY2411036-001	TY2411036-002	TY2411036-002	TY2411036-005	TY2411036-005	TY2411036-006	TY2411036-006	TY2411264-012	TY2411264-012	TY2411264-013	TY2411264-013	TY2411264-007	TY2411264-007	TY2411264-003	TY2411264-003	TY2411264-021	TY2411264-021
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Aluminum	mg/L	--	2.9	--	0.0737	**4.3**	0.0015	**12.4**	0.972	1.25	0.0978	0.176	0.0027	0.159	0.0018	1.2	0.0112	0.133	0.0012	0.114	< 0.001	0.166	0.0025	0.0514	0.0025	**461**
Antimony	mg/L	0.006	0.006	0.006	< 0.001	< 0.001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	0.00023	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00018	0.00017	0.00029	0.00038	0.00017	0.00037	0.00046	< 0.002
Arsenic	mg/L	0.025	0.01	0.01	0.00123	0.00225	0.00601	**0.011**	0.00073	0.00091	**0.00134**	**0.00139**	0.00077	0.00103	0.00066	**0.00144**	0.00025	0.0003	0.00012	0.00024	0.00019	0.00029	0.00028	0.00033	0.00098	**0.109**
Barium	mg/L	1	2	1	0.00778	0.0409	0.0395	0.133	0.00613	0.0095	0.0103	0.0113	0.031	0.0359	0.0166	0.0278	0.0202	0.0225	0.0156	0.017	0.0362	0.0393	0.0258	0.0275	0.105	**3.16**
Beryllium	mg/L	0.004	--	--	< 0.0002	< 0.0002	< 0.00002	0.000497	< 0.0001	< 0.0001	0.000044	0.000041	< 0.00002	< 0.00002	< 0.00002	0.000086	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	**0.0201**
Bismuth	mg/L	--	--	--	< 0.0005	< 0.0005	< 0.00005	< 0.00025	< 0.00025	< 0.00025	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00478
Boron	mg/L	5	5	5	< 0.1	< 0.1	0.013	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	0.011	< 0.01	< 0.02	< 0.01	0.012	< 0.01	0.01	0.016	0.017	0.011	0.016	0.016	0.547
Cadmium	mg/L	0.005	0.007	0.005	< 0.00005	0.0000799	< 0.0000005	0.000129	< 0.0000025	< 0.0000025	< 0.0000005	< 0.0000005	< 0.0000005	0.0000109	< 0.0000005	0.0000238	< 0.0000005	< 0.0000005	0.000024	0.0000176	< 0.0000005	0.0000114	0.0000121	0.0000177	< 0.0000005	0.00406
Calcium	mg/L	--	--	--	21	44	103	400	30.1	32.3	64.5	66.1	86.3	88.5	96	159	71.2	76.5	68.9	73.2	69.1	76.8	68.3	73.4	105	5430
Cesium	mg/L	--	--	--	< 0.0001	0.000496	< 0.00001	0.00156	< 0.00005	< 0.00005	< 0.00001	< 0.00001	< 0.00001	0.000019	< 0.00001	0.000118	< 0.00001	0.000011	< 0.00001	0.000015	< 0.00001	0.000016	< 0.00001	0.000011	< 0.00001	0.0497
Chromium	mg/L	0.05	0.05	0.05	< 0.005	0.00934	< 0.0005	0.0264	< 0.0025	< 0.0025	0.00052	0.00069	< 0.0005	0.00113	< 0.0005	0.00324	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00059	0.00126	0.00141	< 0.0005	**1.12**
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00112	0.00112	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	< 0.001	0.00264	0.00025	**0.00891**	0.00061	0.00076	0.00011	0.00018	< 0.0001	0.0002	< 0.0001	0.00105	< 0.0001	0.00012	< 0.0001	0.00022	< 0.0001	0.00015	< 0.0001	< 0.0001	0.00017	**0.307**
Copper	mg/L	0.087	2	--	0.00212	0.0056	< 0.0002	0.025	0.0012	< 0.0025	< 0.0002	< 0.0005	0.00077	< 0.0005	< 0.0002	0.00161	< 0.0002	< 0.0005	< 0.0002	< 0.0005	< 0.0002	< 0.0005	< 0.0002	< 0.0005	0.0007	**0.66**
Iron	mg/L	--	--	--	**1.13**	**6.54**	1.05	**18.9**	0.48	0.631	**1.65**	**1.79**	**2.29**	**3.08**	**1.4**	**3.5**	0.48	0.659	0.097	0.36	**1.31**	**1.87**	< 0.01	0.06	< 0.01	**595**
Lead	mg/L	0.01	0.005	0.01	< 0.0005	0.00251	< 0.00005	**0.00864**	< 0.00025	0.000299	< 0.00005	0.000066	< 0.00005	0.000125	< 0.00005	0.00112	< 0.00005	0.000085	< 0.00005	0.000092	< 0.00005	0.000128	< 0.00005	< 0.00005	< 0.00005	**0.273**
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	< 0.01	< 0.01	0.0033	0.0246	< 0.005	< 0.005	< 0.001	0.0011	0.0039	0.0049	< 0.001	0.0031	0.0033	0.0043	0.0029	0.0032	0.0082	0.0094	0.0078	0.0085	0.0059	0.849
Magnesium	mg/L	--	--	--	3.38	11.2	16	68.7	4.9	6.45	9.13	9.64	15	15.7	12.2	26.2	16.9	17.2	16.5	16.9	21.7	23.5	20.5	20.9	20.2	1290
Manganese	mg/L	--	--	--	0.0553	0.133	0.367	0.946	0.085	0.0852	0.132	0.137	0.155	0.166	0.287	0.421	0.0395	0.0469	0.0325	0.0678	0.0405	0.058	0.001	0.00529	0.196	**17.4**
Mercury	mg/L	0.001	0.001	0.001	< 0.00005	< 0.00005	< 0.000005	0.0000214	< 0.000005	0.0000054	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000073	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000059	< 0.000005
Molybdenum	mg/L	0.07	--	--	< 0.0005	< 0.0005	0.000773	0.000786	0.000255	< 0.00025	0.000053	0.000056	0.00278	0.00294	0.00026	0.000256	0.000512	0.000519	0.000726	0.000762	0.00231	0.0022	0.00211	0.0022	0.00146	0.00504
Nickel	mg/L	0.1	--	--	< 0.005	0.00749	0.0006	0.0214	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.00273	0.00344	< 0.0005	0.0023	< 0.0005	< 0.0005	0.0012	0.00089	< 0.0005	0.00061	< 0.0005	0.00053	< 0.0005	**0.767**
Potassium	mg/L	--	--	--	< 0.5	1.26	0.975	4.18	0.305	0.342	0.088	0.107	1.06	1.16	0.358	0.774	1.85	1.94	2.09	2.19	3.06	3.07	4.31	4.34	3.27	107
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	< 0.002	0.00815	0.00109	0.022	< 0.001	0.00127	< 0.0002	0.00028	0.00092	0.00124	0.00055	0.00238	0.00185	0.00213	0.00379	0.00437	0.00077	0.00104	0.00155	0.00173	0.00336	0.795
Selenium	mg/L	0.01	0.05	0.05	< 0.0005	< 0.0005	0.000724	< 0.00025	< 0.00025	< 0.00025	0.000438	0.000086	< 0.00005	< 0.00005	0.00023	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00013	< 0.00005	0.000508	0.00043	0.000146	0.00331
Silver	mg/L	0.0015	--	--	< 0.0001	< 0.0001	< 0.00001	0.000074	< 0.00005	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	**0.00189**
Sodium	mg/L	490	--	--	0.816	1.35	4.2	5.81	2.58	2.07	1.41	1.37	3.02	2.99	1.16	1.42	3.02	3.29	2.09	2.12	7.62	7.77	9.11	9.4	9.82	39.4
Strontium	mg/L	--	7	--	0.0352	0.0576	0.108	0.319	0.0246	0.0244	0.0505	0.0522	0.0984	0.106	0.0683	0.114	0.0942	0.1	0.0604	0.0637	0.118	0.118	0.088	0.0875	0.148	3.82
Tellurium	mg/L	--	--	--	< 0.002	< 0.002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.004
Thallium	mg/L	0.002	--	--	< 0.0001	< 0.0001	< 0.00001	0.000185	< 0.00005	< 0.00005	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000015	< 0.00001	**0.00547**
Thorium	mg/L	--	--	--	< 0.001	< 0.001	< 0.0001	0.00827	0.00057	< 0.0005	0.00027	0.00028	< 0.0001	< 0.0001	< 0.0001	0.00074	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.254
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	< 0.001	< 0.001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	0.00021	< 0.0001	< 0.0002	< 0.0001	< 0.0001	0.00013	< 0.0001	< 0.0001	0.00032	< 0.0001	0.00015	< 0.0001	0.0091
Titanium	mg/L	--	--	--	< 0.003	0.196	< 0.0003	0.954	0.0146	0.35	0.00394	0.00846	< 0.0003	0.00978	< 0.0003	0.111	0.00047	0.0118	< 0.0003	0.00742	< 0.0003	0.0129	< 0.0003	0.00315	< 0.0003	27.1
Tungsten	mg/L	--	--	--	< 0.001	< 0.001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	0.0008	< 0.0001	0.00014	< 0.0001	< 0.0002	0.00017	< 0.0001	< 0.0001	< 0.0001	0.00014	0.00016	0.00012	< 0.0001	< 0.0001	< 0.002
Uranium	mg/L	0.02	0.02	0.02	< 0.0001	0.000342	0.000969	0.00194	0.00048	0.00023	0.000076	0.000089	0.000013	0.000026	< 0.00001	0.000186	0.00153	0.0015	0.00266	0.0028	0.000052	0.000073	0.00211	0.00218	0.011	**0.066**
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.005	**0.00929**	< 0.0005	**0.0319**	< 0.0025	< 0.0025	0.00167	0.002	< 0.0005	0.00097	< 0.0005	0.00392	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00058	< 0.0005	0.00056	0.00279	**1.1**
Zinc	mg/L	1.1	--	--	< 0.01	< 0.03	< 0.001	0.0436	< 0.005	< 0.015	0.0017	< 0.003	0.0033	0.0056	< 0.001	< 0.006	< 0.001	< 0.003	0.0018	< 0.003	< 0.001	< 0.003	0.0019	< 0.003	< 0.001	**1.44**
Zirconium	mg/L	--	--	--	< 0.003	0.00225	< 0.0003	0.00468	< 0.0015	< 0.001	0.0013	0.0013	0.00074	0.00115	0.00037	0.00139	< 0.0003	< 0.0002	< 0.0003	< 0.0002	< 0.0003	0.00027	< 0.0003	< 0.0002	< 0.0003	0.088

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-03-02	MW22-03-02	MW22-13-01	MW22-13-01	MW22-13-02	MW22-13-02	MW22-14-01	MW22-14-01	MW22-14-02	MW22-14-02	MW22-15-01	MW22-15-01	MW22-15-03	MW22-15-03	MW22-16-01	MW22-16-01	MW22-16-02	MW22-16-02	MW22-17-01	MW22-17-01	MW22-17-02	MW22-17-02
					MW22-03-02_20241003	MW22-03-02_20241003	MW22-13-01_20241001	MW22-13-01_20241001	MW22-13-02_20241001	MW22-13-02_20241001	MW22-14-01_20241001	MW22-14-01_20241001	MW22-14-02_20241001	MW22-14-02_20241001	MW22-15-01_20241003	MW22-15-01_20241003	MW22-15-03_20241003	MW22-15-03_20241003	MW22-16-01_20241001	MW22-16-01_20241001	MW22-16-02_20241001	MW22-16-02_20241001	MW22-17-01_20241003	MW22-17-01_20241003	MW22-17-02_20241003	MW22-17-02_20241003
					2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-03	2024-10-03
					TY2411264-020	TY2411264-020	TY2411264-001	TY2411264-001	TY2411264-009	TY2411264-009	TY2411264-008	TY2411264-008	TY2411264-002	TY2411264-002	TY2411264-018	TY2411264-018	TY2411264-019	TY2411264-019	TY2411264-011	TY2411264-011	TY2411264-010	TY2411264-010	TY2411264-023	TY2411264-023	TY2411264-022	TY2411264-022
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T
Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guideline: CDWQ MAC	Human Health Based Guideline: OREG 169/03 DWQ																						
Aluminum	mg/L	--	2.9	--	0.0027	0.182	0.0148	0.0899	0.0725	0.119	< 0.001	1.84	0.0066	0.545	0.0026	0.0301	0.0123	0.3	0.0047	0.066	0.0088	**3.6**	0.0082	0.143	0.0086	0.152
Antimony	mg/L	0.006	0.006	0.006	0.00012	0.00066	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00014	0.00027	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00024	0.00055	< 0.0001	< 0.0001	< 0.0001	0.00022	< 0.0001	< 0.0001	0.00035	0.00014
Arsenic	mg/L	0.025	0.01	0.01	0.0007	0.00093	**0.00558**	**0.00552**	**0.00658**	**0.00652**	0.00014	0.00066	0.0002	0.00032	0.00028	0.00034	0.00036	0.00046	0.00022	0.00027	0.00013	0.00064	0.00025	0.00031	**0.00184**	**0.00234**
Barium	mg/L	1	2	1	0.0456	0.0476	0.029	0.0309	0.027	0.0286	0.025	0.0401	0.0209	0.0245	0.0309	0.0325	0.041	0.0466	0.0282	0.0302	0.0173	0.0527	0.0254	0.0263	0.0153	0.0175
Beryllium	mg/L	0.004	--	--	< 0.00002	< 0.00002	0.000021	0.000027	0.000027	0.00004	< 0.00002	0.000078	< 0.00002	0.000022	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000236	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000148	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	0.025	0.027	0.015	0.018	0.012	0.014	< 0.01	< 0.01	< 0.01	< 0.01	0.013	0.014	< 0.01	0.011	< 0.01	< 0.01	< 0.01	0.017	< 0.01	< 0.01	0.063	0.077
Cadmium	mg/L	0.005	0.007	0.005	0.0000268	0.0000896	< 0.000005	< 0.000005	< 0.000005	0.0000073	0.0000071	0.0000228	< 0.000005	0.0000073	0.0000079	0.0000082	0.0000565	0.0000783	0.00001	0.0000166	0.0000292	0.0000571	< 0.000005	0.0000232	0.0000565	0.0000223
Calcium	mg/L	--	--	--	108	103	91.8	95.3	97.2	102	80.4	106	72.1	77.2	70.5	74.3	85.6	87	35.2	37.6	29	37	60	62.6	53.4	58.6
Cesium	mg/L	--	--	--	< 0.00001	0.000029	< 0.00001	0.000013	0.000012	0.000019	< 0.00001	0.00022	< 0.00001	0.000066	< 0.00001	< 0.00001	< 0.00001	0.00002	0.000316	0.000345	0.00048	0.00287	< 0.00001	0.000015	< 0.00001	0.000012
Chromium	mg/L	0.05	0.05	0.05	< 0.0005	< 0.0005	0.00127	0.00168	0.00406	0.00431	< 0.0005	0.00453	0.00091	0.00182	< 0.0005	< 0.0005	< 0.0005	0.0008	0.00054	0.0008	< 0.0005	0.0151	< 0.0005	0.0006	< 0.0005	0.00063
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00086	0.00076	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00019	0.00029	0.00011	0.00019	0.00022	0.00026	< 0.0001	0.00112	< 0.0001	0.00025	0.00028	0.00037	0.00068	0.00085	< 0.0001	0.00019	< 0.0001	**0.00333**	0.00044	0.00056	0.00017	0.00032
Copper	mg/L	0.087	2	--	0.00039	0.00079	< 0.0002	< 0.0005	< 0.0002	< 0.0005	< 0.0002	0.00292	0.00038	0.0011	< 0.0002	< 0.0005	0.0017	0.00068	0.00088	0.00128	0.00066	0.00695	< 0.0002	0.00108	0.00036	0.00083
Iron	mg/L	--	--	--	0.024	0.184	**6.12**	**6.21**	**14.6**	**14.8**	< 0.01	**2.21**	< 0.01	0.515	0.178	0.305	< 0.01	0.268	< 0.01	0.069	< 0.01	**4.76**	0.296	0.491	0.251	0.602
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000259	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00098	< 0.00005	0.000237	< 0.00005	< 0.00005	< 0.00005	0.000185	< 0.00005	0.000066	< 0.00005	0.0011	< 0.00005	0.000158	< 0.00005	0.000159
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0072	0.0082	0.0037	0.0042	0.0013	0.0017	0.0085	0.0123	0.005	0.006	0.0032	0.0038	0.0034	0.0043	0.0041	0.0045	0.0034	0.0146	0.0034	0.004	0.0015	0.0018
Magnesium	mg/L	--	--	--	20.9	21.7	12.2	12.6	10	10.2	23.6	28.9	16.2	16.8	15.2	15.8	18.3	18.9	8.86	8.73	6.84	10	10.9	11.6	10.4	11.6
Manganese	mg/L	--	--	--	0.399	0.354	0.385	0.416	0.241	0.259	0.0214	0.0837	0.00077	0.0108	0.194	0.213	0.732	0.786	0.00018	0.00305	0.109	0.274	0.556	0.579	0.272	0.314
Mercury	mg/L	0.001	0.001	0.001	< 0.000005	< 0.000005	< 0.00005	< 0.00005	< 0.00005	< 0.000005	< 0.00005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.0000056	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.000726	0.000698	0.000383	0.000425	0.000226	0.000226	0.00114	0.00111	0.000153	0.000154	0.00817	0.0082	0.00583	0.00619	0.000318	0.000349	0.00159	0.00197	0.000924	0.00104	0.00515	0.00533
Nickel	mg/L	0.1	--	--	0.00069	0.00109	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00303	< 0.0005	0.00065	0.00058	0.00065	0.00322	0.00509	0.00166	0.00198	0.00106	0.0125	0.00116	0.00154	0.00208	0.0014
Potassium	mg/L	--	--	--	1.65	1.9	1.07	1.13	0.68	0.719	1.2	1.72	0.224	0.347	6.03	6.35	8.09	8.23	1.66	1.76	2.58	5.01	2.98	3.13	2.68	2.72
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00084	0.00115	0.00103	0.00123	0.00093	0.00105	0.00033	0.00345	0.00046	0.00136	0.00172	0.00194	0.00083	0.0012	0.00688	0.00745	0.0017	0.0136	0.00066	0.00106	0.00099	0.00122
Selenium	mg/L	0.01	0.05	0.05	< 0.00005	< 0.00005	0.000175	0.000077	0.000327	0.000065	0.000486	0.000533	0.000169	0.000122	0.000052	< 0.00005	< 0.00005	< 0.00005	0.000069	0.000054	0.00005	0.000073	0.000083	< 0.00005	0.00005	0.000068
Silver	mg/L	0.0015	--	--	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000012	< 0.00001	< 0.00001	0.000013	0.000026	< 0.00001	< 0.00001	0.000013	0.000135	< 0.00001	0.000126	< 0.00001	0.000153	< 0.00001	0.000019
Sodium	mg/L	490	--	--	13.3	13.4	10.6	11.3	12.7	12.5	6.95	7.42	5.18	5.8	5.44	5.4	13.7	19.1	1.51	1.47	7.99	9.96	1.24	1.29	11.9	11.3
Strontium	mg/L	--	7	--	0.178	0.168	0.121	0.119	0.0894	0.0891	0.128	0.143	0.0921	0.0965	0.0654	0.0676	0.077	0.0782	0.0282	0.0273	0.0298	0.0369	0.0494	0.0498	0.0474	0.0532
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	< 0.00001	0.000012	< 0.00001	< 0.00001	< 0.00001	0.000026	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.000027	0.00003	< 0.00001	0.000086	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	0.00019	0.00033	0.0004	< 0.0001	0.00072	< 0.0001	0.00021	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0006	< 0.0001	< 0.0001	< 0.0001	0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	< 0.0001	0.00038	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00055	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00018	0.00056	0.00016	< 0.0001	0.00026	0.00062	< 0.0001	0.00022	0.00058	0.0008
Titanium	mg/L	--	--	--	< 0.0003	0.00577	0.00369	0.00876	0.0108	0.0149	< 0.0003	0.127	< 0.0003	0.0311	< 0.0003	0.00212	< 0.0003	0.0124	< 0.0003	0.00421	< 0.0003	0.268	< 0.0003	0.00987	0.00036	0.0143
Tungsten	mg/L	--	--	--	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0136	0.0154	< 0.0001	< 0.0001	0.00123	0.00166	< 0.0001	0.00046	0.00162	0.00265	0.0142	0.015
Uranium	mg/L	0.02	0.02	0.02	0.00141	0.00133	0.000025	0.000034	0.000096	0.000092	0.00287	0.00312	0.000486	0.000501	0.000344	0.000376	0.0011	0.00125	0.00124	0.00136	0.00424	0.00582	0.00136	0.00143	0.00105	0.00123
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	< 0.0005	0.00065	0.00345	0.00412	**0.00922**	**0.0103**	< 0.0005	0.00467	< 0.0005	0.00158	< 0.0005	< 0.0005	< 0.0005	0.00067	0.00053	0.00079	< 0.0005	**0.011**	0.00064	0.00112	0.00098	0.00152
Zinc	mg/L	1.1	--	--	0.0016	0.0048	< 0.001	< 0.003	< 0.001	0.0058	0.0017	0.0101	< 0.001	< 0.003	< 0.001	< 0.003	0.0059	0.0114	< 0.001	< 0.003	0.0013	0.0111	< 0.001	< 0.003	0.0027	< 0.003
Zirconium	mg/L	--	--	--	< 0.0003	0.00038	0.00377	0.00384	0.00591	0.00614	< 0.0003	0.00214	< 0.0003	0.00053	< 0.0003	< 0.0002	< 0.0003	0.00038	< 0.0003	< 0.0002	< 0.0003	0.00311	0.00088	0.00096	0.0015	0.00167

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 5: Summary of Groundwater Analytical Results of Metals Parameters

					MW22-18-01	MW22-18-01	MW22-18-02	MW22-18-02	MW22-19-01	MW22-19-01	MW22-20-01	MW22-20-01	MW22-20-02	MW22-20-02
					MW22-18-01_20241001	MW22-18-01_20241001	MW22-18-02_20241001	MW22-18-02_20241001	MW22-19-01_20241002	MW22-19-01_20241002	MW22-20-01_20241002	MW22-20-01_20241002	MW22-20-02_20241002	MW22-20-02_20241002
					2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-02	2024-10-02	2024-10-02	2024-10-02	2024-10-02	2024-10-02
					TY2411264-006	TY2411264-006	TY2411264-004	TY2411264-004	TY2411264-014	TY2411264-014	TY2411264-016	TY2411264-016	TY2411264-015	TY2411264-015
					N	N	N	N	N	N	N	N	N	N
					D	T	D	T	D	T	D	T	D	T
Parameter	Units	Generic Ontario Standards	Human Health Based Guideline											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ										
Aluminum	mg/L	--	2.9	--	0.0076	0.0547	0.6	0.757	0.0022	0.252	0.0012	0.0519	0.0072	0.287
Antimony	mg/L	0.006	0.006	0.006	0.00011	0.00022	< 0.0001	0.00013	0.00014	0.00061	< 0.0001	< 0.0001	< 0.0001	0.00013
Arsenic	mg/L	0.025	0.01	0.01	0.00047	0.00061	0.00059	0.0007	0.00021	0.00026	0.0002	0.00022	**0.00148**	**0.0016**
Barium	mg/L	1	2	1	0.0381	0.0408	0.0136	0.0149	0.0149	0.0188	0.0412	0.0405	0.035	0.0387
Beryllium	mg/L	0.004	--	--	0.000578	0.000567	0.00009	0.000099	< 0.00002	0.000024	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth	mg/L	--	--	--	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Boron	mg/L	5	5	5	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.039	0.043	0.012	0.015
Cadmium	mg/L	0.005	0.007	0.005	0.0000202	0.0000384	0.0000283	0.0000343	0.0000219	0.0000394	< 0.000005	< 0.000005	< 0.000005	< 0.00004
Calcium	mg/L	--	--	--	29.2	30.1	8.66	8.2	89.3	91.3	80.9	84.8	112	119
Cesium	mg/L	--	--	--	< 0.00001	0.000016	0.000137	0.000152	< 0.00001	0.000035	0.000012	0.000018	< 0.00001	0.000035
Chromium	mg/L	0.05	0.05	0.05	0.00112	0.0014	0.0016	0.00192	0.00091	0.00146	< 0.0005	< 0.0005	< 0.0005	0.00095
Chromium (Hexavalent)	mg/L	0.025	--	--	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00081	0.00071	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt	mg/L	0.0038	--	--	0.00011	0.00016	0.00106	0.00108	0.0001	0.00041	< 0.0001	0.00012	0.00024	0.0004
Copper	mg/L	0.087	2	--	0.00031	0.00088	0.0118	0.0127	0.00105	0.00215	< 0.0002	< 0.0005	< 0.0002	< 0.0005
Iron	mg/L	--	--	--	0.923	0.985	0.446	0.575	< 0.01	0.299	**3.7**	**4.23**	**2.79**	**3.2**
Lead	mg/L	0.01	0.005	0.01	< 0.00005	0.000144	< 0.00005	0.000101	< 0.00005	0.000259	< 0.00005	< 0.00005	< 0.00005	0.000148
Lead-210	Bq/L	--	2	0.1	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	--	--	--	0.0134	0.0156	0.0028	0.0034	0.0024	0.0026	0.0088	0.0099	0.0032	0.0042
Magnesium	mg/L	--	--	--	7.24	7.55	1.66	1.66	17.1	17.3	19.8	20.6	11.4	12
Manganese	mg/L	--	--	--	0.483	0.525	0.0402	0.0418	0.00222	0.0153	0.161	0.179	0.123	0.134
Mercury	mg/L	0.001	0.001	0.001	< 0.00005	< 0.000005	< 0.00005	0.0000074	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Molybdenum	mg/L	0.07	--	--	0.0012	0.0013	0.00126	0.00113	0.000422	0.000914	0.000622	0.000829	0.000291	0.000339
Nickel	mg/L	0.1	--	--	0.00127	0.00164	0.00624	0.00631	< 0.0005	0.00094	< 0.0005	< 0.0005	0.00069	0.00143
Potassium	mg/L	--	--	--	1.7	1.85	1.43	1.41	0.928	0.983	3.48	3.53	0.434	0.55
Potassium-40	Bq/L	--	--	--	-	-	-	-	-	-	-	-	-	-
Radium-226	Bq/L	--	5	0.6	-	-	-	-	-	-	-	-	-	-
Radium-228	Bq/L	--	2	2	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	--	--	--	0.00254	0.0029	0.00691	0.00732	0.0015	0.00205	0.00238	0.00284	0.00064	0.00116
Selenium	mg/L	0.01	0.05	0.05	0.000059	< 0.00005	0.0001	0.000114	0.000342	0.000352	0.000066	< 0.00005	< 0.00005	< 0.00005
Silver	mg/L	0.0015	--	--	< 0.00001	0.000023	0.00006	0.00033	< 0.00001	< 0.00001	< 0.00001	0.000011	< 0.00001	0.000012
Sodium	mg/L	490	--	--	2.09	2.36	1.24	1.32	6.47	14.2	18.2	17.2	4.98	5.38
Strontium	mg/L	--	7	--	0.15	0.149	0.0379	0.0375	0.0776	0.0766	0.469	0.406	0.167	0.166
Tellurium	mg/L	--	--	--	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium	mg/L	0.002	--	--	< 0.00001	< 0.00001	0.000012	0.000017	< 0.00001	0.000011	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Thorium	mg/L	--	--	--	0.00031	0.00034	0.00064	0.00062	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Thorium-228	Bq/L	--	--	2	-	-	-	-	-	-	-	-	-	-
Thorium-230	Bq/L	--	--	0.4	-	-	-	-	-	-	-	-	-	-
Thorium-234	Bq/L	--	--	20	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	--	--	--	0.00046	0.00081	< 0.0001	0.00015	< 0.0001	0.00084	< 0.0001	< 0.0001	< 0.0001	0.00016
Titanium	mg/L	--	--	--	0.00181	0.00431	0.00426	0.00857	< 0.0003	0.0171	< 0.0003	0.00313	< 0.0003	0.0136
Tungsten	mg/L	--	--	--	0.00198	0.00237	0.0107	0.0108	0.00579	0.00469	0.00123	0.00121	< 0.0001	< 0.0001
Uranium	mg/L	0.02	0.02	0.02	0.00174	0.00185	0.000681	0.000729	0.00137	0.00101	0.000396	0.000346	0.000035	0.000088
Uranium-234	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-
Uranium-235	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-
Uranium-238	Bq/L	--	--	4	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0062	--	--	0.00576	**0.00634**	0.00062	0.00091	< 0.0005	0.00091	< 0.0005	< 0.0005	< 0.0005	0.00084
Zinc	mg/L	1.1	--	--	0.0016	0.0043	0.0022	< 0.003	0.0019	0.0049	< 0.001	< 0.003	< 0.001	< 0.003
Zirconium	mg/L	--	--	--	0.00329	0.00328	0.00072	0.00072	< 0.0003	0.00048	0.00184	0.00194	< 0.0003	0.00039

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
CDWQ AO: Canadian Drinking Water Guidelines Aesthetic Objective
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
Component GW1, OREG 153/04: component GW1 (drinking water) of OREG-153/04 Table 2 Full Depth Generic
(a) only applied if there is an exceedance of generic standards
na: not applied (no exceedance of generic standards)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
Fraction D: Dissolved [Metal] Concentration
Fraction T: Total [Metal] Concentration
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Exceeds Aesthetic Objective
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					Location	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-04	MW22-11-01
					Sample ID	MW22-06-1_20230628	MW22-06-2_20230628	MW22-07-01_20230628	MW22-07-02_20230628	MW22-08-1_20230627	MW22-08-2_20230627	MW22-09-1_20230627	MW22-09-2_20230627	MW22-10-1_20230627	MW22-10-4_20230627	MW22-11-1_20230627
					Date	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27	2023-06-27
					Lab sample ID	TY2306190-010	TY2306190-011	TY2306190-012	TY2306190-013	TY2306190-006	TY2306190-007	TY2306190-004	TY2306190-005	TY2306190-002	TY2306190-003	TY2306190-001
					Sample type	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards		Max Concentration											
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	ND	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	25	< 20	< 20	25	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	ND	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	1.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	ND	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	ND	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	ND	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	ND	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	ND	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	0.61	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.61
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	ND	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-grained)
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-13-01	MW22-13-02	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-05-01	MW22-05-02	MW22-12-01	MW22-12-04	MW22-14-01
					MW22-13-1_20230628	MW22-13-2_20230628	MW22-2-1_20230628	MW22-2-2_20230628	MW22-3-1_20230628	MW22-3-2_20230628	MW22-04-1_20230702	MW22-05-1_20230702	MW22-05-2_20230702	MW22-12-1_20230702	MW22-12-4_20230702	MW22-14-1_20230702
					2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-06-28	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02	2023-07-02
					TY2306190-014	TY2306190-015	TY2306190-018	TY2306190-019	TY2306190-016	TY2306190-017	TY2306289-005	TY2306289-002	TY2306289-001	TY2306289-003	TY2306289-004	TY2306289-006
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-14-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-15-01	MW22-15-03	MW22-16-01	MW22-17-01	MW22-17-02	MW22-18-01
					MW22-14-2_20230702	MW22-19-1_20230703	MW22-20-1_20230703	MW22-20-2_20230703	MW22-01-1_20230704	MW22-01-2_20230704	MW22-15-1_20230705	MW22-15-3_20230705	MW22-16-1_20230705	MW22-17-1_20230704	MW22-17-2_20230704	MW22-18-1_20230704
					2023-07-02	2023-07-03	2023-07-03	2023-07-03	2023-07-04	2023-07-04	2023-07-05	2023-07-05	2023-07-05	2023-07-04	2023-07-04	2023-07-04
					TY2306289-007	TY2306289-009	TY2306289-011	TY2306289-012	TY2306508-005	TY2306508-006	TY2306508-010	TY2306508-011	TY2306508-008	TY2306508-001	TY2306508-002	TY2306508-004
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-18-02	MW22-01-01	MW22-01-02	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-11-01	MW22-16-01	MW22-17-01	MW22-17-02	MW22-18-01
					MW22-18-2_20230704	MW22-01-1_20230809	MW22-01-2_20230809	MW22-05-1_20230808	MW22-05-2_20230808	MW22-06-1_20230808	MW22-06-2_20230808	MW22-11-1_20230808	MW22-16-1_20230809	MW22-17-01_20230809	MW22-17-2_20230809	MW22-18-1_20230809
					2023-07-04	2023-08-09	2023-08-09	2023-08-08	2023-08-08	2023-08-08	2023-08-08	2023-08-08	2023-08-09	2023-08-09	2023-08-09	2023-08-09
					TY2306508-003	TY2307856-007	TY2307856-008	TY2307856-001	TY2307856-002	TY2307856-004	TY2307856-003	TY2307856-005	TY2307856-015	TY2307856-013	TY2307856-009	TY2307856-011
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	5.9	9	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-18-02	MW2-12	MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01
					MW22-18-2_20230809	MW2-12-1_20230811	MW22-02-1_20230812	MW22-02-2_20230812	MW22-03-1_20230810	MW22-03-2_20230810	MW22-04-1_20230811	MW22-08-1_20230811	MW22-08-2_20230811	MW22-09-1_20230811	MW22-09-2_20230811	MW22-10-1_20230811
					2023-08-09	2023-08-11	2023-08-12	2023-08-12	2023-08-10	2023-08-10	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11	2023-08-11
					TY2307856-010	TY2308084-011	TY2308084-019	TY2308084-020	TY2308084-008	TY2308084-009	TY2308084-010	TY2308084-017	TY2308084-018	TY2308084-015	TY2308084-016	TY2308084-013
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

Parameter	Units	Generic Ontario Standards: OREG 153/04 T2 SCS Potable (coarse)	Human Health Based Guidelines/Standards: CDWQ MAC	Human Health Based Guidelines/Standards: OREG 169/03 DWQ	MW22-10-04 / MW22-10-4_20230811 / 2023-08-11 / TY2308084-014 / N	MW22-12-04 / MW22-12-4_20230811 / 2023-08-11 / TY2308084-012 / N	MW22-13-01 / MW22-13-1_20230810 / 2023-08-10 / TY2308084-002 / N	MW22-13-02 / MW22-13-2_20230810 / 2023-08-10 / TY2308084-001 / N	MW22-14-02 / MW22-14-2_20230810 / 2023-08-10 / TY2308084-003 / N	MW22-19-01 / MW22-19-1_20230810 / 2023-08-10 / TY2308084-004 / N	MW22-20-01 / MW22-20-1_20230810 / 2023-08-10 / TY2308084-005 / N	MW22-20-02 / MW22-20-2_20230810 / 2023-08-10 / TY2308084-007 / N	MW22-01-01 / MW22-01-01_20230924 / 2023-09-24 / TY2309741-010 / N	MW22-01-02 / MW22-01-02_20230924 / 2023-09-24 / TY2309741-012 / N	MW22-02-01 / MW22-02-01_20230924 / 2023-09-24 / TY2309741-002 / N	MW22-02-02 / MW22-02-02_20230924 / 2023-09-24 / TY2309741-001 / N
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-03-01	MW22-03-02	MW22-16-01	MW22-16-02	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01
					MW22-03-01_20230924	MW22-03-02_20230924	MW22-16-01_20230925	MW22-16-02_20230925	MW22-17-01_20230924	MW22-17-02_20230924	MW22-18-01_20230924	MW22-18-02_20230924	MW22-04-1_20230923	MW22-05-01_20230920	MW22-05-02_20230920	MW22-06-1_20230920
					2023-09-24	2023-09-24	2023-09-25	2023-09-25	2023-09-24	2023-09-24	2023-09-24	2023-09-24	2023-09-23	2023-09-20	2023-09-20	2023-09-20
					TY2309741-004	TY2309741-005	TY2309741-007	TY2309741-006	TY2309741-008	TY2309741-009	TY2309741-013	TY2309741-014	TY2309749-028	TY2309749-010	TY2309749-009	TY2309749-005
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 23	< 14.5	< 6	< 4.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-06-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-12-01	MW22-12-04
					MW22-06-2_20230920	MW22-07-1_20230923	MW22-07-2_20230923	MW22-08-1_20230923	MW22-08-2_20230923	MW22-09-1_20230920	MW22-09-2_20230920	MW22-10-1_20230920	MW22-10-4_20230920	MW22-11-1_20230920	MW22-12-01_20230923	MW22-12-04_20230923
					2023-09-20	2023-09-23	2023-09-23	2023-09-23	2023-09-23	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-23	2023-09-23
					TY2309749-006	TY2309749-022	TY2309749-021	TY2309749-020	TY2309749-019	TY2309749-001	TY2309749-002	TY2309749-008	TY2309749-007	TY2309749-003	TY2309749-024	TY2309749-023
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-19-01	MW22-20-01	MW22-20-02	MW22-01-01	MW22-01-02	MW22-02-01
					MW22-13-01_20230923	MW22-13-2_20230923	MW22-14-01_20230921	MW22-14-2_20230921	MW22-15-01_20230921	MW22-15-03_20230921	MW22-19-1_20230921	MW22-20-01_20230921	MW22-20-02_20230921	MW22-01-1_20240605	MW22-01-2_20240605	MW22-02-1_20240604
					2023-09-23	2023-09-23	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2023-09-21	2024-06-05	2024-06-05	2024-06-04
					TY2309749-025	TY2309749-027	TY2309749-017	TY2309749-018	TY2309749-014	TY2309749-015	TY2309749-016	TY2309749-011	TY2309749-013	TY2405789-004	TY2405789-005	TY2405789-001
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards		MW22-02-02	MW22-03-01	MW22-03-02	MW22-04-01	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-17-01	MW22-17-02
					MW22-02-2_20240604	MW22-03-1_20240604	MW22-03-2_20240604	MW22-04-1_20240603	MW22-13-1_20240603	MW22-13-2_20240603	MW22-14-1_20240603	MW22-14-2_20240603	MW22-15-1_20240605	MW22-15-3_20240605	MW22-17-1_20240605	MW22-17-2_20240605
					2024-06-04	2024-06-04	2024-06-04	2024-06-03	2024-06-03	2024-06-03	2024-06-03	2024-06-03	2024-06-05	2024-06-05	2024-06-05	2024-06-05
					TY2405789-002	TY2405789-023	TY2405789-024	TY2405789-013	TY2405789-014	TY2405789-015	TY2405789-016	TY2405789-017	TY2405789-007	TY2405789-008	TY2405789-011	TY2405789-025
					N	N	N	N	N	N	N	N	N	N	N	N
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01	MW22-20-02	MW22-07-01	MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-12-01
					MW22-18-1_20240605	MW22-18-2_20240605	MW22-19-1_20240604	MW22-20-1_20240604	MW22-20-2_20240604	MW22-07-1_20240610	MW22-07-2_20240610	MW22-08-1_20240610	MW22-08-2_20240610	MW22-09-1_20240610	MW22-09-2_20240610	MW22-12-1_20240610
					2024-06-05	2024-06-05	2024-06-04	2024-06-04	2024-06-04	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10	2024-06-10
					TY2405789-009	TY2405789-010	TY2405789-019	TY2405789-021	TY2405789-022	TY2405941-001	TY2405941-002	TY2405941-005	TY2405941-006	TY2405941-003	TY2405941-004	TY2405941-007
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-12-04	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-12-01	MW22-12-04	MW22-13-01
					MW22-12-4_20240610	MW22-01-1_20240813	MW22-01-2_20240813	MW22-02-1_20240811	MW22-02-2_20240813	MW22-08-1_20240812	MW22-08-2_20240812	MW22-09-1_20240812	MW22-09-2_20240812	MW22-12-1_20240812	MW22-12-4_20240812	MW22-13-1_20240811
					2024-06-10	2024-08-13	2024-08-13	2024-08-11	2024-08-13	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-11
					TY2405941-008	TY2408880-017	TY2408880-018	TY2408880-006	TY2408880-019	TY2408880-014	TY2408880-013	TY2408880-011	TY2408880-012	TY2408880-009	TY2408880-010	TY2408880-001
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-19-02	MW-BD
					MW22-13-2_20240811	MW22-14-1_20240811	MW22-14-2_20240812	MW22-15-1_20240813	MW22-15-3_20240813	MW22-17-1_20240813	MW22-17-2_20240813	MW22-18-1_20240813	MW22-18-2_20240813	MW22-19-1_20240811	MW22-19-2_20240811	MWBD1_20240811
					2024-08-11	2024-08-11	2024-08-12	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-13	2024-08-11	2024-08-11	2024-08-11
					TY2408880-002	TY2408880-003	TY2408880-015	TY2408880-020	TY2408880-021	TY2408880-022	TY2408880-023	TY2408880-024	TY2408880-025	TY2408880-004	TY2408880-005	TY2408880-008
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW-BD	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-01	MW22-07-02	MW22-10-01	MW22-10-04	MW22-11-01	MW22-16-01
					MWBD2_20240812	MW22-04-1_20240815	MW22-05-1_20240814	MW22-05-2_20240814	MW22-06-1_20240814	MW22-06-2_20240814	MW22-07-01_20240815	MW22-07-2_20240815	MW22-10-1_20240814	MW22-10-4_20240814	MW22-11-1_20240814	MW22-16-1_20240815
					2024-08-12	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-14	2024-08-15	2024-08-15	2024-08-14	2024-08-14	2024-08-14	2024-08-15
					TY2408880-016	TY2409020-010	TY2409020-001	TY2409020-002	TY2409020-003	TY2409020-004	TY2409020-018	TY2409020-011	TY2409020-005	TY2409020-006	TY2409020-007	TY2409020-012
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-16-02	MW22-20-01	MW22-20-02	MW-BD	MW-BD	RA4-WC-34	MW22-04-01	MW22-05-01	MW22-05-02	MW22-06-01	MW22-06-02	MW22-07-01
					MW22-16-2_20240815	MW22-20-1_20240815	MW22-20-2_20240815	MWBD3_20240814	MWBD4_20240815	RA4-WC-34_WG-2021-09-15	MW22-04-01_20240930	MW22-05-01_20240929	MW22-05-02_20240929	MW22-06-01_20240929	MW22-06-02_20240929	MW22-07-01_20240930
					2024-08-15	2024-08-15	2024-08-15	2024-08-14	2024-08-15	2021-09-15	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-30
					TY2409020-013	TY2409020-014	TY2409020-015	TY2409020-008	TY2409020-017	QRU398	TY2411036-018	TY2411036-004	TY2411036-009	TY2411036-008	TY2411036-003	TY2411036-016
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 10	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	< 0.05	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	-	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	-	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 5	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 5	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-07-02	MW22-08-01	MW22-08-02	MW22-09-01	MW22-09-02	MW22-10-01	MW22-10-02	MW22-11-01	MW22-12-01	MW22-12-04	MW22-01-01	MW22-01-02
					MW22-07-02_20240930	MW22-08-01_20240930	MW22-08-02_20240930	MW22-09-01_20240930	MW22-09-02_20240930	MW22-10-01_20240929	MW22-10-02_20240929	MW22-11-01_20240929	MW22-12-01_20240929	MW22-12-04_20240929	MW22-01-01_20241002	MW22-01-02_20241002
					2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-30	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-09-29	2024-10-02	2024-10-02
					TY2411036-010	TY2411036-017	TY2411036-011	TY2411036-019	TY2411036-012	TY2411036-007	TY2411036-001	TY2411036-002	TY2411036-005	TY2411036-006	TY2411264-012	TY2411264-013
					N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards													
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards		MW22-02-01	MW22-02-02	MW22-03-01	MW22-03-02	MW22-13-01	MW22-13-02	MW22-14-01	MW22-14-02	MW22-15-01	MW22-15-03	MW22-16-01	MW22-16-02
					MW22-02-01_20241001	MW22-02-02_20241001	MW22-03-01_20241003	MW22-03-02_20241003	MW22-13-01_20241001	MW22-13-02_20241001	MW22-14-01_20241001	MW22-14-02_20241001	MW22-15-01_20241003	MW22-15-03_20241003	MW22-16-01_20241001	MW22-16-02_20241001
					2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-01	2024-10-01	2024-10-03	2024-10-03	2024-10-01	2024-10-01
					TY2411264-007	TY2411264-003	TY2411264-021	TY2411264-020	TY2411264-001	TY2411264-009	TY2411264-008	TY2411264-002	TY2411264-018	TY2411264-019	TY2411264-011	TY2411264-010
					N	N	N	N	N	N	N	N	N	N	N	N
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ												
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 6: Summary of Groundwater Analytical Results of Volatile Organic Compounds Parameters

					MW22-17-01	MW22-17-02	MW22-18-01	MW22-18-02	MW22-19-01	MW22-20-01	MW22-20-02
					MW22-17-01_20241003	MW22-17-02_20241003	MW22-18-01_20241001	MW22-18-02_20241001	MW22-19-01_20241002	MW22-20-01_20241002	MW22-20-02_20241002
					2024-10-03	2024-10-03	2024-10-01	2024-10-01	2024-10-02	2024-10-02	2024-10-02
					TY2411264-023	TY2411264-022	TY2411264-006	TY2411264-004	TY2411264-014	TY2411264-016	TY2411264-015
					N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards	Human Health Based Guidelines/Standards								
		OREG 153/04 T2 SCS Potable (coarse)	CDWQ MAC	OREG 169/03 DWQ							
2-Hexanone (methyl Butyl Ketone , MBK)	µg/L	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	2700	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Biphenyl, 1,1'-	µg/L	0.5	--	--	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	16	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	µg/L	0.89	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide	µg/L	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	µg/L	30	80	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl Chloride)	µg/L	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane [DBCM]	µg/L	25	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	0.2	--	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorobenzene, 1,2-	µg/L	3	200	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	59	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	1	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	590	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,1-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,1-	µg/L	1.6	14	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- (Total)	µg/L	1.6	--	--	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Dichloroethene, 1,2- cis-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, 1,2- trans-	µg/L	1.6	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene chloride)	µg/L	50	50	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichloropropane, 1,2-	µg/L	5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3-	µg/L	0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, 1,3- cis-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloropropene, 1,3- trans-	µg/L	--	--	--	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Ethyl methyl ketone [MEK]	µg/L	1800	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Hexane	µg/L	890	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	640	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl tert-butyl ether [MTBE]	µg/L	15	15	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	µg/L	5.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	1.1	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	1.6	10	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloromethane (Carbon Tetrachloride)	µg/L	0.79	2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane, 1,1,1-	µg/L	200	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	4.7	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	1.6	5	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	150	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloromethane (Chloroform)	µg/L	2.4	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	µg/L	0.5	2	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 153/04 T2 SCS Potable = OREG-153/04 Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition (coarse-g
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 7: Summary of Sediment Analytical Results of Metals Parameters

					Location	RA1-4-WC-35	RA1-4-WC-37	RA1-WC-14	RA1-WC-26	RA1-WC-57	RA1-WC-66	RA4-WC-31	RA4-WC-42	RA4-WC-45	RA4-WC-58	RA1-WC-27
					Sample ID	RA1-4-WC-35_20201014_SE	RA1-4-WC-37_20201014_SE	RA1-WC-14_20201019_SE	RA1-WC-26_20201020_SE	RA1-WC-57_20201020_SE	RA1-WC-66_20201020_SE	RA4-WC-31_20201018_SE	RA4-WC-42_20201019_SE	RA4-WC-45_20201018_SE	RA4-WC-58_20201018_SE	RA1-WC-27_20201024_SE
					Date	2020-10-14	2020-10-14	2020-10-19	2020-10-20	2020-10-20	2020-10-20	2020-10-18	2020-10-19	2020-10-18	2020-10-18	2020-10-24
					Lab sample ID	NZC264	NZC263	NZC272	NZC270	NZC267	NZC269	NZC271	NZC268	NZC266	NZC265	NZX482
					Sample type	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Generic Ontario Standards		Human Health Specific Guidelines/Standards	Max Concentration											
		OREG-153 (T2)/SO/R-P-I/COARSE	OREG-153 (T8)/SO/R-P-I-I-C-C	CCME - HH SQG												
Aluminum	µg/g	--	--	--	22000	-	-	-	-	-	-	-	-	-	-	-
Antimony	µg/g	7.5	1.3	--	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic	µg/g	18	18	12	5.8	4.3	3.8	1.3	4.5	3.3	5.2	< 1	3.9	2.7	4.3	1.1
Barium	µg/g	390	220	6800	140	91	48	42	68	55	83	7.7	71	97	100	10
Beryllium	µg/g	4	2.5	75	0.86	0.3	< 0.2	0.29	0.27	0.21	0.21	< 0.2	0.23	0.34	0.23	< 0.2
Bismuth	µg/g	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	-
Boron	µg/g	120	36	--	17	5.3	5.5	6.7	6.7	< 5	< 5	< 5	< 5	< 5	5	< 5
Cadmium	µg/g	1.2	1.2	14	1.1	0.31	0.13	0.12	0.7	0.26	0.38	< 0.1	0.4	0.43	1.1	< 0.1
Calcium	µg/g	--	--	--	48000	-	-	-	-	-	-	-	-	-	-	-
Chromium	µg/g	160	70	220	60	28	11	21	21	19	19	12	22	32	24	16
Cobalt	µg/g	22	22	--	14	8.2	3.8	5.2	8	5.8	6.5	2.4	7.3	6.6	8.4	3.2
Copper	µg/g	140	92	1100	22	5.2	4.5	7	8.5	4.5	3.9	0.99	5.2	5.7	5.7	2.5
Iron	µg/g	--	--	--	34000	-	-	-	-	-	-	-	-	-	-	-
Lead	µg/g	120	120	61*	14	9.3	3.5	5.1	10	5.2	6.6	3.3	11	8.8	11	2
Magnesium	µg/g	--	--	--	12000	-	-	-	-	-	-	-	-	-	-	-
Manganese	µg/g	--	--	--	1300	-	-	-	-	-	-	-	-	-	-	-
Mercury	µg/g	0.27	0.27	606	0.18	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	µg/g	6.9	2	--	0.96	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	µg/g	100	82	200	35	13	6.7	12	11	10	9	6.4	11	20	11	7.9
Potassium	µg/g	--	--	--	3500	-	-	-	-	-	-	-	-	-	-	-
Selenium	µg/g	2.4	1.5	80	1	< 0.5	< 0.5	< 0.5	0.84	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Silver	µg/g	20	0.5	--	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Sodium	µg/g	--	--	--	200	-	-	-	-	-	-	-	-	-	-	-
Strontium	µg/g	--	--	--	51	-	-	-	-	-	-	-	-	-	-	-
Thallium	µg/g	1	1	1	0.24	0.17	< 0.05	0.077	0.13	0.1	0.16	< 0.05	0.15	0.2	0.21	< 0.05
Tin	µg/g	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	-
Uranium	µg/g	23	2.5	23	2.2	2.2	0.31	0.46	0.75	0.55	0.76	0.24	0.56	0.88	0.86	0.37
Vanadium	µg/g	86	86	--	55	27	12	20	17	19	21	15	23	33	22	17
Zinc	µg/g	340	290	10000	140	77	47	29	67	63	75	18	73	67	100	17

Notes:
CCME - HH SQG = Canadian Environmental Quality Guidelines Soil Quality Guidelines for Human Health
OREG-153 (T2)/SO/R-P-I/COARSE = Ontario Ministry of Environment Regulation 153, Table 2, Soil, Residential/Parkland/Institutional Property Use, Coarse
OREG-153 (T8)/SO/R-P-I-I-C-C = Ontario Ministry of Environment Regulation 153, Table 8, Soil, Residential/Parkland/Institutional/Industrial/Commercial Property Use
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/g: micrograms per gram
Sample type N: Normal Environmental Sample
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all non-detects
Exceeds Applicable Generic Standard
Exceeds Applicable Human Health Specific Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 7: Summary of Sediment Analytical Results of Metals Parameters

		RA1-WC-28	RA4-WC-15	RA4-WC-55	RA1-4-WC-01	RA1-4-WC-07	RA1-WC-02	RA1-WC-23	RA4-WC-26	RA4-WC-34	RA4-WC-37	RA1-WC-09	RA1-WC-67	RA4-WC-02	RA4-WC-21	RA4-WC-55	RA4-WC-57	RA1-4-WC-36
		RA1-WC-28_20201024_SE	RA4-WC-15_20201025_SE	RA4-WC-55_20201022_SE	RA1-4-WC-01_SE-20210911	RA1-4-WC-07_SE-20210911	RA1-WC-02_SE-20210914	RA1-WC-23_SE-20210915	RA4-WC-26_SE-20210913	RA4-WC-34_SE-20210915	RA4-WC-37_SE-20210912	RA1-WC-09_SE-20210917	RA1-WC-67_SE-20210918	RA4-WC-02_SE-20210917	RA4-WC-21_SE-20210918	RA4-WC-55_SE-20210916	RA4-WC-57_SE-20210916	RA1-4-WC-36-2022825
		2020-10-24	2020-10-25	2020-10-22	2021-09-11	2021-09-11	2021-09-14	2021-09-15	2021-09-13	2021-09-15	2021-09-12	2021-09-17	2021-09-18	2021-09-17	2021-09-18	2021-09-16	2021-09-16	2022-08-25
		NZX484	NZX480	NZX483	QRU382	QRU380	QRU378	QRU383	QRU379	QRU384	QRU381	QSK304	QSK303	QSK305	QSK302	QSK306	QSK307	-
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Parameter	**Units**																	
Aluminum	µg/g	-	-	-	4400	15000	11000	9100	10000	3700	19000	3100	5500	5400	16000	3900	8700	4800
Antimony	µg/g	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20
Arsenic	µg/g	5.8	< 1	1.8	1.1	4	2	3	1.5	< 1	5.8	2.6	2.8	< 1	1.9	< 1	2.6	< 1.0
Barium	µg/g	130	16	15	20	110	66	91	23	13	120	51	35	21	80	11	50	18
Beryllium	µg/g	0.86	< 0.2	< 0.2	< 0.2	0.35	0.36	0.37	0.24	< 0.2	0.42	< 0.2	< 0.2	< 0.2	0.35	< 0.2	< 0.2	< 0.20
Bismuth	µg/g	-	-	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0
Boron	µg/g	17	< 5	< 5	< 5	6.8	5.1	12	< 5	< 5	9.7	7	< 5	< 5	5.6	< 5	< 5	< 5.0
Cadmium	µg/g	0.25	< 0.1	< 0.1	0.16	0.8	0.3	0.29	< 0.1	< 0.1	0.56	0.35	0.13	< 0.1	0.38	< 0.1	0.34	< 0.10
Calcium	µg/g	-	-	-	5000	13000	8800	28000	4900	48000	11000	34000	3900	3300	14000	7800	5800	5700
Chromium	µg/g	60	16	15	13	33	27	21	36	16	41	7.3	15	19	34	13	21	15
Cobalt	µg/g	14	3.1	3.8	2.6	8	6.3	4.9	7.4	3.4	8.3	2.9	6.1	3.9	4.9	3.2	5.3	4.2
Copper	µg/g	22	3.1	3.2	2.4	9.1	9.5	17	4.7	4.4	8.8	8.1	3	2.7	9.4	3	4.2	2.2
Iron	µg/g	-	-	-	8100	18000	14000	17000	20000	11000	23000	13000	13000	8600	14000	8100	13000	10000
Lead	µg/g	14	4.4	2.8	5.9	13	8.4	6.1	3.9	2.7	13	5.1	3.2	3.1	8.3	2	7.5	2.6
Magnesium	µg/g	-	-	-	2500	5100	4200	5000	6300	12000	4800	3100	3100	2700	4200	4400	3200	3300
Manganese	µg/g	-	-	-	130	640	410	250	290	170	1100	610	780	150	320	89	430	250
Mercury	µg/g	-	-	-	< 0.05	0.18	0.08	0.08	< 0.05	< 0.05	0.15	0.11	< 0.05	< 0.05	0.093	< 0.05	0.062	< 0.050
Molybdenum	µg/g	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.96	< 0.5	< 0.5	0.51	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50
Nickel	µg/g	34	8	7.9	7.3	17	15	14	20	7.9	17	6.1	8.1	8.6	16	7.5	10	8.6
Potassium	µg/g	-	-	-	330	1300	1000	830	490	390	1800	460	400	360	1200	270	900	330
Selenium	µg/g	< 0.5	< 0.5	< 0.5	< 0.5	0.57	< 0.5	0.86	< 0.5	< 0.5	0.64	1	< 0.5	< 0.5	0.61	< 0.5	< 0.5	< 0.50
Silver	µg/g	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20
Sodium	µg/g	-	-	-	< 50	100	77	86	< 50	58	130	54	56	< 50	85	51	77	< 50
Strontium	µg/g	-	-	-	10	33	16	31	11	31	30	51	10	6.9	30	9.1	18	9.7
Thallium	µg/g	0.23	< 0.05	< 0.05	< 0.05	0.16	0.13	0.093	< 0.05	< 0.05	0.24	0.06	0.066	0.052	0.16	< 0.05	0.11	< 0.050
Tin	µg/g	-	-	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0
Uranium	µg/g	1.3	0.57	0.38	0.32	0.7	1.5	2.2	0.54	0.58	1	0.74	0.45	0.99	0.84	0.46	0.77	0.36
Vanadium	µg/g	55	18	18	13	27	24	22	29	21	35	6.6	19	15	23	16	20	17
Zinc	µg/g	94	23	29	33	140	66	52	58	16	77	47	50	32	56	22	64	30

Notes:
CCME - HH SQG = Canadian Environn
OREG-153 (T2)/SO/R-P-I/COARSE = (
OREG-153 (T8)/SO/R-P-I-I-C-C = Onta
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/g: micrograms per gram
Sample type N: Normal Environmental
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than ind
- : Not analyzed
--: No Standard/Guideline
ND: all non-detects
Exceeds Applicable Generic Standar
Exceeds Applicable Human Health S
Detection Limit Exceeds Applicable S

Table 7: Summary of Sediment Analytical Results of Metals Parameters

		RA1-WC-14	RA1-WC-22	RA1-WC-28	RA1-WC-30	RA1-WC-32	RA1-WC-41	RA1-WC-51	RA4B-WC-02	RA4-WC-00	RA4-WC-21
		RA1-WC-14-2022822	RA1-WC-22-2022821	RA1-WC-28-2022821	RA1-WC-30-2022822	RA1-WC-32-2022821	RA1-WC-41-2022823	RA1-WC-51-2022826	RA4B-WC-02-2022823	RA4-WC-00-2022825	RA4-WC-21-2022824
		2022-08-22	2022-08-21	2022-08-21	2022-08-22	2022-08-21	2022-08-23	2022-08-26	2022-08-23	2022-08-25	2022-08-24
		-	-	-	-	-	-	-	-	-	-
		N	N	N	N	N	N	N	N	N	N
Parameter	**Units**										
Aluminum	µg/g	7100	16000	22000	3800	7500	10000	5900	3000	7500	22000
Antimony	µg/g	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Arsenic	µg/g	< 1.0	2.9	3.9	< 1.0	1.7	2.1	1.3	1.3	1.7	1.3
Barium	µg/g	40	90	140	15	46	49	28	29	66	93
Beryllium	µg/g	0.27	0.55	0.83	< 0.20	0.2	0.33	< 0.20	< 0.20	< 0.20	0.65
Bismuth	µg/g	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Boron	µg/g	5.8	9	16	< 5.0	< 5.0	6.3	< 5.0	< 5.0	< 5.0	7.6
Cadmium	µg/g	< 0.10	0.29	0.24	0.11	0.24	0.21	0.15	0.4	0.34	0.44
Calcium	µg/g	13000	10000	16000	2900	5200	5700	4300	9100	8800	12000
Chromium	µg/g	19	40	58	12	18	26	17	8	20	48
Cobalt	µg/g	4.4	10	14	2.6	4.5	6.1	4.1	1.5	6.6	7.4
Copper	µg/g	6.3	13	19	1.4	4.1	7.9	4	3.5	4.4	15
Iron	µg/g	12000	26000	34000	7200	10000	14000	11000	4400	13000	19000
Lead	µg/g	4.4	8.8	13	3.9	7.1	4.8	4.4	9.7	5.2	8.6
Magnesium	µg/g	7900	7000	11000	2200	2900	4700	2900	1400	2900	6200
Manganese	µg/g	140	790	390	220	500	150	150	66	1300	180
Mercury	µg/g	< 0.050	0.078	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.052	0.07	0.07
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	µg/g	12	23	35	6.5	9.4	15	9.3	4.2	9.5	25
Potassium	µg/g	1000	2000	3500	240	670	1200	500	250	670	1700
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.57	< 0.50	0.76
Silver	µg/g	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Sodium	µg/g	120	130	200	< 50	< 50	78	< 50	< 50	51	93
Strontium	µg/g	18	21	41	8.7	15	18	11	23	16	33
Thallium	µg/g	0.06	0.16	0.19	< 0.050	0.095	0.097	0.065	< 0.050	0.086	0.16
Tin	µg/g	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Uranium	µg/g	0.41	0.8	1.2	0.27	0.63	0.54	0.57	0.38	0.88	1.3
Vanadium	µg/g	20	34	54	12	17	25	18	7.8	15	36
Zinc	µg/g	31	92	120	25	47	60	51	44	86	75

Notes:
CCME - HH SQG = Canadian Environn
OREG-153 (T2)/SO/R-P-I/COARSE = (
OREG-153 (T8)/SO/R-P-I-I-C-C = Onta
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/g: micrograms per gram
Sample type N: Normal Environmental
* Standard is for 0.5-IQ pt decrement
< : Denotes concentration less than ind
- : Not analyzed
--: No Standard/Guideline
ND: all non-detects
Exceeds Applicable Generic Standar
Exceeds Applicable Human Health S
Detection Limit Exceeds Applicable S

Table 8: Summary of Surface Water Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

					Location	MFFN-01	MFFN-02	RA4-WC-41	RA4-WC-55	RA4-WC-02	MFFN-01	MFFN-02	MFFN-01	MFFN-02	RA1-WC-51	AR001 UP	AR002 DOWN
					Sample ID	MFFN-01_WS-20220624	MFFN-02_WS-20220624	RA4-WC-41_WS-20220625	RA4-WC-55_WS-20220627	RA4-WC-02_WS-20220611	MFFN-01_WS-20210918	MFFN-02_WS-20210918	MFFN-01_WS-20220825	MFFN-02_WS-20220825	RA1-WC-51_WS-20220826	AR001 UP-20250528	AR002 DOWN-20250528
					Date	2022-06-24	2022-06-24	2022-06-25	2022-06-27	2022-06-11	2021-09-18	2021-09-18	2022-08-25	2022-08-25	2022-08-26	2025-05-28	2025-05-28
					Lab sample ID	TAY911	TAY912	TAY913	TAY914	TBB305	QSK284	QSK286	TON915	TON916	TOZ813	AR001 UP	AR002 DOWN
					Sample type	N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Max Concentration												
		CDWQ MAC	OREG 169/03 DWQ	Component GW1, OREG 153/04 T2 SCS Potable (coarse) [(a)]													
Acenaphthene	µg/L	--	--	4.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Acenaphthylene	µg/L	--	--	0.45	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Anthracene	µg/L	--	--	890	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Benzo(a)anthracene	µg/L	--	--	1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Benzo(a)pyrene	µg/L	0.04	0.01	--	ND	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009	< 0.0090	< 0.0090
Benzo(b+j)fluoranthene	µg/L	--	--	0.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-
Benzo(g,h,i)perylene	µg/L	--	--	1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Benzo(k)fluoranthene	µg/L	--	--	0.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Chrysene	µg/L	--	--	0.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Dibenzo(a,h)anthracene	µg/L	--	--	0.01	ND	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.050**	**< 0.050**
Fluoranthene	µg/L	--	--	0.41	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Fluorene	µg/L	--	--	120	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Indeno(1,2,3-c,d)pyrene	µg/L	--	--	0.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Methylnaphthalene, 1-	µg/L	--	--	12	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Methylnaphthalene, 2-	µg/L	--	--	12	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Naphthalene	µg/L	--	--	59	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050
Phenanthrene	µg/L	--	--	1	ND	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.030	< 0.030
Pyrene	µg/L	--	--	4.1	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 8: Summary of Surface Water Analytical Results of Polycyclic Aromatic Hydrocarbon Parameters

				BCR003 UP	BCR004 DOWN
				BCR003 UP-20250528	BCR004 DOWN-20250528
				2025-05-28	2025-05-28
				BCR003 UP	BCR004 DOWN
				N	N
Parameter	Units	Human Health Based Guid			
		CDWQ MAC	OREG 169/03 DWQ		
Acenaphthene	µg/L	--	--	< 0.050	< 0.050
Acenaphthylene	µg/L	--	--	< 0.050	< 0.050
Anthracene	µg/L	--	--	< 0.050	< 0.050
Benzo(a)anthracene	µg/L	--	--	< 0.050	< 0.050
Benzo(a)pyrene	µg/L	0.04	0.01	< 0.0090	< 0.0090
Benzo(b+j)fluoranthene	µg/L	--	--	-	-
Benzo(g,h,i)perylene	µg/L	--	--	< 0.050	< 0.050
Benzo(k)fluoranthene	µg/L	--	--	< 0.050	< 0.050
Chrysene	µg/L	--	--	< 0.050	< 0.050
Dibenzo(a,h)anthracene	µg/L	--	--	**< 0.050**	**< 0.050**
Fluoranthene	µg/L	--	--	< 0.050	< 0.050
Fluorene	µg/L	--	--	< 0.050	< 0.050
Indeno(1,2,3-c,d)pyrene	µg/L	--	--	< 0.050	< 0.050
Methylnaphthalene, 1-	µg/L	--	--	< 0.050	< 0.050
Methylnaphthalene, 2-	µg/L	--	--	< 0.050	< 0.050
Naphthalene	µg/L	--	--	< 0.050	< 0.050
Phenanthrene	µg/L	--	--	< 0.030	< 0.030
Pyrene	µg/L	--	--	< 0.050	< 0.050

Notes:

CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptabl
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality St
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 9: Summary of Surface Water Analytical Results of Metals Parameters

Parameter	Units	Human Health Based Guidelines/Standards: CDWQ MAC	Human Health Based Guidelines/Standards: OREG 169/03 DWQ	Human Health Based Guidelines/Standards: Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [a]	Other Guidelines: CDWQ AO	Max Concentration	Location	RA1-WC-26	RA1-4-WC-37	RA1-4-WC-33	RA1-4-WC-35	RA1-WC-57	RA1-WC-14	RA1-WC-66	RA4B-WC-01	RA4-WC-18	RA4-WC-42	RA4-WC-58	RA4-WC-31	RA4-WC-45	RA1-WC-27	RA1-WC-28	RA4-WC-15	RA4-WC-22	RA4-WC-34
							Sample ID	RA1- WC 26_20201020	RA1-4 WC 37_20201014	RA1-4 WC33_20201019	RA1-4 WC35_20201014	RA1-WC 57_20201020	RA1-WC-14_20201019	RA1-WC-66_20201020	RA-4B WC01_20201015	RA4-WC 18_20201015	RA4-WC 42_20201019	RA4-WC 58_20201019	RA4-WC-31_20201018	RA4-WC-45_20201018	RA1-WC-27_20201024	RA1-WC-28_20201024	RA4-WC-15_20201025	RA4-WC-22_20201025	RA4-WC-34_20201026
							Date	2020-10-20	2020-10-14	2020-10-19	2020-10-14	2020-10-20	2020-10-19	2020-10-20	2020-10-15	2020-10-15	2020-10-19	2020-10-19	2020-10-18	2020-10-18	2020-10-24	2020-10-24	2020-10-25	2020-10-25	2020-10-26
							Lab sample ID	NZC324	NZC318	NZC320	NZC323	NZC317	NZC326	NZC315	NZC316	NZC319	NZC322	NZC321	NZC325	NZC314	NZX655	NZX656	NZX659	NZX654	NZX660
							Sample type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Aluminum	µg/L	2900	--	na	--	250	140	9.9	62	46	41	19	29	39	33	83	47	140	77	120	140	33	26	25
Antimony	µg/L	6	6	na	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Arsenic	µg/L	10	10	na	--	2.7	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	µg/L	2000	1000	na	--	9.9	2.5	4.9	2.8	< 2	2.5	3.7	2.4	6.6	4.1	2.6	2.2	2.9	2.9	6.7	3.1	6.5	3.2	6.2
Beryllium	µg/L	--	--	4	--	ND	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bismuth	µg/L	--	--	na	--	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	µg/L	5000	5000	na	--	29	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	µg/L	7	5	na	--	0.32	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium	µg/L	--	--	na	--	48000	11000	43000	3700	5300	8400	14000	4900	18000	15000	8500	5700	7100	6900	17000	9000	21000	16000	18000
Chromium	µg/L	50	50	25	--	ND	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (Hexavalent)	µg/L	--	--	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	--	--	3	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	µg/L	2000	--	na	--	2.4	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Iron	µg/L	--	--	na	100	1200	220	160	180	260	210	< 100	170	100	100	230	170	280	250	220	360	< 100	110	< 100
Lead	µg/L	5	10	na	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Lead-210	Bq/L	2	0.1	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	µg/L	--	--	na	--	ND	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Magnesium	µg/L	--	--	na	--	8200	2200	7100	560	910	1500	2900	810	3800	2600	1500	1100	1300	1100	3400	1700	4200	3200	3600
Manganese	µg/L	--	--	na	120	270	4.1	21	5.3	14	9.7	18	4.4	12	4.5	5	2.6	8.9	6.2	19	2.5	11	7.8	8.5
Mercury	µg/L	1	1	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Mercury (total)	ng/L	--	--	0.3	--	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	µg/L	--	--	70	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	µg/L	--	--	100	--	1.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Polonium-210	Bq/L	--	0.2	na	--	0.071	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	µg/L	--	--	na	--	470	< 200	310	< 200	< 200	< 200	350	< 200	410	220	< 200	< 200	< 200	< 200	420	< 200	450	210	400
Radium-226	Bq/L	5	0.6	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	µg/L	50	50	na	--	ND	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silicon	µg/L	--	--	na	--	3700	1700	2300	430	1000	1400	2200	1100	1900	1400	1300	1200	1300	700	1700	1800	2100	1700	1600
Silver	µg/L	--	--	na	--	ND	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Sodium	µg/L	--	--	na	200,000	970	680	970	320	400	480	580	340	580	390	480	490	420	410	570	550	660	470	610
Strontium	µg/L	7000	--	na	--	44	11	35	8	8.4	12	16	8.2	16	12	12	10	9.7	8.8	16	12	18	12	17
Tellurium	µg/L	--	--	na	--	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	µg/L	--	--	2	--	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thorium-230	Bq/L	--	0.4	na	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	µg/L	--	--	na	--	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Titanium	µg/L	--	--	na	--	12	6.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5.9	< 5	8.9	6.9	5.9	< 5	< 5
Tungsten	µg/L	--	--	na	--	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Uranium	µg/L	20	20	na	--	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vanadium	µg/L	--	--	6.2	--	0.72	0.52	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.62	0.5	< 0.5	< 0.5	< 0.5
Zinc	µg/L	--	--	5000	5000	5.4	< 5	< 5	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Zirconium	µg/L	--	--	na	--	ND	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
ng/L: nanograms per Litre
µg/L: micrograms per Litre
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 9: Summary of Surface Water Analytical Results of Metals Parameters

				RA4-WC-55	MFFN-01	MFFN-02	RA1-4-WC-33	RA1-4-WC-37	RA4-WC-41	RA4-WC-45	RA4-WC-55	RA1-WC-09	RA1-WC-14	RA1-WC-16	RA1-WC-28	RA1-WC-32	RA4-WC-00	RA4-WC-02	RA4-WC-05	RA4-WC-21	RA4-WC-22	RA4-WC-24	RA1-4-WC-19	RA1-4-WC-21	RA1-4-WC-35
				RA4-WC-55_20201022	MFFN-01_WS-20220624	MFFN-02_WS-20220624	RA1-4-WC-33_WS-20220624	RA1-4-WC-37_WS-20220626	RA4-WC-41_WS-20220625	RA4-WC-45_WS-20220627	RA4-WC-55_WS-20220627	RA1-WC-09_WS-20220623	RA1-WC-14_WS-20220623	RA1-WC-16_WS-20220622	RA1-WC-28_WS-20220624	RA1-WC-32_WS-20220625	RA4-WC-00_WS-20220624	RA4-WC-02_WS-20220611	RA4-WC-05_WS-20220626	RA4-WC-21_WS-20220627	RA4-WC-22_WS-20220622	RA4-WC-24_WS-20220627	RA1-4-WC-19_WS-20220628	RA1-4-WC-21_WS-20220701	RA1-4-WC-35_WS-20220628
				2020-10-22	2022-06-24	2022-06-24	2022-06-24	2022-06-26	2022-06-25	2022-06-27	2022-06-27	2022-06-23	2022-06-23	2022-06-22	2022-06-24	2022-06-25	2022-06-24	2022-06-11	2022-06-26	2022-06-27	2022-06-22	2022-06-27	2022-06-28	2022-07-01	2022-06-28
				NZX657	TAY911	TAY912	TAY915	TAY916	TAY913	TAY917	TAY914	TBB290	TBB289	TBB293	TBB291	TBB286	TBB288	TBB305	TBB285	TBB284	TBB292	TBB287	TBQ490	TBQ494	TBQ489
				N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guid CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	µg/L	2900	--	52	51	110	58	10	250	62	82	15	29	51	150	79	50	59	49	51	46	11	49	70	63
Antimony	µg/L	6	6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Arsenic	µg/L	10	10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	µg/L	2000	1000	3.1	6.4	4.4	2.7	9.9	5.6	3.2	3.7	3.3	4.4	4.2	3.8	4	4.3	5.4	4.4	4.6	4.9	4.6	4.2	3.2	2.1
Beryllium	µg/L	--	--	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bismuth	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	µg/L	5000	5000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	µg/L	7	5	< 0.09	0.32	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium	µg/L	--	--	11000	12000	8700	2700	37000	9400	5500	8900	11000	10000	9500	7600	6200	12000	11000	9300	11000	14000	8200	7900	4700	5100
Chromium	µg/L	50	50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (Hexavalent)	µg/L	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	µg/L	2000	--	< 0.9	< 0.9	1.7	< 0.9	< 0.9	< 0.9	< 0.9	2.4	< 0.9	0.98	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Iron	µg/L	--	--	200	130	300	160	240	570	260	250	< 100	120	150	310	310	110	120	180	170	140	130	210	210	210
Lead	µg/L	5	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Lead-210	Bq/L	2	0.1	-	**< 1**	**< 1**	-	-	**< 1**	-	**< 1**	-	-	-	-	-	-	**< 1**	-	-	-	-	-	-	-
Lithium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Magnesium	µg/L	--	--	2000	2400	1600	370	6200	1700	850	1500	2600	2200	2000	1400	970	2400	2600	2000	2200	2600	1600	1200	920	840
Manganese	µg/L	--	--	11	14	42	4.4	65	92	12	31	< 2	14	6.6	4.8	19	7.8	20	18	10	16	5.4	5.7	14	17
Mercury	µg/L	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Mercury (total)	ng/L	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Polonium-210	Bq/L	--	0.2	-	< 0.01	< 0.01	-	-	< 0.01	-	0.011	-	-	-	-	-	-	0.026	-	-	-	-	-	-	-
Potassium	µg/L	--	--	< 200	470	< 200	< 200	< 200	< 200	< 200	< 200	< 200	290	< 200	< 200	< 200	< 200	390	< 200	< 200	< 200	< 200	< 200	< 200	< 200
Radium-226	Bq/L	5	0.6	-	**< 1**	**< 1**	-	-	**< 1**	-	**< 1**	-	-	-	-	-	-	**< 1**	-	-	-	-	-	-	-
Selenium	µg/L	50	50	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silicon	µg/L	--	--	1300	1100	1000	180	1300	970	490	680	1500	960	860	480	550	1100	860	710	1000	1100	260	510	720	470
Silver	µg/L	--	--	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Sodium	µg/L	--	--	440	530	390	240	820	380	290	350	520	420	420	490	330	470	490	380	450	370	330	430	430	370
Strontium	µg/L	7000	--	12	12	9.9	6	34	11	7.8	11	12	13	12	12	10	11	11	9.5	12	13	11	14	10	8.2
Tellurium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	µg/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thorium-230	Bq/L	--	0.4	-	**< 5**	**< 5**	-	-	**< 5**	-	**< 5**	-	-	-	-	-	-	**< 5**	-	-	-	-	-	-	-
Tin	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Titanium	µg/L	--	--	< 5	< 5	6	< 5	< 5	12	< 5	< 5	< 5	< 5	< 5	5.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Tungsten	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Uranium	µg/L	20	20	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vanadium	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.51	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Zirconium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Accepta
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
ng/L: nanograms per Litre
µg/L: micrograms per Litre
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 9: Summary of Surface Water Analytical Results of Metals Parameters

				RA1-4-WC-36	RA1-WC-11	RA1-WC-66	RA1-WC-67	RA4-WC-17	RA1-4-WC-01	RA1-4-WC-07	RA1-WC-02	RA1-WC-23	RA4-WC-26	RA4-WC-27	RA4-WC-34	RA4-WC-37	MFFN-01	MFFN-02	RA1-WC-02	RA1-WC-09	RA1-WC-67	RA4-WC-21	RA4-WC-55	RA4-WC-57	RA1-4-WC-10
				RA1-4-WC-36_WS-20220628	RA1-WC-11_WS-20220629	RA1-WC-66_WS-20220630	RA1-WC-67_WS-20220630	RA4-WC-17_WS-20220628	RA1-4-WC-01_WS-20210911	RA1-4-WC-07_WS-20210911	RA1-WC-02_WS-20210914	RA1-WC-23_WS-20210915	RA4-WC-26_WS-20210913	RA4-WC-27_WS-20210915	RA4-WC-34_WS-20210915	RA4-WC-37_WS-20210912	MFFN-01_WS-20210918	MFFN-02_WS-20210918	RA1-WC-02_WS-20210917	RA1-WC-09_WS-20210917	RA1-WC-67_WS-20210918	RA4-WC-21_WS-20210918	RA4-WC-55_WS-20210916	RA4-WC-57_WS-20210916	RA1-4-WC-10_WS-20220818
				2022-06-28	2022-06-29	2022-06-30	2022-06-30	2022-06-28	2021-09-11	2021-09-11	2021-09-14	2021-09-15	2021-09-13	2021-09-15	2021-09-15	2021-09-12	2021-09-18	2021-09-18	2021-09-17	2021-09-17	2021-09-18	2021-09-18	2021-09-16	2021-09-16	2022-08-18
				TBQ488	TBQ491	TBQ492	TBQ493	TBQ487	QRU493	QRU494	QRU497	QRU498	QRU496	QRU499	QRU500	QRU495	QSK284	QSK286	QSK285	QSK288	QSK282	QSK283	QSK287	QSK281	TMU401
				N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guid CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	µg/L	2900	--	160	51	39	91	45	59	97	110	61	20	72	44	130	120	100	38	15	62	43	75	62	65
Antimony	µg/L	6	6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Arsenic	µg/L	10	10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.4	1.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.3
Barium	µg/L	2000	1000	3	5.4	3.8	3.1	4.2	3.6	5.5	5.1	5.2	3.5	5.1	7.3	6.2	5	6.1	5.6	3.4	3.7	5.1	4.2	3.5	5.5
Beryllium	µg/L	--	--	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bismuth	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	µg/L	5000	5000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	µg/L	7	5	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium	µg/L	--	--	7000	10000	5600	6500	11000	11000	11000	15000	14000	17000	15000	17000	8600	12000	16000	16000	14000	7900	15000	13000	7600	10000
Chromium	µg/L	50	50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (Hexavalent)	µg/L	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	µg/L	2000	--	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Iron	µg/L	--	--	390	130	150	280	110	300	450	270	320	110	370	< 100	900	610	310	130	< 100	410	170	310	260	530
Lead	µg/L	5	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Lead-210	Bq/L	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 1**	**< 1**	-	-	-	-	-	-	-
Lithium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Magnesium	µg/L	--	--	1300	2100	870	1000	2300	2200	2100	3200	2900	3300	3000	3600	1300	2100	3200	3500	3100	1300	3100	2300	1400	1700
Manganese	µg/L	--	--	34	22	12	35	5.2	7.3	24	18	12	13	18	14	49	21	17	10	4.1	44	5.9	35	14	56
Mercury	µg/L	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Mercury (total)	ng/L	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.05
Molybdenum	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Polonium-210	Bq/L	--	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01	< 0.01	-	-	-	-	-	-	-
Potassium	µg/L	--	--	< 200	410	< 200	< 200	< 200	240	< 200	240	250	< 200	260	470	< 200	< 200	340	350	250	< 200	< 200	< 200	< 200	< 200
Radium-226	Bq/L	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 1**	**< 1**	-	-	-	-	-	-	-
Selenium	µg/L	50	50	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silicon	µg/L	--	--	930	1600	610	640	600	1800	2100	2200	2100	1900	2200	1700	2400	1700	1700	2000	1500	1500	1800	1700	1600	1500
Silver	µg/L	--	--	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Sodium	µg/L	--	--	460	530	320	360	360	610	640	570	660	520	690	590	510	740	590	560	760	540	580	530	520	450
Strontium	µg/L	7000	--	12	11	10	11	11	10	16	17	18	20	19	18	15	24	18	15	15	12	17	16	14	20
Tellurium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	µg/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thorium-230	Bq/L	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 5**	**< 5**	-	-	-	-	-	-	-
Tin	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Titanium	µg/L	--	--	7.6	< 5	< 5	< 5	< 5	< 5	< 5	7.1	< 5	< 5	< 5	< 5	< 5	7.7	6.3	< 5	< 5	< 5	< 5	5.6	< 5	< 5
Tungsten	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Uranium	µg/L	20	20	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vanadium	µg/L	--	--	0.54	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.52	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Zirconium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Accept
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
ng/L: nanograms per Litre
µg/L: micrograms per Litre
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 9: Summary of Surface Water Analytical Results of Metals Parameters

				RA1-4-WC-19	RA1-4-WC-21	RA1-4-WC-37	RA1-WC-09	RA1-4-WC-33	RA1-4-WC-35	RA1-WC-01	RA1-WC-11	RA1-WC-14	RA1-WC-16	RA1-WC-17	RA1-WC-22	RA1-WC-28	RA1-WC-30	RA1-WC-32	RA4-WC-19	MFFN-01	MFFN-02	RA1-4-WC-36	RA1-WC-41	RA4B-WC-02	RA4-WC-00
				RA1-4-WC-19_WS-20220818	RA1-4-WC-21_WS-20220816	RA1-4-WC-37_WS-20220816	RA1-WC-09_WS-20220817	RA1-4-WC-33_WS-20220819	RA1-4-WC-35_WS-20220819	RA1-WC-01_WS-20220820	RA1-WC-11_WS-20220821	RA1-WC-14_WS-20220822	RA1-WC-16_WS-20220819	RA1-WC-17_WS-20220820	RA1-WC-22_WS-20220820	RA1-WC-28_WS-20220821	RA1-WC-30_WS-20220822	RA1-WC-32_WS-20220821	RA4-WC-19_WS-20220822	MFFN-01_WS-20220825	MFFN-02_WS-20220825	RA1-4-WC-36_WS-20220825	RA1-WC-41_WS-20220823	RA4B-WC-02_WS-20220823	RA4-WC-00_WS-20220825
				2022-08-18	2022-08-16	2022-08-16	2022-08-17	2022-08-19	2022-08-19	2022-08-20	2022-08-21	2022-08-22	2022-08-19	2022-08-20	2022-08-20	2022-08-21	2022-08-22	2022-08-21	2022-08-22	2022-08-25	2022-08-25	2022-08-25	2022-08-23	2022-08-23	2022-08-25
				TMU402	TMU398	TMU399	TMU400	TNY412	TNY413	TNY411	TNY428	TNY426	TNY431	TNY430	TNY429	TNY410	TNY408	TNY409	TNY427	TON915	TON916	TON917	TON918	TON922	TON919
				N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guid CDWQ MAC	OREG 169/03 DWQ																						
Aluminum	µg/L	2900	--	60	58	12	13	72	99	52	29	18	38	51	36	180	56	81	42	47	35	150	33	44	36
Antimony	µg/L	6	6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Arsenic	µg/L	10	10	1.5	< 1	< 1	< 1	< 1	1.1	< 1	< 1	< 1	< 1	< 1	< 1	1.3	< 1	1	< 1	1	< 1	1.2	< 1	< 1	< 1
Barium	µg/L	2000	1000	5.8	3.4	8.3	3.3	3.4	4	5.1	5.6	6.2	5	6.3	5.5	4.9	3.8	4.7	5.1	5.2	4.4	3.7	3.1	2.2	5.8
Beryllium	µg/L	--	--	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bismuth	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	µg/L	5000	5000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	29	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	µg/L	7	5	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium	µg/L	--	--	11000	5500	48000	13000	3700	8000	13000	14000	14000	13000	19000	20000	11000	6700	8000	9300	13000	14000	8800	7300	7100	18000
Chromium	µg/L	50	50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (Hexavalent)	µg/L	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	µg/L	2000	--	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Iron	µg/L	--	--	580	190	510	< 100	200	630	290	120	200	180	290	230	580	290	520	320	470	130	820	150	170	220
Lead	µg/L	5	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Lead-210	Bq/L	2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 1**	**< 1**	-	-	-	-
Lithium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Magnesium	µg/L	--	--	1700	1100	8200	2900	490	1200	2700	2700	3000	2500	3400	3700	1800	1100	1200	1800	2400	2800	1500	1400	1300	3800
Manganese	µg/L	--	--	30	13	100	5	17	170	59	20	42	15	15	36	12	17	36	68	20	9.2	49	6.9	7.8	32
Mercury	µg/L	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Mercury (total)	ng/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.08	0.07	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Polonium-210	Bq/L	--	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01	< 0.01	-	-	-	-
Potassium	µg/L	--	--	< 200	< 200	< 200	< 200	< 200	< 200	250	370	< 200	< 200	< 200	230	< 200	< 200	< 200	< 200	280	310	< 200	< 200	< 200	< 200
Radium-226	Bq/L	5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 1**	**< 1**	-	-	-	-
Selenium	µg/L	50	50	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Silicon	µg/L	--	--	1400	910	3700	1900	500	1200	1300	1200	1900	2000	2000	1900	2300	900	1100	1100	1300	1000	1500	1100	1300	3500
Silver	µg/L	--	--	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Sodium	µg/L	--	--	450	500	830	560	390	540	580	590	570	470	670	620	610	420	390	390	580	520	440	460	270	650
Strontium	µg/L	7000	--	22	12	44	16	8.3	12	16	14	21	17	19	22	17	11	13	11	20	15	17	13	7.2	19
Tellurium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	µg/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thorium-230	Bq/L	--	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**< 5**	**< 5**	-	-	-	-
Tin	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Titanium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5.1	< 5	< 5	< 5	< 5	< 5	9.3	< 5	< 5	< 5
Tungsten	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Uranium	µg/L	20	20	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vanadium	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.72	< 0.5	< 0.5	< 0.5
Zinc	µg/L	--	--	5.4	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Zirconium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Accept
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
ng/L: nanograms per Litre
µg/L: micrograms per Litre
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 9: Summary of Surface Water Analytical Results of Metals Parameters

				RA4-WC-21	RA4-WC-22	RA1-WC-51	RA4-WC-45	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
				RA4-WC-21_WS-20220824	RA4-WC-22_WS-20220824	RA1-WC-51_WS-20220826	RA4-WC-45_WS-20220826	AR001 UP-20250528	AR002 DOWN-20250528	BCR003 UP-20250528	BCR004 DOWN-20250528
				2022-08-24	2022-08-24	2022-08-26	2022-08-26	2025-05-28	2025-05-28	2025-05-28	2025-05-28
				TON921	TON920	TOZ813	TOZ814	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
				N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guid CDWQ MAC	OREG 169/03 DWQ								
Aluminum	µg/L	2900	--	34	39	40	59	46	41	64	62
Antimony	µg/L	6	6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	µg/L	10	10	< 1	< 1	< 1	2.7	< 1.0	< 1.0	< 1.0	< 1.0
Barium	µg/L	2000	1000	6.5	4.9	3.1	5.9	5.4	5.4	5.3	5.5
Beryllium	µg/L	--	--	< 0.4	< 0.4	< 0.4	< 0.4	< 0.40	< 0.40	< 0.40	< 0.40
Bismuth	µg/L	--	--	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0
Boron	µg/L	5000	5000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	µg/L	7	5	< 0.09	< 0.09	< 0.09	< 0.09	< 0.090	< 0.090	< 0.090	< 0.090
Calcium	µg/L	--	--	14000	19000	12000	7900	14000	15000	14000	15000
Chromium	µg/L	50	50	< 5	< 5	< 5	< 5	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (Hexavalent)	µg/L	--	--	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Copper	µg/L	2000	--	< 0.9	< 0.9	< 0.9	< 0.9	< 0.90	< 0.90	< 0.90	< 0.90
Iron	µg/L	--	--	260	330	300	1200	160	140	210	270
Lead	µg/L	5	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Lead-210	Bq/L	2	0.1	-	-	**< 1**	-	**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**
Lithium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5.0	< 5.0	< 5.0	< 5.0
Magnesium	µg/L	--	--	2800	3500	2100	1100	2700	2700	2600	2800
Manganese	µg/L	--	--	10	25	38	270	18	14	19	29
Mercury	µg/L	1	1	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Methyl Mercury (total)	ng/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	-	-	0.08	< 0.050
Molybdenum	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	µg/L	--	--	< 1	1.3	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0
Polonium-210	Bq/L	--	0.2	-	-	0.071	-	< 0.010	< 0.010	< 0.010	< 0.010
Potassium	µg/L	--	--	< 200	< 200	< 200	< 200	300	340	270	340
Radium-226	Bq/L	5	0.6	-	-	**< 1**	-	**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**
Selenium	µg/L	50	50	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 2.0	< 2.0
Silicon	µg/L	--	--	2100	1900	1200	1100	1100	1200	1100	1200
Silver	µg/L	--	--	< 0.09	< 0.09	< 0.09	< 0.09	< 0.090	< 0.090	< 0.090	< 0.090
Sodium	µg/L	--	--	490	470	360	380	570	560	570	580
Strontium	µg/L	7000	--	16	19	14	13	16	15	16	16
Tellurium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	µg/L	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-230	Bq/L	--	0.4	-	-	< 5	-	**< 5.0**	**< 5.0**	**< 5.0**	**< 5.0**
Tin	µg/L	--	--	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	µg/L	--	--	< 5	< 5	< 5	< 5	< 5.0	< 5.0	< 5.0	< 5.0
Tungsten	µg/L	--	--	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0
Uranium	µg/L	20	20	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Vanadium	µg/L	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Zinc	µg/L	--	--	< 5	< 5	< 5	< 5	< 5.0	< 5.0	< 5.0	< 5.0
Zirconium	µg/L	--	--	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Accepta
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
ng/L: nanograms per Litre
µg/L: micrograms per Litre
mg/L: milligrams per litre
Bq/L: becquerels per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 10: Summary of Surface Water Analytical Results of Volatile Organic Compounds Parameters

Parameter	Units	Human Health Based Guidelines/Standards: CDWQ MAC	Human Health Based Guidelines/Standards: OREG 169/03 DWQ	Human Health Based Guidelines/Standards: Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [a]	Max Concentration	MFFN-01	MFFN-02	RA4-WC-41	RA4-WC-55	RA4-WC-02	MFFN-01	MFFN-02	MFFN-01	MFFN-02	RA1-WC-51	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
Location						MFFN-01	MFFN-02	RA4-WC-41	RA4-WC-55	RA4-WC-02	MFFN-01	MFFN-02	MFFN-01	MFFN-02	RA1-WC-51	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
Sample ID						MFFN-01_WS-20220624	MFFN-02_WS-20220624	RA4-WC-41_WS-20220625	RA4-WC-55_WS-20220627	RA4-WC-02_WS-20220611	MFFN-01_WS-20210918	MFFN-02_WS-20210918	MFFN-01_WS-20220825	MFFN-02_WS-20220825	RA1-WC-51_WS-20220826	AR001 UP-20250528	AR002 DOWN-20250528	BCR003 UP-20250528	BCR004 DOWN-20250528
Date						2022-06-24	2022-06-24	2022-06-25	2022-06-27	2022-06-11	2021-09-18	2021-09-18	2022-08-25	2022-08-25	2022-08-26	2025-05-28	2025-05-28	2025-05-28	2025-05-28
Lab sample ID						TAY911	TAY912	TAY913	TAY914	TBB305	QSK284	QSK286	TON915	TON916	TOZ813	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
Sample type						N	N	N	N	N	N	N	N	N	N	N	N	N	N
2-Fluorobiphenyl	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	µg/L	--	--	2700	ND	< 10	< 10	< 10	< 10	< 10	< 50	< 100	< 10	< 10	< 10	-	-	-	-
Alachlor	µg/L	--	5	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Atrazine	µg/L	5	5	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Atrazine Desethyl	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Biphenyl, 1,1'-	µg/L	--	--	--	ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	< 0.050	< 0.050	< 0.050
Bromodichloromethane	µg/L	--	--	16	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.5	< 0.5	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Bromoform	µg/L	--	--	25	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 1	< 1	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20
Bromomethane	µg/L	--	--	0.89	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.5	< 5	< 0.5	< 0.5	< 0.5	-	-	-	-
Chlorobenzene	µg/L	80	--	na	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Chlorpyrifos	µg/L	90	90	na	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Cyanazine	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Diazinon	µg/L	--	20	na	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane [DBCM]	µg/L	--	--	25	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.5	< 0.5	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20
Dibromoethane, 1,2- (ethylene dibromide)	µg/L	--	--	0.05	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.19	< 0.19	< 0.2	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	200	200	na	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20
Dichlorobenzene,1,3-	µg/L	--	--	3	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	-	-	-	-
Dichlorobenzene,1,4-	µg/L	5	5	na	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20
Dichlorodifluoromethane	µg/L	--	--	590	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.5	< 5	< 1	< 1	< 0.5	-	-	-	-
Dichloroethane, 1,1-	µg/L	--	--	5	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	-	-	-	-
Dichloroethane, 1,2-	µg/L	5	5	na	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.49	< 0.49	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20
Dichloroethene, 1,1-	µg/L	14	14	na	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Dichloroethene, 1,2- cis-	µg/L	--	--	20	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.5	< 0.5	< 0.1	-	-	-	-
Dichloroethene, 1,2- trans-	µg/L	--	--	20	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.5	< 0.5	< 0.1	-	-	-	-
Dichloromethane (Methylene chloride)	µg/L	50	50	na	0.99	< 0.5	0.99	< 0.5	< 0.5	< 0.5	< 2.5	< 5	< 2	< 2	< 0.5	< 0.50	< 0.50	< 0.50	< 0.50
Dichloropropane, 1,2-	µg/L	--	--	5	ND	-	-	-	-	-	-	-	-	-	-	< 0.25	< 0.25	< 0.25	< 0.25
Dichloropropene, 1,3-	µg/L	--	--	0.5	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	-	-	-	-
Dichloropropene, 1,3- cis-	µg/L	--	--	--	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.3	< 0.3	< 0.2	-	-	-	-
Dichloropropene, 1,3- trans-	µg/L	--	--	--	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	-	-	-	-
Dimethoate	µg/L	20	20	na	ND	-	-	-	-	-	-	-	-	-	-	< 2.5	< 2.5	< 2.5	< 2.5
Dinoseb	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Dual (Metolachlor)	µg/L	--	50	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Ethyl methyl ketone [MEK]	µg/L	--	--	--	ND	< 5	< 5	< 5	< 5	< 5	< 25	< 50	< 10	< 10	< 5	-	-	-	-
Hexane	µg/L	--	--	--	ND	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.5	< 5	< 1	< 1	< 0.5	-	-	-	-
Malathion	µg/L	290	190	na	ND	-	-	-	-	-	-	-	-	-	-	< 5.0	< 5.0	< 5.0	< 5.0
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	µg/L	--	--	3000	ND	< 5	< 5	< 5	< 5	< 5	< 25	< 50	< 5	< 5	< 5	-	-	-	-
Methyl Parathion (Parathion-Methyl)	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Methyl tert-butyl ether [MTBE]	µg/L	15	--	na	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.5	< 0.5	< 0.2	-	-	-	-
Parathion	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Phorate	µg/L	--	2	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Simazine	µg/L	--	10	na	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/L	--	--	100	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	-	-	-	-
Terbufos	µg/L	--	1	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethane, 1,1,2,2-	µg/L	--	--	1	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	-	-	-	-
Tetrachloroethane,1,1,1,2-	µg/L	--	--	1.1	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.5	< 0.5	< 0.2	-	-	-	-
Tetrachloroethylene	µg/L	10	10	na	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Tetrachloromethane (Carbon Tetrachloride)	µg/L	2	2	na	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.19	< 0.19	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Tetrachlorophenol, 2,3,4,6-	µg/L	--	100	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Total Pentachlorophenol	µg/L	*30	60	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Triallate	µg/L	--	230	na	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Tribromophenol, 2,4,6-	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	--	--	200	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	--	--	5	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.4	< 0.4	< 0.2	-	-	-	-
Trichloroethylene	µg/L	5	5	na	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Trichlorofluoromethane	µg/L	--	--	150	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.5	< 0.5	< 0.2	-	-	-	-
Trichloromethane (Chloroform)	µg/L	--	--	--	ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 1	< 0.2	< 0.2	< 0.1	< 0.10	< 0.10	< 0.10	< 0.10
Trichlorophenol, 2,4,6-	µg/L	5	5	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorophenoxyacetic acid, 2,4,5-	µg/L	--	--	--	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Trifluralin	µg/L	--	45	na	ND	-	-	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Trihalomethanes	µg/L	--	100	na	ND	-	-	-	-	-	-	-	-	-	-	< 0.20	< 0.20	< 0.20	< 0.20
Vinyl chloride	µg/L	2	1	na	ND	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	< 0.20	< 0.20

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
mbgs: meters below ground surface
µg/L: micrograms per litre
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
ND: all measurements are non-detects
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							Location	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN	MFFN-01	MFFN-01	MFFN-01
							Sample ID	AR001 UP-20250528	AR002 DOWN-20250528	BCR003 UP-20250528	BCR004 DOWN-20250528	MFFN-01_WS-20210918	MFFN-01_WS-20220624	MFFN-01_WS-20220825
							Date	2025-05-28	2025-05-28	2025-05-28	2025-05-28	2021-09-18	2022-06-24	2022-08-25
							Lab sample ID	ARJX09	ARJX08	ARJW82	ARJW81	QSK284	TAY911	TON915
							Lab work order	C562632	C562632	C562627	C562627	C1R3438	C2I2256	C2O5949
							Sample type	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL	Max Concentration							
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	140	-	-	-	-	28	40	43
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	1	-	-	-	-	< 1	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	140	45	44	44	43	28	40	43
Ammonia-N	mg/L	--	--	na	--	0.05	0.2	-	-	-	-	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	2.7	< 1.0	< 1.0	< 1.0	< 1.0	2.2	< 1	1.3
Conductivity	umhos/cm	--	--	na	--	1	270	-	-	-	-	61	84	86
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	42	15	15	15	15	33	14	20
Fluoride	mg/L	1.5	1.5	na	--	0.1	ND	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	150	46	49	46	48	37	41	44
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	0.8	-	-	-	-	< 0.5	< 0.5	0.6
Nitrate (as N)	mg/L	10	10	na	--	0.1	0.1	-	-	-	-	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	1.4	-	-	-	-	< 0.5	< 0.5	1.4
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	0.049	-	-	-	-	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.9	7.66	7.72	7.59	7.7	7.28	7.48	7.69
Phosphorus	mg/L	--	--	na	--	0.004	0.078	0.007	< 0.004	0.012	0.008	0.012	0.016	0.016
Phosphorus (dissolved)	µg/L	--	--	na	--	100	ND	< 100	< 100	< 100	< 100	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	2.8	2.7	2.8	2.7	2.5	< 5	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.69	-	-	-	-	0.5	0.41	0.34
Total Organic Carbon	mg/L	--	--	na	--	0.4	45	-	-	-	-	29	13	18
Total Suspended Solids	mg/L	--	--	na	--	1	27	3	3	6	3	3	3	2
Turbidity	ntu	--	--	na	--	0.1	5.9	-	-	-	-	1.1	1.7	2.1

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							MFFN-02	MFFN-02	MFFN-02	RA1-4-WC-01	RA1-4-WC-07	RA1-4-WC-10	RA1-4-WC-19	RA1-4-WC-19
							MFFN-02_WS-20210918	MFFN-02_WS-20220624	MFFN-02_WS-20220825	RA1-4-WC-01_WS-20210911	RA1-4-WC-07_WS-20210911	RA1-4-WC-10_WS-20220818	RA1-4-WC-19_WS-20220628	RA1-4-WC-19_WS-20220818
							2021-09-18	2022-06-24	2022-08-25	2021-09-11	2021-09-11	2022-08-18	2022-06-28	2022-08-18
							QSK286	TAY912	TON916	QRU493	QRU494	TMU401	TBQ490	TMU402
							C1R3438	C2I2256	C2O5949	C1R0645	C1R0645	C2N7731	C2I5107	C2N7731
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	44	22	48	26	26	25	16	25
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	44	22	49	26	26	25	16	25
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	0.053	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.5	< 10	< 1	1.3	1.3	< 1	< 1	< 1
Conductivity	umhos/cm	--	--	na	--	1	85	45	97	57	58	52	39	54
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	28	26	18	33	36	26	21	26
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	52	26	50	37	39	32	24	32
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	1.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.1	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.61	6.98	7.9	6.82	6.92	7.09	6.98	7.21
Phosphorus	mg/L	--	--	na	--	0.004	0.013	0.012	0.012	0.009	0.011	0.007	0.006	0.006
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 5	< 10	< 1	< 5	< 5	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.48	0.4	0.39	0.63	0.61	0.38	0.32	0.34
Total Organic Carbon	mg/L	--	--	na	--	0.4	25	24	16	32	34	25	20	24
Total Suspended Solids	mg/L	--	--	na	--	1	9	1	1	< 1	1	< 1	1	2
Turbidity	ntu	--	--	na	--	0.1	1.6	1.1	0.9	0.5	0.7	0.9	0.5	0.8

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-4-WC-21	RA1-4-WC-21	RA1-4-WC-33	RA1-4-WC-33	RA1-4-WC-33	RA1-4-WC-35	RA1-4-WC-35	RA1-4-WC-35
							RA1-4-WC-21_WS-20220701	RA1-4-WC-21_WS-20220816	RA1-4 WC33_20201019	RA1-4-WC-33_WS-20220624	RA1-4-WC-33_WS-20220819	RA1-4 WC35_20201014	RA1-4-WC-35_WS-20220628	RA1-4-WC-35_WS-20220819
							2022-07-01	2022-08-16	2020-10-19	2022-06-24	2022-08-19	2020-10-14	2022-06-28	2022-08-19
							TBQ494	TMU398	NZC320	TAY915	TNY412	NZC323	TBQ489	TNY413
							C2I5107	C2N7731	C0S0909	C2I2256	C2O3135	C0S0909	C2I5107	C2O3135
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	9.6	9.7	-	5.1	4.4	-	7.8	13
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	-	< 1	< 1	-	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	9.6	9.7	4.2	5.1	4.4	7.8	7.8	13
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.16	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	< 1	< 1	1.6	1	< 1	1.3	< 1	1.3
Conductivity	umhos/cm	--	--	na	--	1	26	29	-	16	19	-	27	38
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	27	19	21	17	21	23	25	29
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	15	17	-	8.2	12	-	16	25
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	-	< 0.5	0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	-	< 0.5	0.9
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	6.77	6.78	-	6.72	6.35	-	6.45	6.66
Phosphorus	mg/L	--	--	na	--	0.004	0.031	0.004	0.011	0.014	0.017	0.005	0.006	0.011
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.25	0.38	0.27	0.3	0.39	0.32	0.36	0.52
Total Organic Carbon	mg/L	--	--	na	--	0.4	17	19	-	16	19	-	23	30
Total Suspended Solids	mg/L	--	--	na	--	1	9	4	< 10	< 1	2	< 10	17	1
Turbidity	ntu	--	--	na	--	0.1	5.9	1.2	-	0.9	1	-	2.8	0.8

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-4-WC-36	RA1-4-WC-36	RA1-4-WC-37	RA1-4-WC-37	RA1-4-WC-37	RA1-WC-01	RA1-WC-02	RA1-WC-02
							RA1-4-WC-36_WS-20220628	RA1-4-WC-36_WS-20220825	RA1-4 WC 37_20201014	RA1-4-WC-37_WS-20220626	RA1-4-WC-37_WS-20220816	RA1-WC-01_WS-20220820	RA1-WC-02_WS-20210914	RA1-WC-02_WS-20210917
							2022-06-28	2022-08-25	2020-10-14	2022-06-26	2022-08-16	2022-08-20	2021-09-14	2021-09-17
							TBQ488	TON917	NZC318	TAY916	TMU399	TNY411	QRU497	QSK285
							C2I5107	C2O5949	C0S0909	C2I2256	C2N7731	C2O3135	C1R0645	C1R3438
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	13	23	-	120	140	39	47	47
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	-	< 1	1	< 1	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	13	23	130	120	140	39	47	47
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.097	0.19	0.063	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	< 1	< 1	< 1	< 1	< 1	1.2	1.5	1.6
Conductivity	umhos/cm	--	--	na	--	1	36	50	-	230	270	77	94	92
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	27	29	9.3	13	14	21	21	23
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	23	28	-	120	150	46	56	52
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	0.8	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	0.011	0.014	0.049	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	6.86	7.1	-	7.9	7.88	7.33	7.56	7.54
Phosphorus	mg/L	--	--	na	--	0.004	0.014	0.022	0.033	0.068	0.078	0.011	0.016	0.009
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.33	0.47	0.24	0.35	0.33	0.43	0.69	0.54
Total Organic Carbon	mg/L	--	--	na	--	0.4	24	27	-	11	12	20	20	21
Total Suspended Solids	mg/L	--	--	na	--	1	2	3	< 10	20	3	2	5	2
Turbidity	ntu	--	--	na	--	0.1	1.2	3	-	1.1	2	0.8	2.8	0.7

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-WC-09	RA1-WC-09	RA1-WC-09	RA1-WC-11	RA1-WC-11	RA1-WC-14	RA1-WC-14	RA1-WC-14
							RA1-WC-09_WS-20210917	RA1-WC-09_WS-20220623	RA1-WC-09_WS-20220817	RA1-WC-11_WS-20220629	RA1-WC-11_WS-20220821	RA1-WC-14_20201019	RA1-WC-14_WS-20220623	RA1-WC-14_WS-20220822
							2021-09-17	2022-06-23	2022-08-17	2022-06-29	2022-08-21	2020-10-19	2022-06-23	2022-08-22
							QSK288	TBB290	TMU400	TBQ491	TNY428	NZC326	TBB289	TNY426
							C1R3438	C2I2702	C2N7731	C2I5107	C2O3135	C0S0909	C2I2702	C2O3135
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	38	34	39	31	41	-	31	40
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	< 1	< 1	< 1	-	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	39	34	39	31	41	42	31	40
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.7	< 1	< 1	< 1	< 1	1	< 1	< 1
Conductivity	umhos/cm	--	--	na	--	1	79	70	79	64	84	-	64	83
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	24	21	22	14	15	16	18	19
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	46	40	46	34	46	-	33	50
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	1.1
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.52	7.3	7.29	7.43	7.62	-	7.25	7.29
Phosphorus	mg/L	--	--	na	--	0.004	0.007	0.005	< 0.004	0.016	0.008	0.01	0.013	0.006
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.53	0.5	0.32	0.35	0.35	0.37	0.46	0.44
Total Organic Carbon	mg/L	--	--	na	--	0.4	22	20	21	14	13	-	17	19
Total Suspended Solids	mg/L	--	--	na	--	1	2	2	< 1	3	1	< 10	3	1
Turbidity	ntu	--	--	na	--	0.1	< 0.1	< 0.1	0.2	2.4	0.8	-	1.1	0.6

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-WC-16	RA1-WC-16	RA1-WC-17	RA1-WC-22	RA1-WC-23	RA1-WC-26	RA1-WC-27	RA1-WC-28
							RA1-WC-16_WS-20220622	RA1-WC-16_WS-20220819	RA1-WC-17_WS-20220820	RA1-WC-22_WS-20220820	RA1-WC-23_WS-20210915	RA1- WC 26_20201020	RA1-WC-27_20201024	RA1-WC-28_20201024
							2022-06-22	2022-08-19	2022-08-20	2022-08-20	2021-09-15	2020-10-20	2020-10-24	2020-10-24
							TBB293	TNY431	TNY430	TNY429	QRU498	NZC324	NZX655	NZX656
							C2I2702	C2O3135	C2O3135	C2O3135	C1R0645	C0S0909	C0S4568	C0S4568
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	26	33	51	58	40	-	-	-
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	< 1	< 1	< 1	-	-	-
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	26	33	52	58	40	15	54	13
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1	0.13
Chloride ion (dissolved)	mg/L	--	--	250	250	1	< 1	1.2	1.4	1.5	1.5	1.8	2	2.6
Conductivity	umhos/cm	--	--	na	--	1	54	68	100	120	82	-	-	-
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	23	25	21	21	30	42	11	38
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-
Hardness (as CaCO3)	mg/L	--	--	na	--	1	30	45	61	69	51	-	-	-
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.12	7.12	7.54	7.45	7.22	-	-	-
Phosphorus	mg/L	--	--	na	--	0.004	0.009	< 0.004	0.01	0.012	0.011	0.008	0.017	0.007
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.43	0.48	0.37	0.47	0.64	0.65	0.34	0.54
Total Organic Carbon	mg/L	--	--	na	--	0.4	22	26	20	20	29	-	-	-
Total Suspended Solids	mg/L	--	--	na	--	1	< 1	< 1	< 1	1	27	< 10	< 10	< 10
Turbidity	ntu	--	--	na	--	0.1	0.3	0.4	1.2	0.8	0.8	-	-	-

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-WC-28	RA1-WC-28	RA1-WC-30	RA1-WC-32	RA1-WC-32	RA1-WC-41	RA1-WC-51	RA1-WC-57
							RA1-WC-28_WS-20220624	RA1-WC-28_WS-20220821	RA1-WC-30_WS-20220822	RA1-WC-32_WS-20220625	RA1-WC-32_WS-20220821	RA1-WC-41_WS-20220823	RA1-WC-51_WS-20220826	RA1-WC 57_20201020
							2022-06-24	2022-08-21	2022-08-22	2022-06-25	2022-08-21	2022-08-23	2022-08-26	2020-10-20
							TBB291	TNY410	TNY408	TBB286	TNY409	TON918	TOZ813	NZC317
							C2I2702	C2O3135	C2O3135	C2I2702	C2O3135	C2O5949	C2O7933	C0S0909
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	13	21	13	10	14	20	36	-
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	-
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	13	21	13	10	14	20	36	21
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	0.2	0.16	< 0.05	0.15	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.1	1.9	1.4	1.1	< 1	< 1	< 1	1.9
Conductivity	umhos/cm	--	--	na	--	1	38	49	35	32	38	45	72	-
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	30	42	30	24	30	21	21	20
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-
Hardness (as CaCO3)	mg/L	--	--	na	--	1	24	36	22	19	26	25	37	-
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	-	< 0.5	1.1	< 0.5	0.8	0.8	< 0.5	-
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	6.79	6.88	6.78	6.68	6.8	7.06	7.53	-
Phosphorus	mg/L	--	--	na	--	0.004	0.009	0.006	0.005	0.009	0.005	0.013	0.012	0.005
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.44	0.59	0.4	0.34	0.41	0.41	0.4	0.29
Total Organic Carbon	mg/L	--	--	na	--	0.4	30	45	26	23	29	19	19	-
Total Suspended Solids	mg/L	--	--	na	--	1	3	< 1	1	1	1	1	3	< 10
Turbidity	ntu	--	--	na	--	0.1	0.6	0.7	0.4	0.6	0.8	0.7	0.9	-

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA1-WC-66	RA1-WC-66	RA1-WC-67	RA1-WC-67	RA4B-WC-01	RA4B-WC-02	RA4-WC-00	RA4-WC-00
							RA1-WC-66_20201020	RA1-WC-66_WS-20220630	RA1-WC-67_WS-20210918	RA1-WC-67_WS-20220630	RA-4B WC01_20201015	RA4B-WC-02_WS-20220823	RA4-WC-00_WS-20220624	RA4-WC-00_WS-20220825
							2020-10-20	2022-06-30	2021-09-18	2022-06-30	2020-10-15	2022-08-23	2022-06-24	2022-08-25
							NZC315	TBQ492	QSK282	TBQ493	NZC316	TON922	TBB288	TON919
							C0S0909	C2I5107	C1R3438	C2I5107	C0S0909	C2O5949	C2I2702	C2O5949
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	-	12	17	12	-	15	30	50
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	-	< 1	< 1	< 1	-	< 1	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	9.3	12	17	12	56	15	30	50
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.6	< 1	1.4	< 1	1.2	< 1	< 1	1.5
Conductivity	umhos/cm	--	--	na	--	1	-	30	47	34	-	41	63	110
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	15	18	25	23	13	27	28	29
Fluoride	mg/L	1.5	1.5	na	--	0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	-	17	25	21	-	24	37	58
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-	0.9	< 0.5	< 0.5
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	-	6.65	7.11	6.85	-	6.95	7.07	7.39
Phosphorus	mg/L	--	--	na	--	0.004	0.005	0.008	0.008	0.008	0.013	0.007	0.008	0.008
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.26	0.32	0.41	0.37	0.25	0.51	0.56	0.56
Total Organic Carbon	mg/L	--	--	na	--	0.4	-	16	23	21	-	27	27	27
Total Suspended Solids	mg/L	--	--	na	--	1	< 10	< 1	1	3	< 10	1	< 1	< 1
Turbidity	ntu	--	--	na	--	0.1	-	< 0.1	0.6	1.3	-	0.4	< 0.1	0.4

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA4-WC-02	RA4-WC-05	RA4-WC-15	RA4-WC-17	RA4-WC-18	RA4-WC-19	RA4-WC-21	RA4-WC-21
							RA4-WC-02_WS-20220611	RA4-WC-05_WS-20220626	RA4-WC-15_20201025	RA4-WC-17_WS-20220628	RA4-WC 18_20201015	RA4-WC-19_WS-20220822	RA4-WC-21_WS-20210918	RA4-WC-21_WS-20220627
							2022-06-11	2022-06-26	2020-10-25	2022-06-28	2020-10-15	2022-08-22	2021-09-18	2022-06-27
							TBB305	TBB285	NZX659	TBQ487	NZC319	TNY427	QSK283	TBB284
							C2I2702	C2I2702	C0S4568	C2I5107	C0S0909	C2O3135	C1R3438	C2I2702
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	36	26	-	30	-	25	40	30
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	< 1	-	< 1	-	< 1	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	36	26	60	30	41	25	40	30
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	< 1	1.2	1.8	< 1	1.4	1.3	< 1	< 1
Conductivity	umhos/cm	--	--	na	--	1	72	55	-	61	-	52	81	61
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	18	23	14	24	19	21	26	22
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	38	30	-	38	-	32	48	35
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	< 0.5	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.44	7.21	-	7.24	-	7.05	7.34	7.07
Phosphorus	mg/L	--	--	na	--	0.004	0.014	0.009	0.007	0.007	0.009	0.008	0.008	0.018
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.52	0.44	0.34	0.48	0.38	0.42	0.45	0.44
Total Organic Carbon	mg/L	--	--	na	--	0.4	17	21	-	24	-	21	24	21
Total Suspended Solids	mg/L	--	--	na	--	1	4	2	< 10	< 1	< 10	1	2	2
Turbidity	ntu	--	--	na	--	0.1	1.6	1.1	-	< 0.1	-	0.7	0.1	1.3

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA4-WC-21	RA4-WC-22	RA4-WC-22	RA4-WC-22	RA4-WC-24	RA4-WC-26	RA4-WC-27	RA4-WC-31
							RA4-WC-21_WS-20220824	RA4-WC-22_20201025	RA4-WC-22_WS-20220622	RA4-WC-22_WS-20220824	RA4-WC-24_WS-20220627	RA4-WC-26_WS-20210913	RA4-WC-27_WS-20210915	RA4-WC-31_20201018
							2022-08-24	2020-10-25	2022-06-22	2022-08-24	2022-06-27	2021-09-13	2021-09-15	2020-10-18
							TON921	NZX654	TBB292	TON920	TBB287	QRU496	QRU499	NZC325
							C2O5949	C0S4568	C2I2702	C2O5949	C2I2702	C1R0645	C1R0645	C0S0909
							N	N	N	N	N	N	N	N
Parameter	**Units**	**Human Health Based Guidelines/Standards**			**Other Guidelines**	**Minimum RDL**								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	38	-	41	55	24	54	39	-
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	< 1	-	< 1	< 1	< 1	< 1	< 1	-
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	39	48	42	56	24	54	39	6.6
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	0.078	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	< 1	1.5	< 1	< 1	< 1	< 1	2.1	2.7
Conductivity	umhos/cm	--	--	na	--	1	83	-	84	110	50	110	80	-
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	25	18	19	19	17	16	29	41
Fluoride	mg/L	1.5	1.5	na	--	0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-
Hardness (as CaCO3)	mg/L	--	--	na	--	1	45	-	45	59	27	61	51	-
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	0.8	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	1	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	7.14	-	7.46	7.52	7.03	7.63	7.34	-
Phosphorus	mg/L	--	--	na	--	0.004	0.009	0.007	0.01	0.01	0.009	0.01	0.012	0.007
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.5	0.4	0.43	0.41	0.43	0.45	0.59	0.52
Total Organic Carbon	mg/L	--	--	na	--	0.4	25	-	17	19	17	15	28	-
Total Suspended Solids	mg/L	--	--	na	--	1	1	< 10	2	2	< 1	1	4	< 10
Turbidity	ntu	--	--	na	--	0.1	0.5	-	0.4	1.5	< 0.1	1.5	0.5	-

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA4-WC-34	RA4-WC-34	RA4-WC-37	RA4-WC-41	RA4-WC-42	RA4-WC-45	RA4-WC-45	RA4-WC-45
							RA4-WC-34_20201026	RA4-WC-34_WS-20210915	RA4-WC-37_WS-20210912	RA4-WC-41_WS-20220625	RA4-WC 42_20201019	RA4-WC-45_20201018	RA4-WC-45_WS-20220627	RA4-WC-45_WS-20220826
							2020-10-26	2021-09-15	2021-09-12	2022-06-25	2020-10-19	2020-10-18	2022-06-27	2022-08-26
							NZX660	QRU500	QRU495	TAY913	NZC322	NZC314	TAY917	TOZ814
							C0S4568	C1R0645	C1R0645	C2I2256	C0S0909	C0S0909	C2I2256	C2O7933
							N	N	N	N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL								
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO									
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	-	55	14	24	-	-	11	20
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	-	< 1	< 1	< 1	-	-	< 1	< 1
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	54	55	14	24	15	12	11	20
Ammonia-N	mg/L	--	--	na	--	0.05	< 0.05	< 0.05	0.051	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.7	< 1	1.2	< 1	1.9	1.9	< 1	1
Conductivity	umhos/cm	--	--	na	--	1	-	110	42	51	-	-	29	44
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	13	13	37	23	29	26	22	25
Fluoride	mg/L	1.5	1.5	na	--	0.1	-	< 0.1	< 0.1	< 0.1	-	-	< 0.1	< 0.1
Hardness (as CaCO3)	mg/L	--	--	na	--	1	-	61	27	29	-	-	16	23
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-	-	< 0.5	< 0.5
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-	-	< 0.5	< 0.5
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	-	7.68	6.84	7.25	-	-	6.82	6.79
Phosphorus	mg/L	--	--	na	--	0.004	0.008	0.012	0.023	0.023	0.01	0.01	0.013	0.023
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.27	0.4	0.69	0.41	0.35	0.32	0.28	0.5
Total Organic Carbon	mg/L	--	--	na	--	0.4	-	12	35	21	-	-	20	23
Total Suspended Solids	mg/L	--	--	na	--	1	< 10	2	8	4	< 10	< 10	< 1	4
Turbidity	ntu	--	--	na	--	0.1	-	1	1.6	2.6	-	-	0.5	1.3

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 11: Summary of Surface Water Analytica Results of General Chemistry Parameters

							RA4-WC-55	RA4-WC-55	RA4-WC-55	RA4-WC-57	RA4-WC-58
							RA4-WC-55_20201022	RA4-WC-55_WS-20210916	RA4-WC-55_WS-20220627	RA4-WC-57_WS-20210916	RA4-WC 58_20201019
							2020-10-22	2021-09-16	2022-06-27	2021-09-16	2020-10-19
							NZX657	QSK287	TAY914	QSK281	NZC321
							C0S4568	C1R3438	C2I2256	C1R3438	C0S0909
							N	N	N	N	N
Parameter	Units	Human Health Based Guidelines/Standards			Other Guidelines	Minimum RDL					
		CDWQ MAC	OREG 169/03 DWQ	Component GW 1, OREG 153/04 T2 SCS Potable (coarse) [(a)]	CDWQ AO						
Alkalinity, Bicarbonate (as CaCO3)	mg/L	--	--	na	--	1	-	33	24	16	-
Alkalinity, Carbonate (as CaCO3)	mg/L	--	--	na	--	1	-	< 1	< 1	< 1	-
Alkalinity, Total (As CaCO3)	mg/L	--	--	na	--	1	29	33	24	16	10
Ammonia-N	mg/L	--	--	na	--	0.05	0.12	< 0.05	< 0.05	< 0.05	< 0.05
Chloride ion (dissolved)	mg/L	--	--	250	250	1	1.5	1.4	< 1	1.2	1.3
Conductivity	umhos/cm	--	--	na	--	1	-	67	51	40	-
Dissolved Organic Carbon (DOC)	mg/L	--	--	na	--	0.4	20	24	20	23	21
Fluoride	mg/L	1.5	1.5	na	--	0.1	-	< 0.1	< 0.1	< 0.1	-
Hardness (as CaCO3)	mg/L	--	--	na	--	1	-	39	28	24	-
Mineral Oil and Grease	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-
Nitrate (as N)	mg/L	10	10	na	--	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oil and Grease, Total	mg/L	--	--	na	--	0.5	-	< 0.5	< 0.5	< 0.5	-
Orthophosphate (PO4)	mg/L	--	--	na	--	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH, Lab	ph units	--	--	na	7-10.5	0	-	7.43	7.29	6.94	-
Phosphorus	mg/L	--	--	na	--	0.004	0.012	0.01	0.01	0.006	0.004
Phosphorus (dissolved)	µg/L	--	--	na	--	100	-	-	-	-	-
Sulphate (dissolved)	mg/L	--	--	na	500	1	< 1	< 1	< 1	< 1	< 1
Total Kjeldahl Nitrogen	mg/L	--	--	na	--	0.1	0.39	0.48	0.37	0.42	0.3
Total Organic Carbon	mg/L	--	--	na	--	0.4	-	22	18	22	-
Total Suspended Solids	mg/L	--	--	na	--	1	< 10	4	3	2	< 10
Turbidity	ntu	--	--	na	--	0.1	-	0.7	2.4	0.6	-

Notes:
CDWQ MAC: Canadian Drinking Water Guidelines Maximum Acceptable Concentration
OREG 169/03 DWQ = OREG-169/03 Ontario Drinking Water Quality Standards
(a) only applied if no CDWQ MAC or OREG 169/03 value is available
na: not applied (CDWQ MAC and/or OREG 169/03 value is available)
yyyy/mm/dd: year/month/day
Matrix WS: Surface Water
mg/l: milligrams per liter
µg/l: micrograms per liter
ntu: nephelometric turbidity units
umhos/cm: micromhos per centimeter
* : Value presented is a Canadian Drinking Water Guideline Aesthetic Objective
Sample type N: Normal Environmental Sample
< : Denotes concentration less than indicated detection limit
- : Not analyzed
--: No Standard/Guideline
Exceeds Applicable Standard/Guideline
Detection Limit Exceeds Applicable Standard/Guideline
Exceeds Aesthetic Objective

Table 12 - 1 Air Quality
MFCAR - North/South Road Segement - Construction Phase
Maximum Ground Level Concentration Summary

						All Construction Activities Combined Impact		
Indicator Compound	**Averaging Period**	**Criteria [µg/m^3]**	**Guideline**	**Basis**	**Ambient [µg/m^3]**	**Maximum POI [µg/m^3]**	**% Criteria [Project Only]**	**% Criteria [Project + Background]**
NO_2	1 hr	400	Ontario AAQC	Health	3.8	275	69%	70%
		79	CAAQS (2025)	Health & Environment	3.8	275	>100	>100
	24 hr	200	Ontario AAQC	Health	3.1	88	44%	46%
	Annual	**22.6**	CAAQS (2025)	Health & Environment	1.3	27	>100	>100
$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	245	>100	>100
	Annual	8.8	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	5.1	2	26%	84%
PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	308	>100	>100
TSP	24 hr	120	Ontario AAQC	Visibility	89.1	433	>100	>100
	Annual	60	Ontario AAQC	Visibility	56.7	12	20%	>100
SO2	10 min	**178**	Ontario AAQC	Health	4.3	18250	>100	>100
	1 hr	**100**	MECP ACB List	Health	2.6	11060	>100	>100
		170	CAAQS (2025)	Health & Environment	2.6	11060	>100	>100
	Annual	**10**	CAAQS (2025)	Health & Environment	1.3	0.23	2%	15%
		10	Ontario AAQC	Vegetation	1.3	0.23	2%	15%
CO	1 hr	36,200	Ontario AAQC	Health	469.7	189631	>100	>100
	8 hr	15,700	Ontario AAQC	Health	454.0	31419	>100	>100
Acrolein	1 hr	4.5	Ontario AAQC	Health	0.1	2	52%	54%
	24 hr	0.4	Ontario AAQC	Health	0.04	0.39	97%	>100
Acetaldehyde	0.5 hr	500	Ontario AAQC	Health	10.05	13	3%	5%
	24 hr	500	Ontario AAQC	Health	3.4	2	0%	1%
Benzene	24 hr	2.3	Ontario AAQC	Health	0.5	0.8	35%	57%
	Annual	0.45	Ontario AAQC	Health	0.3	0.1	23%	90%
Formaldehyde	24 hr	65	Ontario AAQC	Health	10.7	5.0	8%	24%
1,3 Butadiene	24 hr	10	Ontario AAQC	Health	0.8	0.1	1%	9%
	Annual	2	Ontario AAQC	Health	0.9	0.004	0%	45%
Toluene	24 hr	2,000	Ontario AAQC	Odour	0.5	0.64	0%	0%
Ethylbenzene	10 min	1,900	Ontario ACB List	Odour	0.8	8.2	0%	0%
	24 hr	1,000	Ontario AAQC	Health	0.2	2.0	0%	0%
Xylene	10 min	3,000	Ontario AAQC	Odour	2.8	2.5	0%	0%
	24 hr	730	Ontario AAQC	Health	0.7	0.6	0%	0%
Benzo(a)pyrene	24 hr	0.00005	Ontario AAQC	Health	0.00003	0.00008	>100	>100
	Annual	0.00001	Ontario AAQC	Health	0.00002	0.00001	98%	>100
DPM	24 hr	N/A	N/A	N/A	0.6	15.1	N/A	N/A
	Annual	N/A	N/A	N/A	0.4	2.0	N/A	N/A
Dustfall	30-day	7	Ontario AAQC	Soiling	N/A	3.0	42%	N/A
	Annual	4.6	Ontario AAQC	Soiling	N/A	28	>100	N/A

Notes:
- N/A = Not Avaliable
- 10-min averaging period results were converted from 1-hr results
- Bold values were converted from PPB and/or PPM to ug/m3
- CDA = Construction Disturbance Area

Table 12 - 2 Air Quality
MFCAR - Community Receptors - Construction Phase
Maximum Ground Level Concentration Summary

						All Construction Activities Combined Impact		
Indicator Compound	**Averaging Period**	**Criteria [µg/m^3]**	**Guideline**	**Basis**	**Ambient [µg/m^3]**	**Maximum POI [µg/m^3]**	**% Criteria [Project Only]**	**% Criteria [Project + Background]**
NO_2	1 hr	400	Ontario AAQC	Health	3.8	170	43%	43%
		79	CAAQS (2025)	Health & Environment	3.8	170	>100	>100
	24 hr	200	Ontario AAQC	Health	3.1	54	27%	28%
	Annual	**22.6**	CAAQS (2025)	Health & Environment	1.3	3	14%	20%
$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	156	>100	>100
	Annual	8.8	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	5.1	0.79	9%	67%
PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	175	>100	>100
TSP	24 hr	120	Ontario AAQC	Visibility	89.1	348	>100	>100
	Annual	60	Ontario AAQC	Visibility	56.7	3	5%	100%
SO2	10 min	**178**	Ontario AAQC	Health	4.3	939	>100	>100
	1 hr	**100**	Ontario AAQC	Health	2.6	569	>100	>100
		170	CAAQS (2025)	Health & Environment	2.6	569	>100	>100
	Annual	**10**	CAAQS (2025)	Health & Environment	1.3	0.04	0.4%	13%
		10	Ontario AAQC	Vegetation	1.3	0.04	0.4%	13%
CO	1 hr	36,200	Ontario AAQC	Health	469.7	12472	34.5%	36%
	8 hr	15,700	Ontario AAQC	Health	454.0	3102	19.8%	23%
Acrolein	1 hr	4.5	Ontario AAQC	Health	0.1	0.9	19.1%	21%
	24 hr	0.4	Ontario AAQC	Health	0.04	0.1	17.1%	27%
Acetaldehyde	0.5 hr	500	Ontario AAQC	Health	10.1	5	1.0%	3%
	24 hr	500	Ontario AAQC	Health	3.4	0.3	0.1%	1%
Benzene	24 hr	2.3	Ontario AAQC	Health	0.6	0.1	6.2%	30%
	Annual	0.45	Ontario AAQC	Health	0.3	0.0	2.2%	71%
Formaldehyde	24 hr	65	Ontario AAQC	Health	10.7	0.9	1.4%	18%
1,3 Butadiene	24 hr	10	Ontario AAQC	Health	0.8	0.1	0.7%	9%
	Annual	2	Ontario AAQC	Health	0.9	0.01	0.3%	45%
Toluene	24 hr	2,000	Ontario AAQC	Odour	0.5	0.1	0.01%	0.03%
Ethylbenzene	10 min	1,900	Ontario ACB List	Odour	0.8	5.6	0.3%	0.3%
	24 hr	1,000	Ontario AAQC	Health	0.2	1.3	0.1%	0.2%
Xylene	10 min	3,000	Ontario ACB List	Odour	2.8	0.5	0.02%	0.1%
	24 hr	730	Ontario AAQC	Health	0.7	0.1	0.02%	0.1%
Benzo(a)pyrene	24 hr	0.00005	Ontario AAQC	Health	0.00003	0.00002	40%	>100
	Annual	0.00001	Ontario AAQC	Health	0.00002	0.000001	12%	>100
DPM	24 hr	N/A	N/A	N/A	0.6	3	N/A	N/A
	Annual	N/A	N/A	N/A	0.4	0.2	N/A	N/A
Dustfall	30-day	7	Ontario AAQC	Soiling	N/A	0.1	2%	N/A
	Annual	4.6	Ontario AAQC	Soiling	N/A	1	25%	N/A

Notes:
- N/A = Not Avaliable
- '10-min averaging period results were converted from 1-hr results

Table 12 - 3 Air Quality
MFCAR - North/South Road Segement - Operation Phase
Maximum Ground Level Concentration Summary

Indicator Compound	Averaging Period	Criteria	Guideline	Basis	Ambient	Maximum POI	% Criteria	% Criteria
		[µg/m^3]			[µg/m^3]	[µg/m^3]	[Project Only]	[Project + Background]
NO_2	1 hr	400	Ontario AAQC	Health	3.8	10.8	3%	4%
		79	CAAQS (2025)	Health & Environment	3.8	10.8	14%	18%
	24 hr	200	Ontario AAQC	Health	3.1	2.3	1%	3%
	Annual	**22.6**	CAAQS (2025)	Health & Environment	1.3	0.9	4%	10%
$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	67.4	>100%	>100%
	Annual	8.8	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	5.1	10.0	>100%	>100%
PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	655.5	>100%	>100%
TSP	24 hr	120	Ontario AAQC	Visibility	89.1	2292.6	>100%	>100%
	Annual	60	Ontario AAQC	Visibility	56.7	344.6	>100%	>100%
SO2	10 min	**178**	Ontario AAQC	Health	4.3	0.02	0.01%	2%
	1 hr	**100**	Ontario AAQC	Health	2.6	0.01	0.01%	3%
		170	CAAQS (2025)	Health & Environment	2.6	0.01	0.01%	2%
	Annual	**10**	CAAQS (2025)	Health & Environment	1.3	0.001	0.01%	13%
		10	Ontario AAQC	Vegetation	1.3	0.001	0.01%	13%
CO	1 hr	36,200	Ontario AAQC	Health	469.7	6.90	0.02%	1%
	8 hr	15,700	Ontario AAQC	Health	454.0	2.70	0.02%	3%
Acrolein	1 hr	4.5	Ontario AAQC	Health	0.1	0.001	0.02%	2%
	24 hr	0.4	Ontario AAQC	Health	0.04	0.0001	0.04%	10%
Acetaldehyde	0.5 hr	500	Ontario AAQC	Health	10.1	0.01	0.001%	2%
	24 hr	500	Ontario AAQC	Health	3.4	0.002	0.0003%	1%
Benzene	24 hr	2.3	Ontario AAQC	Health	0.6	0.0001	0.003%	24%
	Annual	0.45	Ontario AAQC	Health	0.3	0.00003	0.01%	69%
Formaldehyde	24 hr	65	Ontario AAQC	Health	10.7	0.001	0.002%	16%
1,3 Butadiene	24 hr	10	Ontario AAQC	Health	0.8	0.000005	0.00005%	8%
	Annual	2	Ontario AAQC	Health	0.9	0.000002	0.0001%	45%
Toluene	24 hr	2,000	Ontario AAQC	Odour	0.5	0.001	0.00004%	0.02%
Ethylbenzene	10 min	1,900	Ontario ACB List	Odour	0.8	0.001	0.00004%	0.04%
	24 hr	1,000	Ontario AAQC	Health	0.2	0.0004	0.00004%	0.02%
Xylene	10 min	3,000	Ontario ACB List	Odour	2.8	0.01	0.0002%	0.1%
	24 hr	730	Ontario AAQC	Health	0.7	0.003	0.0004%	0.1%
Benzo(a)pyrene	24 hr	0.00005	Ontario AAQC	Health	0.00003	0.0000001	0.27%	67%
	Annual	0.00001	Ontario AAQC	Health	0.00002	0.0000001	1%	>100
DPM	24 hr	N/A	N/A	N/A	0.6	0.02	N/A	N/A
	Annual	N/A	N/A	N/A	0.4	0.01	N/A	N/A
Dustfall	30-day	7	Ontario AAQC	Soiling	N/A	11.5	>100	N/A
	Annual	4.6	Ontario AAQC	Soiling	N/A	54.3	>100	N/A

Notes:
1. "N/A" = Source Group does not release specific indicator compound.
2. 10-min averaging period results were converted from 1-hr results
3. Bold values were converted from PPB and/or PPM to ug/m3

Table 12 - 4 Air Quality
MFCAR - East/West Road Segement - Operation Phase
Maximum Ground Level Concentration Summary

Indicator Compound	Averaging Period	Criteria [µg/m^3]	Guideline	Basis	Ambient [µg/m^3]	Maximum POI [µg/m^3]	% Criteria [Project Only]	% Criteria [Project + Background]
NO_2	1 hr	400	Ontario AAQC	Health	3.8	0.5	0.1%	1%
		79	CAAQS (2025)	Health & Environment	3.8	0.5	1%	5%
	24 hr	200	Ontario AAQC	Health	3.1	0.2	0.1%	2%
	Annual	**22.6**	CAAQS (2025)	Health & Environment	1.3	0.1	0.2%	6%
$PM_{2.5}$	24 hr	27	AAQC/CAAQS (2025)	Health/Health & Environment	8.0	9.7	36%	66%
	Annual	8.8	AAQC/CAAQS (2025)	Health/Health & Environment	5.1	1.2	13%	71%
PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	94.0	>100	>100
TSP	24 hr	120	Ontario AAQC	Visibility	89.1	328.8	>100	>100
	Annual	60	Ontario AAQC	Visibility	56.7	39.9	66.5%	>100
SO2	10 min	**178**	Ontario AAQC	Health	4.3	0.001	0.001%	2%
	1 hr	**100**	Ontario AAQC	Health	2.6	0.001	0.001%	3%
		170	CAAQS (2025)	Health & Environment	2.6	0.001	0.001%	2%
	Annual	**10**	CAAQS (2025)	Health & Environment	1.3	0.0001	0.001%	13%
		10	Ontario AAQC	Vegetation	1.3	0.0001	0.001%	13%
CO	1 hr	36,200	Ontario AAQC	Health	469.7	0.6	0.002%	1%
	8 hr	15,700	Ontario AAQC	Health	454.0	0.3	0.002%	3%
Acrolein	1 hr	4.5	Ontario AAQC	Health	0.1	0.00004	0.001%	2%
	24 hr	0.4	Ontario AAQC	Health	0.04	0.00001	0.003%	10%
Acetaldehyde	0.5 hr	500	Ontario AAQC	Health	10.1	0.001	0.0001%	2%
	24 hr	500	Ontario AAQC	Health	3.4	0.0001	0.00003%	1%
Benzene	24 hr	2.3	Ontario AAQC	Health	0.6	0.00003	0.001%	24%
	Annual	0.45	Ontario AAQC	Health	0.3	0.00001	0.002%	69%
Formaldehyde	24 hr	65	Ontario AAQC	Health	10.7	0.0001	0.00019%	16%
1,3 Butadiene	24 hr	10	Ontario AAQC	Health	0.8	0.000002	0.00002%	8%
	Annual	2	Ontario AAQC	Health	0.9	0.000001	0.00003%	45%
Toluene	24 hr	2,000	Ontario AAQC	Odour	0.5	0.0001	0.000004%	0.02%
Ethylbenzene	10 min	1,900	Ontario ACB List	Odour	0.8	0.0002	0.00001%	0.04%
	24 hr	1,000	Ontario AAQC	Health	0.2	0.00004	0.00000%	0.02%
Xylene	10 min	3,000	Ontario ACB List	Odour	2.8	0.001	0.00003%	0.09%
	24 hr	730	Ontario AAQC	Health	0.7	0.0003	0.00003%	0.09%
Benzo(a)pyrene	24 hr	0.00005	Ontario AAQC	Health	0.00003	0.00000003	0.07%	67%
	Annual	0.00001	Ontario AAQC	Health	0.00002	0.00000001	0.10%	>100
DPM	24 hr	N/A	N/A	N/A	0.6	0.001	N/A	N/A
	Annual	N/A	N/A	N/A	0.4	0.0004	N/A	N/A
Dustfall	30-day	7	Ontario AAQC	Soiling	N/A	1.6	23.5%	N/A
	Annual	4.6	Ontario AAQC	Soiling	N/A	6.3	>100	N/A

Notes:
1. "N/A" = Not Applicable
2. 10-min averaging period results were converted from 1-hr or 24-hr results pending on avalibility of data
3. Bold values were converted from PPB and/or PPM to ug/m3

Table 12 - 5 Air Quality
MFCAR - Operation Phase
Maximum Particulate Ground Level Concentration Summary - Mitigation Assessment

							No Mitigation			With Mitigation (80% Control Efficiency)		
Road Segment	**Indicator Compound**	**Averaging Period**	**Criteria**	**Guideline**	**Basis**	**Ambient**	**Maximum POI**	**% Criteria**	**% Criteria**	**Maximum POI**	**% Criteria**	**% Criteria**
			[µg/m^3]			**[µg/m^3]**	**[µg/m^3]**	**[Project Only]**	**[Project + Background]**	**[µg/m^3]**	**[Project Only]**	**[Project + Background]**
N/S	$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	67	>100%	>100%	13.5	50%	80%
		Annual	8.8	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	5.1	10	>100%	>100%	5.5	62%	>100%
	PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	656	>100%	>100%	131.2	>100%	>100%
	TSP	24 hr	120	Ontario AAQC	Visibility	89.1	2293	>100%	>100%	458.7	>100%	>100%
		Annual	60	Ontario AAQC	Visibility	56.7	345	>100%	>100%	187.8	>100%	>100%
E/W	$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	10	36%	66%	1.9	7%	37%
		Annual	8.8	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	5.1	1	13%	71%	0.6	7%	65%
	PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	94	>100%	>100%	18.8	38%	>100%
	TSP	24 hr	120	Ontario AAQC	Visibility	89.1	329	>100%	>100%	65.8	55%	>100%
		Annual	60	Ontario AAQC	Visibility	56.7	40	67%	>100%	22	36%	>100%

						No Mitigation		With 80% Mitigation	
Road Segment	**Indicator Compound**	**Averaging Period**	**Ambient**	**Guideline**	**Criteria**	**Max Distance to Criteria**	**Max Distance to Criteria Minus Background**	**Max Distance to Criteria**	**Max Distance to Criteria Minus Background**
			[µg/m^3]		**[µg/m^3]**	**(m)**	**(m)**	**(m)**	**(m)**
North South Operations	TSP	24 hr	89.12	Ontario AAQC	120	> 3000	> 3000	226	2298
		Annual	56.65	Ontario AAQC	60	899	> 3000	135	2336
East West Operations	TSP	24 hr	89.12	Ontario AAQC	120	119	1001	N/A	65
		Annual	56.65	Ontario AAQC	60	N/A	639	N/A	319

Table 12 - 6 Air Quality
Dustfall Summary

Project Phase	Road Segment	Period	MECP Criteria	Maximum Deposition	% Criteria	Approximate Max Distance from Edge of Road[2] [Criteria]	Approximate Max Distance from Edge of Road[3] [50% Criteria]
			[g/m2]	[g/m2]		[m]	[m]
Construction	N/S	30-day	7	3.0	42%	N/A	N/A
		Annual	4.6	28	>100%	280	500
	E/W	30-day	7	0.1	2%	N/A	N/A
		Annual	4.6	1.1	25%	N/A	N/A
Operations[1]	N/S	30-day	7	11.5	>100%	45	174
		Annual	4.6	54.3	>100%	681	1280
	E/W	30-day	7	1.6	23%	N/A	N/A
		Annual	4.6	6.3	>100%	28	102

Notes:
[1] Calroads model does not compute deposition as such deposition from operations was calculated from concentration values using the formula F = VdC, where F = deposition flux, Vd = deposition velocity and C = concentration

[2] Maximum distance from edge of road indicates the distance which an exceedance to criteria is present
[3] Maximum distance from edge of road indicates the distance from road until dustfall equals 50% of respective criteria

Table 12 - 7 Air Quality

Diesel Particulate Matter Maximum Concentration Summary

Project Phase	Road Segment	Averaging Period	Maximum[1] [ug/m3]
Construction	N/S	24 hr	15.1
		Annual	2.0
	E/W	24 hr	3.0
		Annual	0.2
Operations	N/S	24 hr	0.02
		Annual	0.01
	E/W	24 hr	0.001
		Annual	0.0004

[1] DPM emissions are conservatively estimated to equal tailpipe emissions of PM2.5.

Table 12 - 8 Air Quality

Frequency Analysis - 80% Mitigation Model Runs Operations

							80% Mitigation Applied					
							Maximum			90th Percentile		
Road Segment	Indicator Compound	Averaging Period	Criteria	Guideline	Basis	Ambient	Maximum POI	% Criteria	% Criteria	Maximum POI	% Criteria	% Criteria
			[µg/m^3]			[µg/m^3]	[µg/m^3]	[Project Only]	[Project + Background]	[µg/m^3]	[Project Only]	[Project + Background]
N/S	$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	13.5	50%	80%	8.9	33%	63%
	PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	131.2	>100%	>100%	87.0	>100%	>100%
	TSP	24 hr	120	Ontario AAQC	Visibility	89.1	458.7	>100%	>100%	304.0	>100%	>100%
E/W	$PM_{2.5}$	24 hr	27	AAQC (2023)/CAAQS (2025)	Health/Health & Environment	8.0	1.9	7%	37%	1.1	4%	34%
	PM_{10}	24 hr	50	Ontario AAQC	Health	31.2	18.8	38%	100%	10.7	21%	84%
	TSP	24 hr	120	Ontario AAQC	Visibility	89.1	65.8	55%	>100%	37.5	31%	>100%

				No Mitigation		Mitigation Applied (80%)			
				Maximum		Maximum		90th Percentile	
Road Segment	Indicator Compound	Averaging Period	Criteria	Max Distance to Criteria	Max Distance to Criteria Minus Background	Max Distance to Criteria	Max Distance to Criteria Minus Background	Max Distance to Criteria	Max Distance to Criteria Minus Background
			[µg/m^3]						
N/S	TSP	24 hr	120	> 3000	> 3000	226	2298	105	675
E/W	TSP	24 hr	120	119	1001	N/A	65	N/A	28

Table 13: Analytical Data for Surface Water Albany River May 2025

				Location	AR001 UP	AR002 DOWN	BCR003 UP	BCR004 DOWN
				Date	2025-May-28	2025-May-28	2025-May-28	2025-May-28
				Lab work order	C562632 / C562445	C562632 / C562445	C562627 / C562445	C562627 / C562445
				Lab sample ID	ARJX09 / ARJN49	ARJX08 / ARJN48	ARJW82 / ARJN50	ARJW81 / ARJN51
Parameter	**Units**	**CDWQ MAC**	**O. Reg 169/03**					
Acenaphthene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Alachlor	µg/L	--	5		< 0.50	< 0.50	< 0.50	< 0.50
Aldicarb	µg/L	--	--		< 5.0	< 5.0	< 5.0	< 5.0
Alkalinity, Total (As CaCO3)	mg/L	--	--		45	44	44	43
Aluminum	mg/L	2.9	--		0.046	0.041	0.064	0.062
Ammonia	mg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Anthracene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Antimony	µg/L	6	6		< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	µg/L	10	10		< 1.0	< 1.0	< 1.0	< 1.0
Atrazine	mg/L	0.005	--		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Atrazine + Des-ethyl atrazine, Total	µg/L	--	5		< 1.0	< 1.0	< 1.0	< 1.0
Atrazine Desethyl	µg/L	--	--		< 0.50	< 0.50	< 0.50	< 0.50
Barium	µg/L	2000	1000		5.4	5.4	5.3	5.5
Bendiocarb	µg/L	--	--		< 2.0	< 2.0	< 2.0	< 2.0
Benzene	mg/L	0.005	0.001		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo(a)anthracene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Benzo(a)pyrene	mg/L	0.00004	0.00001		< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Benzo(g,h,i)perylene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Benzo(k)fluoranthene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Beryllium	µg/L	--	--		< 0.40	< 0.40	< 0.40	< 0.40
Biochemical Oxygen Demand	mg/L	--	--		< 2	< 2	< 2	< 2
Biphenyl, 1,1'-	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Bismuth	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Boron	µg/L	5000	5000		< 10	< 10	< 10	< 10
Bromide	mg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/L	--	--		< 0.10	< 0.10	< 0.10	< 0.10
Bromoform	µg/L	--	--		< 0.20	< 0.20	< 0.20	< 0.20
Bromoxynil	mg/L	0.03	0.005		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Cadmium	µg/L	7	5		< 0.090	< 0.090	< 0.090	< 0.090
Calcium	µg/L	--	--		14000	15000	14000	15000
Carbaryl	mg/L	--	0.09		< 0.0050	< 0.0050	< 0.0050	< 0.0050
Carbofuran	mg/L	--	0.09		< 0.0050	< 0.0050	< 0.0050	< 0.0050
Chemical Oxygen Demand	mg/L	--	--		40	40	42	41
Chloride ion	mg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	mg/L	--	0.08		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chlorpyrifos	mg/L	0.09	0.09		< 0.0010	< 0.0010	< 0.0010	< 0.0010
Chromium	µg/L	50	50		< 5.0	< 5.0	< 5.0	< 5.0
Chromium (Hexavalent)	µg/L	--	--		< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Cobalt	µg/L	--	--		< 0.50	< 0.50	< 0.50	< 0.50
Copper	µg/L	2000	--		< 0.90	< 0.90	< 0.90	< 0.90
Cyanazine	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Diazinon	mg/L	--	0.02		< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dibenzo(a,h)anthracene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Dibromochloromethane [DBCM]	µg/L	--	--		< 0.20	< 0.20	< 0.20	< 0.20
Dicamba	mg/L	0.11	0.12		< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dichlorobenzene, 1,2-	mg/L	--	0.2		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Dichlorobenzene,1,4-	mg/L	0.005	0.005		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Dichloroethane, 1,2-	mg/L	0.005	0.005		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Dichloroethene, 1,1-	mg/L	--	0.014		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dichloromethane (Methylene chloride)	mg/L	0.05	0.05		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Dichlorophenol, 2,4-	mg/L	--	0.9		< 0.00025	< 0.00025	< 0.00025	< 0.00025
Dichlorophenoxy acetic acid, 2,4- [2,4-D]	µg/L	100	100		< 1.0	< 1.0	< 1.0	< 1.0
Diclofop-methyl	mg/L	--	0.009		< 0.00090	< 0.00090	< 0.00090	< 0.00090
Dimethoate	mg/L	0.02	0.02		< 0.0025	< 0.0025	< 0.0025	< 0.0025
Dinoseb	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon (DOC)	mg/L	--	--		15	15	15	15
Dual (Metolachlor)	mg/L	--	0.05		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Electrical Conductivity	umhos/cm	--	--		90	89	88	89
Escherichia coli (E.Coli)	mpn/100mL	0	0		**2**	**2**	**3**	**2**
Ethylbenzene	mg/L	0.14	0.14		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Fluorene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Fluoride	mg/L	1.5	1.5		< 0.10	< 0.10	< 0.10	< 0.10
Hardness (as CaCO3)	mg/L	--	--		46	49	46	48
Heterotrophic Plate Count	cfu/mL	--	--		190	130	140	81
Indeno(1,2,3-c,d)pyrene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Iron	µg/L	--	--		160	140	210	270
Leachable Benzo(b+j)fluoranthene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Lead	µg/L	5	10		< 0.50	< 0.50	< 0.50	< 0.50
Lead-210	bq/L	2	0.1		**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**
Lithium	µg/L	--	--		< 5.0	< 5.0	< 5.0	< 5.0
Magnesium	µg/L	--	--		2700	2700	2600	2800
Malathion	mg/L	0.29	0.19		< 0.0050	< 0.0050	< 0.0050	< 0.0050
Manganese	µg/L	120	--		18	14	19	29
Mercury	mg/L	0.001	0.001		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Methyl Mercury	ng/L	--	--		-	-	0.080	< 0.050
Methyl Parathion (Parathion-Methyl)	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Methylnaphthalene, 1-	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Methylnaphthalene, 2-	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Metribuzin	mg/L	0.08	0.08		< 0.0050	< 0.0050	< 0.0050	< 0.0050
Microcystin-LR	µg/L	--	--		< 0.10	< 0.10	< 0.10	< 0.10
Molybdenum	µg/L	--	--		< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Nickel	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Nitrate	mg/L	45	10		< 0.10	< 0.10	< 0.10	< 0.10
Nitrite	mg/L	3	1		< 0.010	< 0.010	< 0.010	< 0.010
Parathion	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
pH, Lab	ph units	--	--		7.66	7.72	7.59	7.70
Phenanthrene	µg/L	--	--		< 0.030	< 0.030	< 0.030	< 0.030
Phorate	mg/L	--	0.002		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Phosphorus	mg/L	--	--		0.007	< 0.004	0.012	0.008
Phosphorus	µg/L	--	--		< 100	< 100	< 100	< 100
Picloram	mg/L	--	0.19		< 0.0050	< 0.0050	< 0.0050	< 0.0050
Polonium-210	bq/L	--	0.2		< 0.010	< 0.010	< 0.010	< 0.010
Potassium	µg/L	--	--		300	340	270	340
Prometryn	µg/L	--	1		< 0.25	< 0.25	< 0.25	< 0.25
Pyrene	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Radium-226	bq/L	5	0.6		**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**
Selenium	µg/L	50	50		< 2.0	< 2.0	< 2.0	< 2.0
Silicon	µg/L	--	--		1100	1200	1100	1200
Silver	µg/L	--	--		< 0.090	< 0.090	< 0.090	< 0.090
Simazine	mg/L	--	0.01		< 0.0010	< 0.0010	< 0.0010	< 0.0010
Sodium	mg/L	--	--		0.57	0.56	0.57	0.58
Strontium	µg/L	7000	--		16	15	16	16
Sulphate	mg/L	--	--		2.7	2.8	2.7	2.5
Tellurium	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Terbufos	mg/L	--	0.001		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Tetrachloroethylene	mg/L	0.01	0.01		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Tetrachloromethane (Carbon Tetrachloride)	mg/L	0.002	0.002		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Tetrachlorophenol, 2,3,4,6-	mg/L	--	0.1		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Thallium	µg/L	--	--		< 0.050	< 0.050	< 0.050	< 0.050
Thorium-230	bq/L	--	0.4		**< 5.0**	**< 5.0**	**< 5.0**	**< 5.0**
Tin	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Titanium	µg/L	--	--		< 5.0	< 5.0	< 5.0	< 5.0
Toluene	mg/L	0.06	0.06		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Total Coliform Background	cfu/100mL	--	--		590	510	690	570
Total Coliforms	mpn/100mL	0	0		**200**	**190**	**170**	**190**
Total Dissolved Solids	mg/L	--	--		50	51	49	49
Total Pentachlorophenol	mg/L	0.06	0.06		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Total Suspended Solids	mg/L	--	--		3	3	6	3
Triallate	µg/L	--	230		< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	mg/L	0.005	0.005		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Trichloromethane (Chloroform)	µg/L	--	--		< 0.10	< 0.10	< 0.10	< 0.10
Trichlorophenol, 2,4,6-	mg/L	0.005	0.005		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Trichlorophenoxyacetic acid, 2,4,5-	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Trifluralin	mg/L	--	0.045		< 0.0010	< 0.0010	< 0.0010	< 0.0010
Trihalomethanes	mg/L	0.1	0.1		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Tungsten	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0
Uranium	µg/L	20	20		< 0.10	< 0.10	< 0.10	< 0.10
Vanadium	µg/L	--	--		< 0.50	< 0.50	< 0.50	< 0.50
Vinyl chloride	mg/L	0.002	0.001		< 0.00020	< 0.00020	< 0.00020	< 0.00020
Xylene, O-	µg/L	--	--		< 0.10	< 0.10	< 0.10	< 0.10
Xylene, p+m-	µg/L	--	--		< 0.10	< 0.10	< 0.10	< 0.10
Xylenes, Total	mg/L	0.09	0.09		< 0.00010	< 0.00010	< 0.00010	< 0.00010
Zinc	µg/L	--	--		< 5.0	< 5.0	< 5.0	< 5.0
Zirconium	µg/L	--	--		< 1.0	< 1.0	< 1.0	< 1.0

Notes:

CDWQ MAC = Canadian Drinking Water Quality (CDWQ) Guidelines, Maximum Acceptable Concentrations (MAC)

O. Reg 169/03 = Ontario Drinking Water Quality Standards

bq/l: BECQUEREL/LITER

cfu/100ml: colony forming units per 100 milliliters

cfu/ml: colony forming units per milliliters

mg/l: milligrams per liter

mpn/100ml: most probable number per 100 ml

ng/l: nanogram per liter

ph units: pH units

ug/l: micrograms/liter

umhos/cm: micromhos per centimeter

< : Denotes concentration less than indicated detection limit

- : Not analyzed

--: No Standard/Guideline

Exceeds Applicable Standard/Guideline

Detection Limit Exceeds Applicable Standard/Guideline

Table 14 - Animal Tissue Data - CONFIDENTIAL

Table 15 - Plant Tissue Data - CONFIDENTIAL

Phone: 1-800-764-9114 **Email:** info@martenfallsaccessroad.ca **Web:** http://www.martenfallsaccessroad.ca

Attachment B

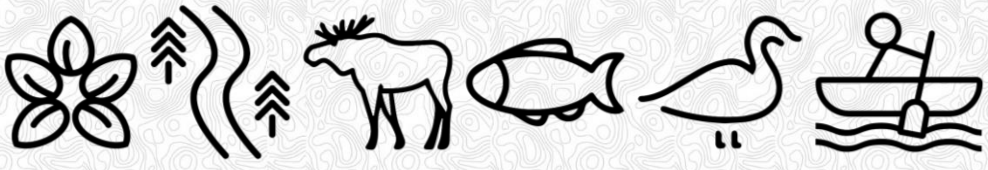
Draft Study Plan, Work Plan and Regulator Comments

MARTEN FALLS FIRST NATION
ALL SEASON COMMUNITY ACCESS ROAD

FINAL

Economic Study Plan

May 2021



Draft

Distribution List

# Hard Copies	PDF Required	Association / Company Name
	✓	Marten Falls First Nation
	✓	AECOM Canada Ltd.

Revision History

Rev #	Date	Revision Description
Draft	May 2020	Submitted “Economic Study Plan” to the Agency.
Final	May 2021	Revised to address federal and provincial agency comments.

Statement of Qualifications and Limitations: AECOM

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13
© 2009-2015 AECOM Canada Ltd. All Rights Reserved.

Draft

Disclaimer: Dillon Consulting Limited

This report was prepared by Dillon Consulting Limited ("Dillon") for the sole benefit of our Client. The material in it reflects Dillon's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Draft

Authors

Report Prepared By:

<Originally Signed By>

Jessica Metuzals, MES
Environmental Planner
Dillon Consulting Ltd.

Report Reviewed By:

<Originally Signed By>

Don McKinnon, MES, RPP
Partner
Dillon Consulting Ltd.

<Originally Signed By>

Brady Romanson, MES, MCIP, RPP
Senior Social Scientist
AECOM

Draft

Table of Contents

page

1. Introduction 1
1.1 Federal and Provincial Terminology 1
1.2 Project Study Plans 2

2. Purpose and Objectives 5
2.1 Approach to Handling Confidential Information 7
2.1.1 Indigenous Knowledge 7
2.1.2 Socio-Economic Primary Data 7

3. Study Plan Technical Discussions 8

4. IS / EA Report Consultation and Engagement Process 9
4.1 Interested Persons and Government Agencies 9
4.2 Indigenous Communities 9
4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement 11
4.4 Consultation on Economic Concerns and Impacts 12

5. Consideration of Indigenous Knowledge in the IS / EA Report 13

6. Assessment Boundaries 16
6.1 Temporal Boundaries: Project Phases 16
6.2 Spatial Boundaries: Study Areas 17
6.2.1 General Information 17
6.2.2 Economic Environment Study Areas 19
6.2.3 Study Areas and Effects Assessment 21

7. Baseline Study Design 23
7.1 Desktop Assessment 23
7.2 Baseline Data Collection 23
7.2.1 Secondary Data Collection 24
7.2.2 Primary Data Collection 26
7.3 Study Methods 29

Draft

8. Data Management and Analysis 30

9. Effects Assessment 31

9.1 Project-Environment Interactions 31
9.2 Valued Components and Indicators 32
9.3 Potential Effects 37
9.4 Methods for Predicting Future Conditions 39
9.5 Mitigation and Enhancement Measures 40
9.5.1 TISG Section 20 Requirements 40
9.6 Residual Effects 42
9.7 Consideration of Sustainability Principles 43
9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment 44
9.9 Follow-up Programs 44

10. Assumptions 45

11. Concordance with Federal and Provincial Guidance 46

12. References 54

List of Figures

Figure 6-1: Project Schedule 16
Figure 6-2: Economic Local and Regional Study Areas 22

List of Tables

Table 1-1: Equivalent Federal and Provincial Terms 1
Table 1-2: Project Study Plans and Valued Components 2
Table 3-1: Summary of Study Plan Technical Discussions 8
Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations 10
Table 6-1: Economic Study Areas 19
Table 9-1: Project – Environment Interactions 31
Table 9-2: Economic Indicators 34

Draft

Table 9-3: Potential Discipline Interactions – Economic 38
Table 9-4: TISG Section 20 Requirements 40
Table 9-5: Economic Magnitude Definition 42
Table 11-1: Study Plan Federal and Provincial Concordance – Conformance with Requirements 47
Table 11-2: Study Plan Draft ToR Provincial Concordance 51
Table 11-3: Study Plan Federal Concordance – Required Deviations 53

Appendices

Appendix A. Preliminary List of Data Sources
Appendix B. Agency Comments on the Draft Study Plan
Appendix C. Table Example: Employment by Age and Sex in the Marten Falls First Nation Community

Acronyms

Agency, the ... Impact Assessment Agency of Canada
CAR ..... Community Access Road
EA ..... Environmental Assessment
GBA+ ..... Gender-based Analysis Plus
IA ..... Impact Assessment
IAA ..... *Impact Assessment Act*
IS ..... Impact Statement
km ..... kilometre
LSA ..... Local Study Area
MECP ..... Ontario Ministry of the Environment, Conservation and Parks
MFFN ..... Marten Falls First Nation
PDA ..... Project Development Area
RSA ..... Regional Study Area
SAR ..... Species at Risk
TISG ..... Tailored Impact Statement Guidelines
ToR ..... Terms of Reference
VC ..... Valued Component

Draft

1. Introduction

The Proponent of the Community Access Road (CAR or the Project) is Marten Falls First Nation (MFFN), a remote First Nation community in northern Ontario located at the junction of the Albany and Ogoki rivers, approximately 430 kilometres (km) from Thunder Bay, Ontario. The MFFN community is proposing an all-season Community Access Road that will connect the MFFN community to Ontario's provincial highway network (Highway 643) to the south via the existing Painter Lake Road. MFFN, as the Proponent of the Project, has formed a MFFN CAR Project Team that includes MFFN CAR Community Member Advisors and MFFN CAR Project Consultants who act with input, guidance and direction from the MFFN Chief and Council.

This document outlines the Study Plan for the Economic Environment to support a coordinated Impact Assessment (IA) required for Project review by the Impact Assessment Agency of Canada (the Agency) under the federal *Impact Assessment Act* (IAA) and Environmental Assessment (EA) required for Project review by the Ontario Ministry of the Environment, Conservation and Parks (MECP) under the Ontario *Environmental Assessment Act*.

1.1 Federal and Provincial Terminology

The study plans have been prepared using federal terminology, however, the respective provincial terminology has been provided in **Table 1-1** for reference. The terms can be used interchangeably.

Table 1-1: Equivalent Federal and Provincial Terms

Provincial Term	Federal Term
Criteria	Valued Component
Impact Management Measure	Mitigation Measure
Net Effects	Residual Effects
Record of Consultation	Record of Engagement

Draft

1.2 Project Study Plans

This Study Plan is one of a group of study plans created for the Project. **Table 1-2** includes the study plans for each environmental[1] discipline currently planned for the Project and the valued components (VCs) covered by the study plans where applicable.

Table 1-2: Project Study Plans and Valued Components

Environmental Discipline	Study Plan Name	Valued Component(s)
Aboriginal and Treaty Rights and Interests	■ Aboriginal and Treaty Rights and Interests Study Plan	■ Indigenous Current Use of Lands and Resources for Traditional Purposes ■ Cultural Continuity (ability to practice and transmit cultural traditions)
Atmospheric Environment	■ Atmospheric Environment and Greenhouse Gases Study Plan	■ Air Quality ■ Greenhouse Gas Emissions
Climate Change	■ Climate Adaptation and Resiliency Study Plan	■ Climate Change
Acoustic and Vibration Environment	■ Acoustic and Vibration Environment Study Plan	■ Noise ■ Vibration
Physiography, Geology, Terrain and Soils	■ Physiography, Terrain and Soils Study Plan	■ Physiography, Terrain and Soils
Surface Water	■ Surface Water Study Plan	■ Surface Water
Groundwater and Geochemistry	■ Groundwater and Geochemistry Study Plan	■ Groundwater
Vegetation	■ Vegetation Study Plan	■ Wetland and Riparian Ecosystems ■ Upland Ecosystems ■ Designated Areas (Areas of Natural and Scientific Interest, Environmentally Significant Areas, Significant Woodlands, Critical Landform / Vegetation Associations) ■ Traditional Use Plants and SAR Plant Populations (including species with special conservation status or rarity in the province)
	■ Peatlands Study Plan	■ Peatland Ecosystems (bogs and fens)
Wildlife	■ Wildlife Study Plan	■ Bats (including SAR-bats such as: Little Brown Myotis [*Myotis lucifugus*], Northern Myotis [*Myotis septentrionalis*] and Tricolored Bat [*Perimyotis subflavus*])

1. *The use of the term environment in this document is inclusive of the components of the environment that are included in the Ontario Environmental Assessment Act definition, which includes a general description of the social, cultural, built and natural environments.*

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Fur Bearers (proxy VC[2] American Marten [*Martes americana*], Beaver [*Castor canadensis*] and Wolverine [*Gulo gulo*]) ■ Amphibians and Reptiles ■ Pollinating Insects
	■ Ungulates (Moose and Caribou) Study Plan	■ Moose (*Alces alces*) ■ Caribou, boreal population (*Rangifer tarandus*)
	■ Bird Study Plan	■ Forest Birds (proxy VC of Red-eyed Vireo [*Vireo olivaceus*] for deciduous forest, Ovenbird [*Seirus aurocapilla*] for mixedwood forest, Dark-eyed Junco [*Junco hyemalis*] for coniferous forest and disturbed forest ■ Raptors (proxy VC of Osprey [*Pandion haliaetus*] for diurnal raptors and Boreal Owl [*Aegolius funereus*] for nocturnal raptors ■ Shorebirds (proxy VC of Wilson's Snipe [*Gallingo delicata*]) ■ Waterfowl (proxy VC of Mallard [*Anas platyrhynchos*]) ■ Bog / Fen Birds and Other Wetland Birds (proxy VC of Palm Warbler [*Setophaga palmarum*] for bogs, Common Yellowthroat [*Geothlypis trichas*] for fens; and Northern Waterthrush [*Parkesia noveboracensis*] for swamps. ■ SAR birds: Canada Warbler (*Cardellina canadensis*), Chimney Swift (*Chaetura pelagica*), Common Nighthawk (*Chordeiles minor*), Eastern Whip-poor-will (*Antrostomus vociferous*), Eastern Wood-Pewee (*Contopus virens*), Evening Grosbeak (*Coccothraustes vespertinus*), Olive-sided Flycatcher (*Contopus cooperi*), Bald Eagle (*Haliaeetus leucocephalus)*, Peregrine Falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus)*, Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Black Tern (*Childonias niger*), Rusty Blackbird (*Euphagus carolinus*), Yellow Rail (*Coturnicops noveboracensis*)
Fish and Fish Habitat	■ Fish and Fish Habitat Study Plan	■ Lake Sturgeon (*Acipenser fulvescens*) ■ Walleye (*Sander vitreus*) ■ Brook Trout (*Salvelinus fontinalis*) ■ Northern Pike (*Esox Lucius*) ■ Lake Whitefish (*Coregonus clupeaformis*) ■ Chain Pickerel (*Esox niger*) ■ Yellow Perch (*Perca flavescens*)

[2] *A proxy VC is used when looking at the effects of one species that represents many others.*

Draft

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Cisco (*Coregonus artedii*) ■ Burbot (*Lota lota*) ■ Longnose Sucker (*Catostomus catostomus*) ■ White Sucker (*Catostomus commersonii*) ■ Forage / Prey Species (including species such as Lake Chub [*Couesius plumbeus*]) ■ Lower Trophic Organisms (e.g., benthic invertebrates)
Social	■ Social Study Plan	■ Housing and Accommodation ■ Community Service and Infrastructure ■ Transportation ■ Community Well-being ■ Populations and Demographics
Economy	■ Economic Study Plan	■ Regional Economy ■ Labour Force and Employment ■ Government Finances
Land and Resource Use	■ Land and Resource Use Study Plan	■ Land Use Compatibility ■ Parks and Protected Areas ■ Extractive Industry ■ Forestry Industry ■ Energy and Linear Infrastructure ■ Recreation and Tourism
Human Health and Community Safety	■ Human Health and Community Safety Study Plan	■ Public Safety ■ Public Health ■ Diet ■ Environmental Factors Influencing Health
Visual Aesthetics	■ Visual Aesthetics Study Plan	■ Visual Contrast / Character ■ Visibility ■ Visual Sensitivity
Archaeological and Cultural Heritage	■ Cultural Heritage Study Plan	■ Archaeological Sites and Resources ■ Built Heritage Resources and Cultural Heritage Landscapes

It should be noted that while there is not a consultation study plan, the Project has developed the *Consultation and Engagement Plan to Support the Environmental Assessment / Impact Statement* (AECOM 2020) (referred to as the Impact Statement [IS] / EA Consultation Plan).

Draft

2. Purpose and Objectives

The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative, direct and indirect) of the Project and alternatives on the environment, determine measures needed to avoid or minimize adverse Project effects, and enhance beneficial Project effects where feasible, and to undertake consultation and engagement throughout. The purpose of this Study Plan is to explain:

- A baseline[3] study methodology that will result in a comprehensive description of the existing environment potentially impacted by the Project;
- How efficient and transparent data management and analysis will be undertaken;
- Effects assessment scoping inputs specific to the Economic Environment that will allow for potential effects of the Project on the existing environment to be appropriately assessed in the IS/EA Report; and
- How the Study Plan aligns with federal and provincial requirements and guidance, including the Agency's Tailored Impact Statement Guidelines (TISG), dated February 24, 2020 (the Agency 2020c), for this Project and applicable provincial agency comments on the Draft Terms of Reference (ToR)[4].

As required by the IAA and referenced in TISG Section 7.3, work plans will also be developed for disciplines as required. It is anticipated the work plans will include further details on how to action the study plans; for example they would contain such information as location of sampling sites, scheduling and sequencing.

The Economic Study Plan considers the following issues, which align with items listed under Economic in Section 18 of the TISG:

- Labour market;
- Household and consumer prices (baseline information may be included in other sections, particularly socio-community);
- Business environment;
- Public finances; and,
- Overall economic impact (except energy production, transportation, utilities, land uses, and zoning).

3. *Baseline refers to the current conditions of the environment potentially impacted by the Project. Baseline conditions serve as a reference against which changes due the Project are measured.*
4. *If necessary, the Study Plan will be updated to reflect the approved ToR if approval is obtained.*

Draft

Related items not included in this Study Plan, are covered under separate study plans including the Human Health and Community Safety Study Plan, the Social Study Plan, and the Land and Resource Use Study Plan. Items not included explicitly within this Study Plan may be referenced and considered in the assessment of effects to relevant components of the Economic Environment such as infrastructure and industrial land uses. For example, information on energy production, utilities and transportation are included in the Social Study Plan while information on land uses are described in the Land and Resource Use Study Plan.

The Economic Assessment will consider how the Economic Environment and features may be affected by the Project. This includes changes to the regional economy, including prices and the business environment; the labour market including training; and public finances. In conducting the Economic Assessment, information from the following other disciplines[5] will be considered:

- **Social** – Changes to the Social Environment that will be considered in the Economic Assessment include changes to community services and infrastructure; housing; education opportunities; and population and demographics. Additionally, changes to the Economic Environment can be a determinant of community well-being.
- **Human Health and Community Safety** – Changes to the economy and the material well-being of individuals will be considered as a social determinant of health. Additionally, changes to health services and community health may influence the regional economy, employment and government finances.
- **Aboriginal and Treaty Rights and Interests** – Potential changes to traditional land and resource use may influence traditional economies. These changes are considered within the Economic Assessment through the assessment of the regional economy.
- **Land and Resource Use** – Changes to the potential for industrial land uses may influence the Economic Environment.

For the purposes of establishing appropriate context, the Study Plan begins with background and relevant information on:

- Study Plan related discussions with the Agency, the MECP and applicable agencies to date (**Section 3**);
- The approach to Project consultation and engagement (**Section 4**);

5. *It is expected each discipline will produce their own technical report supporting the assessment of key factors within that area.*

Draft

- How Indigenous Knowledge will be collected and used in the IA / EA (**Section 5**); and
- The spatial and temporal boundaries that will be used for the IA / EA (**Section 6**).

2.1 Approach to Handling Confidential Information

2.1.1 Indigenous Knowledge

Available and applicable Indigenous Knowledge will be considered in the assessment of economic impacts. Permission from the Indigenous community will be sought before including Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. Sensitive and / or confidential information will be specifically collected through the Indigenous Knowledge Program to inform the IS / EA Report, and its use and publication will be governed by Indigenous community-specific Indigenous Knowledge Sharing Agreements. Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared).

2.1.2 Socio-Economic Primary Data

Collected primary economic data that is considered to be confidential will not be documented in the IS / EA Report. This confidential information may include identity factors such as demographic data provided by individuals from whom the data are obtained. The content and findings obtained that are not considered as confidential will be included in baseline documentation irrespective of source (Indigenous or non-Indigenous knowledge holder). Information obtained through other primary data programs (such as Indigenous Knowledge) will adhere to the confidentiality provisions of the respective data sharing agreements that have been established.

Draft

3. Study Plan Technical Discussions

To facilitate the development of satisfactory study plans and eventually a satisfactory IS / EA Report, MFFN previously submitted draft study plans in an effort to hold technical discussions with the Agency, the MECP and applicable agencies. A summary of technical discussions and correspondence held to date on this Study Plan has been provided in **Table 3-1**.

Table 3-1: Summary of Study Plan Technical Discussions

Attendees / Responsible Party	Correspondence	Discussion Point	Solution
■ **The Agency**	■ Preliminary comments received following submission and review of draft Study Plan	■ **05-August-2020:** Comments and clarification questions received, including editorial comments, additional information requirements regarding study plan, and clarification requests related to study areas, data collection, assessment, criteria and indicators, and concordance with federal and provincial requirements.	■ Additional details and clarification provided within this Study Plan, and responses to these comments are in **Appendix B.**
■ **The Agency** ■ **MECP** ■ **The Ministry of Energy, Northern Development and Mines** ■ **MFFN CAR Project Team**	■ Technical discussion of comments received following agency review of draft Study Plan.	■ **07-October-2020:** Discussion on the role of the general consultation and engagement program to confirm the interests of Indigenous communities and other persons in economic impacts and subsequent target information gathering sessions.	■ Additional details and clarification on the consultation and engagement program are provided in **Section 4** of the Study Plan.
		■ **07-October-2020:** Discussion on data validation. The Agency indicated that it is not necessary to validate raw data with Chiefs and Councils, rather, community leadership can review / validate data that is to be documented in the IS / EA Report and supporting reports to ensure accurate representation.	■ This approach to data verification will be followed. See **Section 8.**

Draft

4. IS / EA Report Consultation and Engagement Process

4.1 Interested Persons and Government Agencies

The Proponent will provide Project notices and advise of opportunities for consultation and engagement with interested persons[6] which includes, at a minimum, members of the public outlined in the *Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020) (referred to as the Public Participation Plan). This will include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date. Government agencies and interested persons will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. The Project's approach to handling confidential and sensitive information is outlined in **Section 2.1**.

4.2 Indigenous Communities

The Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in **Table 4-1**, which is inclusive of all Indigenous communities identified in the *Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020a) (referred to as the Indigenous Engagement and Partnership Plan).

Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the IS / EA Report so that the Proponent can consider and incorporate, where appropriate Indigenous Knowledge and Indigenous land and resource use information into the Project as it pertains to the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. A variety of activities will be offered so that Indigenous communities are

6. *Interested persons, as defined in the IS / EA Consultation Plan, are individuals and groups (e.g., associations, non-governmental organizations, industry and academia) who could have an interest in the Project, including but not limited to communities in the region, those with commercial interests (e.g., forestry, trappers, outfitters, other mineral tenure holders in the area) and recreational users or those with recreational interest (e.g., campers, hunters and environmental groups).*

Draft

informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. The study plans have recognized Indigenous community input received on the Project to date. Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process.

Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations

Tribal Council Affiliation	Indigenous Community or Organization
Matawa First Nations Management *(Nishnawbe Aski Nation)*	■ **Marten Falls First Nation** (Proponent and potentially affected Indigenous community) ■ Aroland First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Ginoogaming First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Webequie First Nation
Matawa First Nations Management and the Union of Ontario Indians / Nishnawbe Aski Nation	■ Long Lake #58 First Nation**
Mushkegowuk Council *(Nishnawbe Aski Nation)*	■ Attawapiskat First Nation ■ Fort Albany First Nation ■ Kashechewan First Nation
Shibogama First Nations Council *(Nishnawbe Aski Nation)*	■ Kasabonika Lake First Nation ■ Kingfisher Lake First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Wunnumin Lake First Nation
Independent First Nations Alliance *(Nishnawbe Aski Nation)*	■ Kitchenuhmaykoosib Inninuwug First Nation
Independent First Nations *(Nishnawbe Aski Nation)*	■ Mishkeegogamang First Nation ■ Weenusk First Nation
Nokiiwin Tribal Council	■ Animbiigoo Zaagi'igan Anishinaabek First Nation *
Métis Nation of Ontario	■ Métis Nation of Ontario; Region 2*
Independent Métis Nation	■ Red Sky Independent Métis Nation*

*Notes: * Indigenous communities or organizations identified by the MECP who should be consulted on the basis that they may be interested in the Community Access Road.*
*** The MECP indicated in a letter to MFFN that Long Lake #58 First Nation was moved from interest-based to rights-based.*

Draft

4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement

To fulfill requirements of the IAA, the Consultation and Engagement Program and the economic data collection program will consider a diverse range of perspectives from interested persons and interested Indigenous communities and their members identified in the Agency's Indigenous Engagement and Partnership Plan and the Public Participation Plan. This will include at a minimum providing ongoing opportunities for engagement to:

- **Neighbouring Indigenous communities, including relevant subpopulations:**
  - Women;
  - Youth; and
  - Elders.
- **Non-Indigenous communities including:**
  - Women;
  - Youth; and
  - Activity-based subgroups (e.g., recreationalists, snowmobilers, tourism establishment operators).

The Proponent will also consult and engage with other subpopulations identified by communities during consultation and engagement. The information from these activities and any additional identity groups identified by communities through consultation and engagement will be considered by applicable environmental disciplines for the purposes of data collection and considering disproportionate effects.

During consultation and engagement, these aforementioned groups will be consulted and engaged with on targeted input**.** Specialized knowledge will be gathered through other disciplines such as Social, Economic, Land and Resource Use and Aboriginal and Treaty Rights and Interests. The economic data collection program will include primary data collection activities that may involve for example, targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in economic secondary data. These diverse populations include the aforementioned identity groups, which are also referenced in the IS / EA Consultation Plan, and those identified by communities during consultation and engagement. The importance of soliciting inputs and perspectives from diverse subgroups has also been factored into the Indigenous Knowledge Program and associated materials (see **Section 5**).

Draft

When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan. Specific to Gender-Based Analysis Plus (GBA+) objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement.

4.4 Consultation on Economic Concerns and Impacts

As part of the IS / EA Consultation Plan (AECOM 2020) and Indigenous Knowledge Program, Indigenous communities identified in **Table 4-1** will be contacted to determine their level of interest in the Project and their concerns related to potential economic impacts. For the Indigenous communities that express specific economic concerns, targeted economic data collection will be implemented through the economic data collection program, consistent with the likelihood of effect anticipated to the community as defined by the MFFN CAR Project Team. In addition, interested persons identified through the general engagement program and listed in the *Public Participation Plan* (the Agency 2020) may also be engaged on potential economic concerns and impacts. **Section 7.2** provides additional details on the targeted economic data collection approach.

Draft

5. Consideration of Indigenous Knowledge in the IS / EA Report

The following provides a general description of how Indigenous Knowledge will be considered in the IS / EA process. The extent to which Indigenous Knowledge is considered by each specific VC will vary depending on the nature of the VC, the potential for Project effects on the VC and whether Indigenous knowledge that relates to a VC is provided / obtained. As such, not all aspects of the general approach described below may apply to all VCs / study plans.

There are two concurrent and complementary avenues for Indigenous communities and groups to be engaged with and provide input on the Project: the Indigenous Knowledge Program and the Consultation and Engagement Program. Both programs serve to support the collection of Indigenous perspectives, values, and input on the Project, including Aboriginal and Treaty Rights and how they may be impacted by the Project, to be integrated throughout the IA / EA process. However, the Indigenous Knowledge Program specifically aims to solicit and incorporate information that is considered sensitive and may have confidentiality requirements, including Indigenous Knowledge and information on Indigenous land and resource use. Indigenous Knowledge Sharing Agreements will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information.

All Indigenous communities and groups identified by the MECP and the Agency through the Indigenous Engagement and Partnership Plan have the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the Project, and / or complete Project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program includes opportunities for Indigenous communities and groups to meet with the Proponent to discuss the program, ask questions, and share concerns and interests. In support of this, the Proponent has created an Indigenous Knowledge Program Guidance Document (the Guidance Document) that provides:

- An overview of the Indigenous Knowledge Program and information on how Indigenous Knowledge, Indigenous land and resource use and cultural values and practices can be collected and / or shared;

Draft

- Information on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values and practices may be used in the planning and design processes; and
- A suite of guidance materials that were developed based on the information requirements of both the federal and provincial assessment processes, including; question guides to support the collection of information on historical and current community context; Indigenous Knowledge that may be relevant to the various technical disciplines; information on Indigenous land and resource use, cultural values and practices and associated spatial data, and perspective on potential Project-related effects and associated mitigation and / or enhancement measures.

The Guidance Document will also support participating Indigenous communities in providing Project-specific information in a manner that facilitates meaningful incorporation into the IS / EA Report. The IS / EA Consultation Plan outlines the process for obtaining information and feedback about the Project from Indigenous communities (i.e., the Consultation and Engagement Program). All Indigenous communities identified by the MECP and the Agency have the opportunity to participate in the Consultation and Engagement Program through community-specific meetings, Public Information Centres, web conferences, and other formats. All Indigenous communities identified by the MECP and the Agency will be provided information related to the Project and invited to participate at various points throughout the IA / EA process.

There are also opportunities for technical teams to engage with Indigenous communities to solicit perspectives and information relevant to the Project, including information related to collection of existing information and the development of the IS / EA Report. The Proponent also invites feedback and inputs throughout the Project via the Project website and ongoing communications with the Proponent.

The Indigenous Knowledge and Consultation and Engagement programs are designed to be complementary and provide multiple opportunities for communities to offer feedback and information, including perspectives on Aboriginal and Treaty Rights and interests and how these may be impacted by the proposed Project. Relevant information collected through both the Indigenous Knowledge and Consultation and Engagement programs, including potential effect pathways on Aboriginal and Treaty Rights and interests, will be shared with each of the relevant disciplines throughout the IA / EA to: guide and inform VCs; support characterization of the existing environment; identify the potential effects of the Project on VCs; help identify mitigation measures and potential monitoring programs; and ultimately guide Project planning. The nature of how the Indigenous Knowledge becomes integrated into the IS / EA Report will be dictated by the specific information provided by each Indigenous community and the parameters set out in the Indigenous Knowledge Sharing Agreements. A description of how Indigenous Knowledge was considered in the IA / EA and in each of the technical discipline areas will be included in the IS / EA Report.

Draft

It is also important to note that information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs, given the interrelated nature of Indigenous peoples and other environmental disciplines.

The Proponent will strive to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values will become part of the IS / EA Report, and how potential effects to Aboriginal and Treaty Rights and interests will be assessed. It is expected that measures to support this may include but are not limited to: engaging Indigenous communities to solicit information on Indigenous Knowledge and Indigenous land and resource use and cultural values to inform baseline conditions, providing Indigenous communities with draft sections of the IS / EA Report to illustrate how Indigenous Knowledge and information on Indigenous land and resource use and cultural values has been integrated and to confirm it has been presented appropriately, and completing collaborative working sessions with Indigenous communities for the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights will be assessed is provided in the Aboriginal and Treaty Rights and Interests Study Plan.

Draft

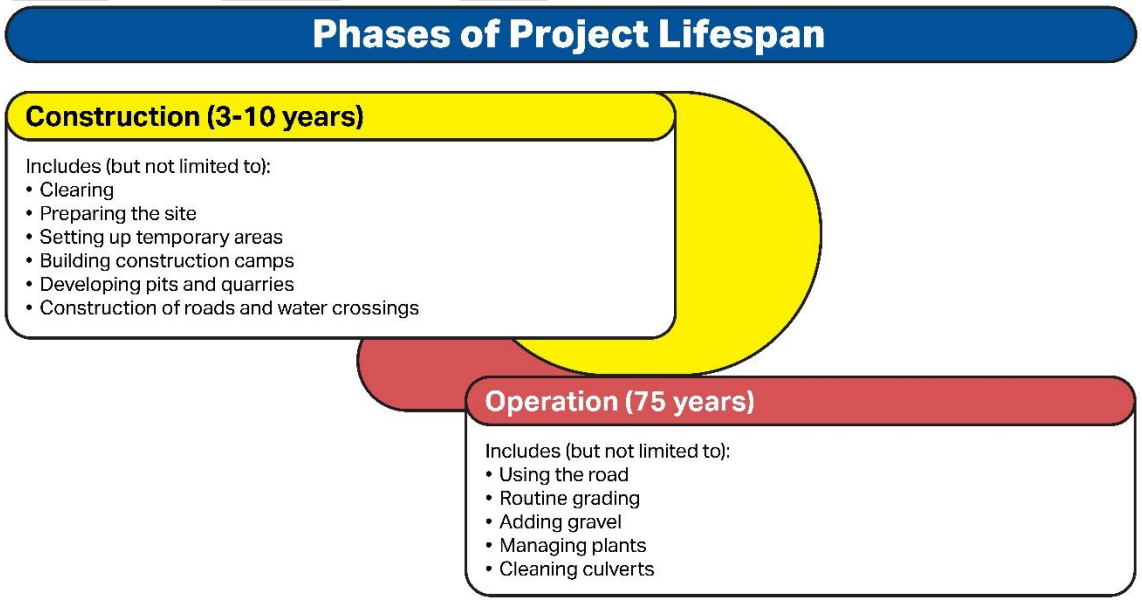
6. Assessment Boundaries

6.1 Temporal Boundaries: Project Phases

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the Project will be considered in the IS / EA Report. The Project is planned to occur in two phases, which are briefly described below and shown in **Figure 6-1**.

- **Construction Phase:**
  The time from start of construction, including site preparation activities, to the start of operations and maintenance of the CAR. Decommissioning of construction works is included in the construction phase. The construction phase is anticipated to take approximately 3 to 10 years to complete.
- **Operations and Maintenance Phase:**
  The operations and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The operations and maintenance phase of the Project is considered to be 75 years based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.

Figure 6-1: Project Schedule



There are currently no plans to decommission the CAR as there is no expected / known end date for its need. Therefore, future suspension, decommissioning and eventual abandonment of the CAR will not be considered in the IS / EA Report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long operations and maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations (Sustainability Principle #2[7]). The final temporal boundaries to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation process.

6.2 Spatial Boundaries: Study Areas

6.2.1 General Information

Study areas identify the geographic extents within which potential effects of the Project are likely to occur and will be considered in the IS / EA Report. The existing conditions and potential effects are documented for three study areas selected for the Project:

- **Project Development Area (PDA):** area of direct disturbance;
- **Local Study Area (LSA):** the area where most of the direct effects of the Project are likely to occur; and
- **Regional Study Area (RSA):** the area where indirect effects of the Project are likely to occur.

The PDA encompasses the 100 metre wide CAR right-of-way (ROW), temporary construction access roads, work areas, worker camps, and pits, quarries and associated access roads. The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4. The preliminary study area generally allows for the documentation of existing conditions and prediction of potential environmental effects for the Project. A 5 km wide study area also allows for route refinements during development of Project design (e.g., adjustment of the alignment to avoid sensitive features).

7. *Sustainability Principles #2 is one of four sustainability principles included in Section 25 of the Project's TISG as further elaborated on Section 9.7.*

Draft

The specific location of Project components, including the roadway, quarries, pits and temporary infrastructure, are not yet known and will be included in the IS / EA Report. While most of the Project components are expected to be located within the preliminary 5 km wide study area, benefits (e.g., reduced environmental disturbance, avoidance of sensitive features, technical considerations, concerns received through consultation) for locating Project components on lands outside of the 5 km wide study area may become known during the IA / EA process. If the need to locate Project components outside the 5 km wide study area is determined to be required or of benefit to the Project, the study area would be adjusted.

The study area for each environmental discipline may vary from the above-described general study area based on the potential for the Project to directly or indirectly affect each environmental discipline; therefore, discipline-specific LSAs and RSAs have been defined for the Project. In defining the final LSAs and RSAs, each environmental discipline will consider:

- Location and other characteristics of the environmental discipline relative to the Project;
- The anticipated extent of the potential Project effects;
- Federal, provincial, regional, and local government administrative boundaries;
- Indigenous groups listed in **Table 4-1**;
- Community knowledge and Indigenous Knowledge;
- Current or traditional land and resource use by Indigenous communities;
- Exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices; and
- Physical, ecological, technical, social, health, economic and cultural considerations.

The study areas included in this document are preliminary, covering the extent to which readily available information suggests the Project may have noticeable effects on the environment. The size, nature and location of past, present and reasonably foreseeable projects will be taken into consideration in the development of the cumulative effects assessment study area(s). The appropriate study area(s) to assess cumulative effects are dependent on the VCs predicted to have direct residual adverse effects as a result of the Project, and therefore, cannot be defined until the IS / EA Report has sufficiently advanced.

As further detailed in **Section 4**, the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs.

Draft

6.2.2 Economic Environment Study Areas

The proposed LSA and RSA boundaries for Economic Environment are detailed in **Table 6-1** and shown on **Figure 6-2**.

Table 6-1: Economic Study Areas

Study Area	Geographic Extent	Rationale
Local Study Area	■ The communities of: – MFFN; – Aroland First Nation; and – Municipality of Greenstone.	■ Communities located in close proximity to the access road such that the Project or resulting access has the potential to directly influence the Economic Environment of these areas. This is the area where most economic impacts are expected.
Regional Study Area	■ The unorganized regional districts of: – Cochrane, including the following Indigenous communities: • Constance Lake First Nation • Fort Albany First Nation – Kenora, including the following Indigenous communities: • Attawapiskat First Nation • Eabametoong First Nation • Kasabonika First Nation • Kashechewan First Nation • Kitchenuhmaykoosib Inninuwug • Kingfisher Lake Fist Nation • MFFN • Mishkeegogamang First Nation • Neskantaga Fist Nation • Nibinamik First Nation • Wapekeka First Nation • Wawakapewin First Nation • Webequie First Nation • Weenusk First Nation • Wunnumin Lake First Nation – Thunder Bay, including the following Indigenous communities: • Animbiigoo Zaagi'igan Anishinaabek First Nation • Aroland First Nation • Ginoogaming First Nation	■ The regional area where Project effects to the Economic Environment may also be experienced but to a lesser extent than in the LSA. If economic residual effects in the RSA are identified, the potential for cumulative economic effects from other planned future projects will be assessed.

Draft

Study Area	Geographic Extent	Rationale
	• Long Lake #58 First Nation Red Sky Independent Métis Nation • Métis Nation of Ontario, Region 2 ■ The Province of Ontario will also be considered to estimate quantitative economic effects.	

Notes: The Economic RSA is inclusive of all Indigenous communities identified in Table 4-1. While statistics are likely to be provided for the region, specific information on communities is likely to be provided at a high-level.

As currently defined, the Economic study areas are defined to capture the potential Economic effects of the Project on the surrounding environment. The study areas are also reflective of potential changes to natural environment, health, and social conditions that could directly or indirectly impact Economic considerations.

The Economic LSA and RSA were defined based on secondary source information, including existing mapping and reports profiling relevant communities, to understand the extent to which community-level socio-economic interest was apparent in the PDA. More specifically, this included assessing the use of the PDA and / or a connection to the Project that has the potential to alter the Economic Environment of a community. The Economic Assessment will consider the potential for economic impacts on all communities identified in **Table 6-1**. Communities in the Economic LSA are those who are anticipated to experience noticeable changes due to the Project. Comparatively, communities in the Economic RSA, which is regionally defined, are likely to be impacted by the Project in a less noticeable and more variable manner due largely to their limited use and connection to the PDA and future transportation infrastructure.

Indigenous communities and interested persons will be consulted on their interest, concern and perceptions regarding the potential for economic impacts to their community. Further, the Proponent remains open to receiving information from communities on their activities within the PDA and how interlinkages between the Project and those communities may result in economic effects. The Economic LSA and RSA will be informed by feedback received from Indigenous communities and interested persons identified in **Sections 4.1** and **4.2.**

To be included in the Economic LSA, there needs to be either an articulated community concern or perception of economic impact on the community as a result of changing access to the MFFN community due to the Project; and / or due to Project effects on the environment that could result on economic impacts to a community. If there is rationale to alter study areas, the extents of the applicable study areas will be revised accordingly (i.e., if additional information is provided that warrants a community's inclusion in the Economic LSA, the Economic LSA will be adjusted). Alternatively, if requested, a community may be removed from the study area should the Project effects not be relevant to the community.

Draft

All communities identified in **Table 6-1** will be profiled in in the Economic Assessment. Detailed economic profiles will be developed for communities listed in the Economic LSA. Primary data collection will be undertaken to develop profiles for these communities to augment secondary information sources. The Economic RSA will be profiled in less detail based on secondary data sources with key interactions and thematic information provided. Statistics collected on the Economic RSA will focus on larger regional areas such as unorganized regional districts.

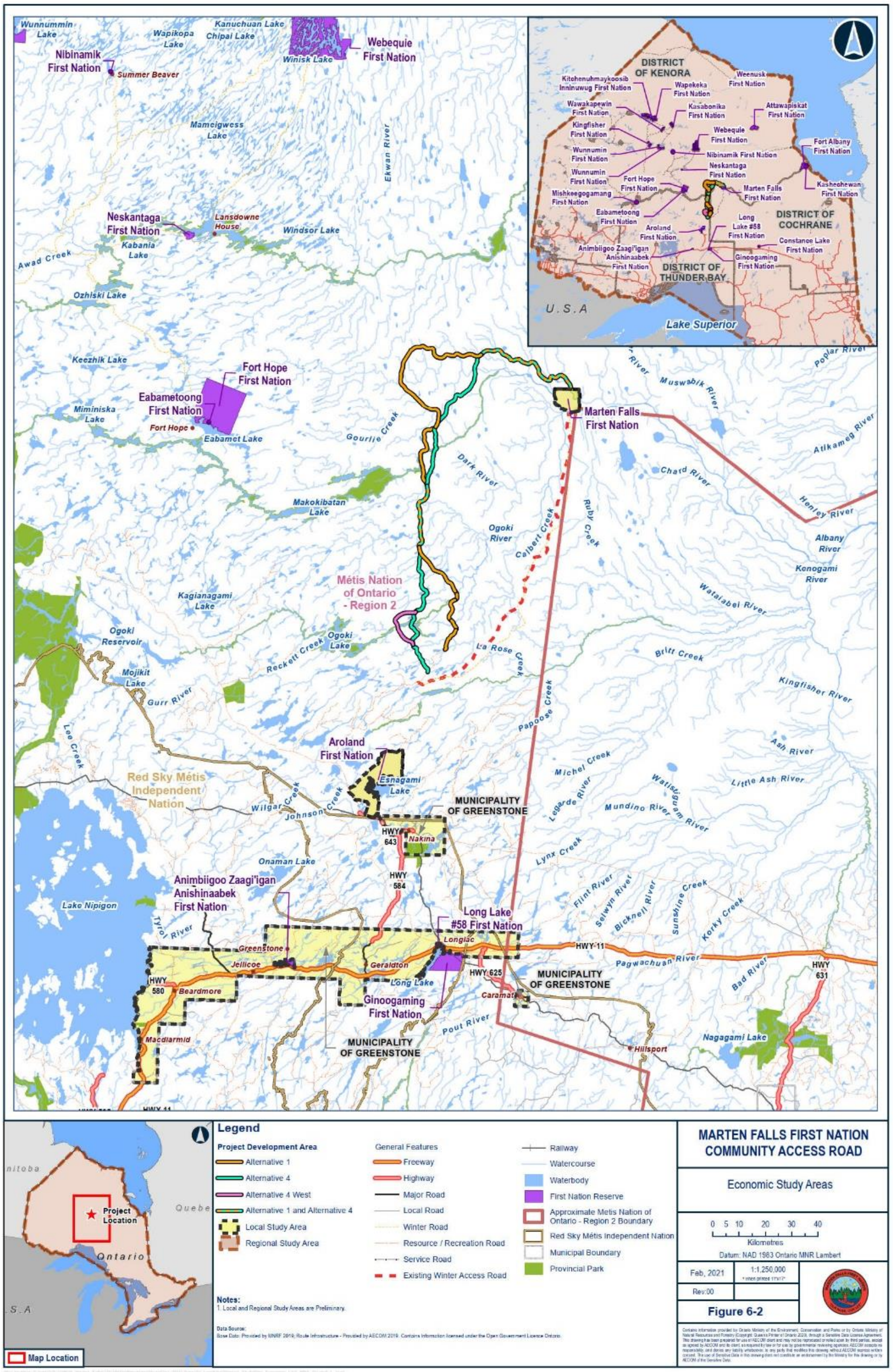
6.2.3 Study Areas and Effects Assessment

Considering the above description of study areas, a pathway analysis of potential economic impact will be completed for all Indigenous and non-Indigenous communities identified in **Table 6-1**. Communities with identified effect pathways will be assessed in detail in the IS / EA Report. For communities that are not expected to experience Economic impacts, a rationale will be provided. Communities located in the LSA will be assessed in greater detail than communities in the RSA. **Section 9.0** of this report provides a description to the effects assessment approach to be followed.

Members in other communities who are involved in land use activities within the Project area will be assessed and considered in the Land and Resource Use Assessment.

Draft

Figure 6-2: Economic Local and Regional Study Areas



7. Baseline Study Design

7.1 Desktop Assessment

A desktop review of existing information sources will be completed to identify information gaps that will need to be addressed through further study. A preliminary list of applicable information sources has been included in Appendix A and reflects federal and provincial guidance received to date. This Study Plan focuses on the additional studies that are anticipated to be required to gather information beyond what is currently available through existing information sources, including those as described in Section 7.2 'Sources of baseline information' in the Agency's TISG for this Project.

7.2 Baseline Data Collection

Data collected for the Economic Assessment will be used to inform the IS / EA Report. Overall, data collection will be completed in support of the following objectives:

- Provide an understanding of the current state of each VC and indicator (**Section 9.2**) including relevant trends, barriers and opportunities;
- Describe economic conditions using disaggregated data and gender statistics, where publicly available or volunteered by knowledge holders;
- A sample table of publicly available disaggregated data are included in **Appendix C;**
- Identity factors that cannot be disaggregated through secondary source data will be considered qualitatively. Where available, these identity factors will be referenced and considered in existing conditions reporting and analysis;
- Define access and control of resources in alignment with GBA+ principles, for each indicator, as data allows;
- Conduct intersectional gender analysis considering resources, opportunity, control and access;
- Identify the capacity of institutions and socio-economic structures;
- Describe local and regional economic goals, as applicable; and,
- Provide relevant historical background and economic issues for the applicable study area.

These objectives will be reflected in the data collection processes and which data are included in the IS / EA Report. The purpose of the data collection will be to inform the assessment of the effects of the Project on

Draft

the Economic Environment and to inform the development of mitigation measures to minimize adverse effects and / or enhance Project benefits. To collect information supporting the aforementioned objectives, data will be collected from primary and secondary data sources.

Indigenous communities identified in **Table 4-1** may be engaged for the purposes of economic data collection. In addition, when appropriate, the following is an initial list of stakeholders that may be engaged with for the purposes of economic data collection. This list of stakeholders may be revised and expanded upon on the IS / EA Report.

- Canada Chrome Corporation;
- Geraldton Chamber of Commerce;
- Golden Share Resource Corporation;
- KWG Resources Inc.;
- Leuenberger Air Service;
- Longlac Chamber of Commerce;
- Municipality of Greenstone;
- Noront Resources Ltd.;
- Northern Ontario Tourist Outfitters;
- Ontario Forest Industry Association;
- Wabassi Resources Inc.; and
- Wilderness North.

7.2.1 Secondary Data Collection

Secondary source data will be collected on relevant economic features, issues and activities within the LSA and RSA. The information will be collected for the purposes of assessing the effects of the Project on the Economic Environment. The secondary data will be collected from (including example sources):

- Statistics Canada;
  - Employment and labour force data
- Municipal, provincial and Indigenous government websites;
  - Municipal websites such as the Municipality of Greenstone Labour (Municipality of Greenstone 2016);

Draft

- Municipal plans and reports;
  - Municipal reports such as the Municipality of Greenstone Financial Statements (Municipality of Greenstone 2018);
- Provincial plans and reports;
  - Provincial plans such as Plan to Build Ontario Together (Ontario Government 2019) 2019 Ontario Economic Outlook and Fiscal Review (Ministry of Finance 2019);
- Local service providers;
  - Local service providers such as Marten Falls First Nation Economic Development (211 Ontario North 2020)
- Regional reports;
  - Regional Reports such as Northern Projections – Human Capital Series (Moazzami 2019b) available for Cochrane District, Kenora District and Thunder Bay District;
  - Regional Reports such as Mining Readiness Strategy: An Integrated Regional Economic Development Plan (Advantage Northwest 2013);
- Industry reports;
  - Industry reports such as Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012);
- Academic research;
  - Academic research such as the Northern Policy Institute's Community Labour and Market Report: Marten Falls First Nation (Martel and Noiseux 2017);
- Web-based sources such as firm websites; and,
  - Web-based sources such as Marten Falls First Nation: Economic Development (211 Ontario 2020);
- Previous relevant EAs;
  - The Hardrock Project Environmental Assessment (Greenstone Gold 2017).

Other secondary data sources publicly and readily available will also be considered and utilized as applicable. This includes sources listed in Appendix 1 of the TISG.

Economic data collection will be undertaken following the objectives outlined in **Section 7.0** to define the current state of the Economic Environment as applicable to each economic VC. Data collected from secondary sources will be disaggregated when available and analyzed to cover a diverse range of subgroups applicable to the Project area. Attention will be paid to norms, roles and relations, power

Draft

structures, and needs, constraints and opportunities. The purpose of the disaggregation will be to understand disproportionate effects that may result from the Project.

7.2.2 Primary Data Collection

Primary data collection will include field work to collect qualitative data on the Economic Environment within communities potentially affected by the Project (included in **Table 6-1**). The MFFN CAR Project Team may undertake community visits for the purpose of data collection. Depending on COVID-19 restrictions, data collection at the community-level may also be conducted using alternative methods (i.e., online or telephone) or by Community Consultation Co-ordinators. If field visits do occur, they are expected to include interviews, focus groups and other discussions with community members to provide information on the Economic Environment. The field visits will include:

- Data collection methods including interviews, focus groups and surveys designed with respect to cultural norms and the socio-economic situation in a community;
- Focused data collection on gaps identified in the secondary sources related to VCs and indicators such as quality factors for services and infrastructure;
- Community Consultation Coordinators integrated into the data collection process to improve capacity;
- Engagement with knowledge holders including community government officials such as Chief, Council and band office staff;
- Engagement with relevant identity groups for the community including women, youth and elders, if culturally appropriate;
- Engagement with Community Consultation Coordinators to verify if the approach is applicable to the community and receive feedback prior to commencing activities; and,
- Cultural norms and participant confidentiality respected in all activities.

The specific scope of the primary data collection program will be informed by the final Economic study areas. However, it is anticipated primary data collection will focus on the communities most likely to be affected by the Project including MFFN and Aroland First Nation (**Section 6.2**). Based on the nature of the Economic Environment, primary data will also be collected in the regional service centre of Geraldton located in the Municipality of Greenstone. These communities are likely to experience the most Project-related change due to the location of the Project and its resulting access.

Draft

The primary data collection will be informed by the same objectives as the overall data collection. However, the primary data collection program will have the added focuses of filling gaps identified in secondary data and informing further secondary data collection based on issue-specific items raised through primary data collection. This includes the collection of Indigenous and local knowledge of the Economic Environment, disaggregated qualitative data by identity factors when volunteered and other information relevant to understanding the current state of the Economic Environment in the Project area. Specific information requirements will be based on gaps in the secondary literature. For example, if information on youth is not readily available through secondary sources or engagement within a community, this group may be more heavily targeted for primary economic data collection.

Specific primary data collection activities will vary based on the preferences of groups, the number of individuals in the group and other information identified through the Indigenous Knowledge Program and engagement relating to cultural relevancy of data collection practices. It is important to note that this targeted data collection activity differs from the engagement activities outlined in the IS / EA Consultation Plan and the Aboriginal and Treaty Rights and Interests Study Plan.

The economic primary data collection will involve asking questions in order to fill discipline-specific information gaps. Interviews will be tailored to the specific individuals being interviewed. Example interview questions include:

- What type of employment opportunities exist within the community? Where do people work?
- Do people leave the community for work? Is it seasonal? Where do people go for work?
- Is unemployment a problem for specific groups? Youth? Women? Are there times of the year when unemployment is higher?
- Do you purchase goods outside the community? If so, how often? How much is spent on a typical month? What types of goods?
- What indigenous owned businesses operate in the community? What services do they provide? What challenges do Indigenous owned businesses face?
- Are there employment training opportunities available in the community?

There will be also be opportunities throughout the interviews for participants to raise topics they deem to be relevant and appropriate.

Draft

When conducting this targeted primary data collection, reporting and consultation requirements identified by communities will be followed, including those provided by Indigenous communities and identified by Community Consultation Coordinators.

GBA+ will be integrated into economic primary data collection activities. Drawing on this analytical framework, the economic primary data collection program will seek to understand the diverse views and perspectives of a range of individuals including relevant identity groups such as youth, women, elders and those engaged in traditional cultural practices. Primary data collection will be inclusive of other community-specific identity factors that emerge through engagement activities and the Indigenous Knowledge Program.

Information obtained through consultation and engagement and the Indigenous Knowledge Program will be used to support the economic baseline conditions and effects assessment, including any disproportionate effects on identified sub-populations. Relevant information from engagement activities and the Indigenous Knowledge Program may also include data collection techniques for the target group, information to support baseline data collection, an expression of interest in providing additional knowledge, and identifying other sources of information (i.e., people, groups or key documents).

The economic primary data collection program will select key socio-economic knowledge holders to participate in the program. These participants may include government officials (including community officials), women's groups, youth groups, political officials (municipal and Indigenous communities), services providers and other relevant community knowledge holders consistent with gaps in secondary literature. The selection of participants will be informed by factors such as the availability of information, community level of interest, anticipated magnitude of effect and willingness to participate in activities.

In addition, the selection of participants will be based on existing stakeholder contact lists, previous engagement information, secondary data sources that identify key contacts, and information obtained from Community Consultation Coordinators. Information obtained through the general engagement activities and the Indigenous Knowledge Program may be used to identify participants, specifically if this information is relevant to the economic assessment.

Community Consultation Coordinators may be engaged to assist those Indigenous communities with the highest potential for impact and Project interest. Community Consultation Coordinators will be responsible for assisting in the coordination of engagement activities at the community-level and will be integral in gathering input from Indigenous communities. To attract participants to the economic primary data collection program, the MFFN CAR Project Team will work with Community Consultation Coordinators to advertise data collection activities, encourage participation, identify barriers to participation and identify key socio-

economic knowledge holders. Community Consultation Coordinators will also play a key role in the identification of community-specific identity factors to be considered in the Economic Assessment.

7.3 Study Methods

The study methods that will be employed to characterize the economic baseline conditions include data collection, data analysis and qualitative descriptions and profiling. Multiple sources of data, including primary, secondary, engagement and Indigenous Knowledge, will be utilized for the purposes of economic data collection. Data collection methods are detailed in **Section 7.2**. The data collection process can be conceptualized as a matrix. For each indicator listed in **Section 9.2**, data will be collected for different groups of interest (e.g., communities, subgroups within the community). The data collected will be tracked and assessed using this approach, and, when required, primary data collection will target information gaps identified in the matrix. Data analysis will involve classifying, comparing and interpreting the data collected in line with this matrix approach. An intersectional gender analysis will also be conducted to examine the differences in the status of different subgroups and their differential access to resources, opportunities and services.

Based on this analysis, qualitative descriptions and economic profiles will be produced, including community and regional profiles derived from the data as described above. These descriptions and profiles will provide the economic baseline information to characterize the Economic VCs and inform the effects assessment. In addition, to support GBA+ objectives, the qualitative descriptions and profiles will describe economic conditions using disaggregated data and gender statistics, when available. Regional and community profiles provide a comprehensive and holistic background to consider and assess changes in a dynamic environment. These study methods are standard practices for economic impact assessments.

The scope of the Economic Baseline Study will be tailored to the Project context and consider Indigenous community inputs and priorities. The scope of this study will be inclusive of the temporal and spatial boundaries identified in **Section 6.1** and **Section 6.2**. The Project phases and the Economic LSA and RSA will inform data collection and data analysis.

The primary economic data collection is anticipated to be conducted during the Spring and Summer of 2021, however this timing is subject to change and dependent on the larger Project schedule, including engagement and consultation activities. Public gathering restrictions related to COVID-19 may also influence timing. Other economic baseline study methods will occur throughout the IS / EA process.

Draft

8. Data Management and Analysis

Data management including quality assurance / quality control (QA / QC) will be employed to minimize potential for data entry and analysis errors, prepare data sets for analysis and limit sensitive data distribution in accordance to established agreements.

It is expected that there will be a multitude of data issues and limitations based on the Project area. This may include:

- The suppression of data by Statistics Canada due to low population numbers, particularly when disaggregating data related to income and other sensitive factors;
- Individuals volunteering to self-identify during the primary data collection program to support disaggregated data reporting; and,
- Community-specific research and planning documentation to support all elements of data collection including community-specific studies and specialized plans.

The above list is not comprehensive. It is anticipated that additional data issues and limitations may be encountered. Data issues and limitations will be tracked for the duration of the Project and, when possible, addressed with supplementary sources of information. These issues may limit the information available to be reported by the Proponent as part of the IS / EA Report, particularly related to disaggregated data to support GBA+. None of these issues are likely to limit the ability of the Proponent to assess economic effects but may result in more frequent assumptions related to the applicability of data across communities.

The economic data collection program will involve a data verification component. There will be opportunities for community members that participate in economic data collection activities to review, comment and discuss changes to the information presented in the economic baseline study. In addition, meeting minutes will be shared with participants following primary data collection activities. When appropriate, Community Consultation Coordinators will also support and inform the data verification process. The data verification process will be clearly documented.

Draft

9. Effects Assessment

The following sections provide discipline-specific input and considerations as they pertain to the methodology for effects assessment. The Project is in the early stage of the IS / EA Report preparation and it is expected that the effects assessment methodology will be refined iteratively based on regulatory agency guidance, professional judgment and input received through the Project consultation and engagement process.

9.1 Project-Environment Interactions

The Project activities that may result in changes to the environment are described within the identified temporal and spatial boundaries. This includes identification of both direct and indirect changes by comparing the existing setting to the conditions anticipated to occur as a result of the Project. For each environmental discipline, the likely Project-environment interactions will be identified based on professional judgment, activities listed in TISG Section 3.2 as well as projects of similar magnitude and / or location.

A preliminary analysis of Project-environment interactions for the Economic Environment is provided in **Table 9-1** and will be confirmed during the IA / EA process to identify the Project-environment interactions that are likely to have a potential effect, and to identify measures to avoid or minimize potential negative effects and enhance benefits.

Table 9-1: Project – Environment Interactions

Project Phases	Project Activities	Economic
Construction Phase	*Mobilization of Equipment and Supplies*	**X**
	Temporary Construction Staging Areas[1]	**X**
	Temporary Access Roads and Trails[1]	**X**
	Temporary Construction Camps[1]	**X**
	ROW Clearing and Grubbing	**X**
	Brush and Timber Disposal	**X**
	Pits and Quarries[1]	**X**
	Drilling / Blasting / Aggregate Production	**X**
	Road Construction (stripping, subgrade excavation, embankment fill placement, grading, ditching)	**X**
	Bridge and Culvert Installation (approach embankments, foundations, substructures, superstructures, traffic protection, erosion controls)	**X**
	Construction Site Restoration	**X**

Draft

Project Phases	Project Activities	Economic
Construction Phase: Decommissioning	*Pits and Quarries*	**X**
	Temporary Camps, Roads / Trails and Staging Areas	**X**
Operations Phase	*Road Usage*	**X**
	Maintenance[2]	**X**

Notes: 1. Includes construction and use of
2. Includes General Maintenance (e.g., grading, erosion control, quarrying, borrow pits), Seasonal Maintenance (e.g., snow clearing, bridge and culvert maintenance), and Special Maintenance (e.g., slope failures, road settlement / break-up.).

9.2 Valued Components and Indicators

VCs are the environmental, health, social, economic or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and are of concern or value to the public, Indigenous peoples, federal authorities and interested parties (the Agency 2020b). Indicators represent the resource, feature, or issue related to the VC that, if changed, may demonstrate an effect on the environment. The indicators and rationale for selection and measurement of potential effects, to be used to assess and evaluate the alternative routes and assess the overall effects of the Project in the IS / EA Report are provided in **Table 9-2**. The table includes both quantitative and qualitative indicators. The final list of VCs and indicators to be used in the IS / EA Report will be finalized based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement activities with Indigenous communities and interested persons.

The VCs of the Economic Environment have been determined through consideration of the following factors listed in the TISG[8]:

- VC presence in the study area;
- The extent to which the VC is linked to the interests or exercise of Aboriginal and Treaty Rights of Indigenous peoples, and whether an Indigenous group has requested the VC;
- The extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the VC;

8. *The TISG also states that information from ongoing and completed regional assessments in the proposed area of the Project should be used to inform VCs for the Project. In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/ EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project.*

- The extent to which the VC may be under cumulative stress from other past, existing or future undertakings in combination with other human activities and natural processes;
- The extent to which the VC is linked to federal, provincial, territorial or municipal government priorities (e.g., legislation, programs, policies);
- The possibility that adverse or positive effects on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and
- Whether the potential effects of the Project on the VC can be measured and / or monitored or would be better ascertained through the analysis of a proxy VC.

Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Economic discipline.

As the Economic Environment has an abundance of interlinkages and overlaps, certain aspects of the Economic Environment are considered in other study plans, and have their baseline information documented in other relevant reports. The Social Assessment will document information on housing and infrastructure. The Land and Resource Use Assessment includes information on industrial land uses and tourism establishments. Elements of the traditional economy are covered in the Aboriginal and Treaty Rights and Interests Assessment. Findings and data included in these disciplines are considered under relevant components of the Economic Assessment.

Draft

Table 9-2: Economic Indicators

Valued Component	Indicator[1]	Sub Indicator[1]	Rationale for Selection	Sources of Information
Regional Economy	Economic Opportunity	■ Change in business opportunity ■ Change in regional economic activity ■ Change in output ■ Change in GDP value-added	■ The Project has the potential to change the composition of the economy and alter the industrial and commercial activities available within the area.	■ Primary data (e.g., interviews with community members / key contacts; area businesses, municipal economic development office); ■ Municipal, provincial and Indigenous government websites; – Marten Falls First Nation Community Profile (Matawa 2014); ■ Municipal plans and reports; – Greenstone Business Capacity Inventory (Greenstone Economic Development Corporation 2018); ■ Provincial plans and reports; – Growth Plan for Northern Ontario (Ontario Ministry of Northern Development, Mines and Forestry (ENDM) 2011); ■ Local service providers; – Marten Falls First Nation Economic Development (211 Ontario 2020); ■ Regional economic development reports; – Mining Readiness Strategy: An Integrated Regional Economic Development Plan (Advantage Northwest 2013); ■ Regional tourism reports; – Regional Tourism Profiles (Ministry of Tourism, Culture and Sport 2017); ■ Industry reports; – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012) ■ Previous EAs; and, – Hardrock Project Environmental Assessment (Greenstone Gold 2017) ■ Land and Resource Use IA.

Draft

Valued Component	Indicator[1]	Sub Indicator[1]	Rationale for Selection	Sources of Information
Regional Economy	Procurement	■ Value of procurement opportunities associated with the Project	■ The Project will require the procurement of goods and services – possibly from firms within the local area.	■ Primary data (e.g., interviews with community members / key contacts; area businesses, municipal economic development office); ■ Municipal, provincial and Indigenous government websites; ■ Municipal plans and reports; – Greenstone Business Capacity Inventory (Greenstone Economic Development Corporation 2018); ■ Provincial plans and reports; ■ Local service providers; ■ Regional economic development reports; – Mining Readiness Strategy: An Integrated Regional Economic Development Plan (2013) ■ Regional tourism reports; – Regional Tourism Profiles (Ministry of Tourism, Culture and Sport 2017); ■ Industry reports; and, ■ Previous EAs. – Hardrock Project Environmental Assessment (Greenstone Gold 2017)
Regional Economy	Price of Goods	■ Estimated price changes at an order of magnitude level for key consumptive goods	■ The Project may affect the price of goods due to increased access to the community.	■ Primary data (e.g., interviews with community members / key contacts; area businesses, municipal economic development office);
Regional Economy	Traditional Economies	■ Change in ability to undertake traditional economic activities ■ Change in willingness to undertake traditional economic activities	■ The Project may influence the traditional economies of local communities.	■ Primary data (e.g., interviews with community members / key contacts); ■ Indigenous Knowledge Program; and ■ Academic research and NGO reports – What's at Stake in the Ring of Fire (Gamble 2017).

Draft

Valued Component	Indicator[1]	Sub Indicator[1]	Rationale for Selection	Sources of Information
Labour Force and Employment	Employment	■ Change in job opportunities ■ Change in labour income ■ Training opportunities	■ The Project is likely to offer employment opportunities. ■ Note that the IS / EA Report will include recommendations for employment training to enhance local hiring opportunities.	■ Primary data (e.g., interviews with community members / key contacts; area businesses, municipal economic development office); ■ Statistics Canada (e.g., employment and labour force data); ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Profile: Labour Force (2016); ■ Municipal plans and reports; – Greenstone Business Capacity Inventory (Greenstone Economic Development Corporation 2018); ■ Provincial plans and reports; – Growth Plan for Northern Ontario (ENDM 2011); ■ Industry reports; and, – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012); ■ Previous EAs; – Hardrock Project Environmental Assessment (Greenstone Gold 2017).
Government Finances	Expenditure	■ Change in government expenditure	■ The Project may change the available funds for governments to spend.	■ Municipal and Indigenous community financial statements; and ■ Municipality of Greenstone Financial Statements (Municipality of Greenstone 2018).
	Taxation	■ Change in tax revenue	■ The Project may affect tax revenues.	■ Municipal and Indigenous community financial statements; and ■ Municipality of Greenstone Financial Statements (Municipality of Greenstone 2018).

Note: 1. Indicators define changes during both construction and operation.

Draft

9.3 Potential Effects

A direct effect occurs through the direct interaction of an activity with an environmental discipline. The Project-environment interactions currently anticipated, based upon preliminary analysis, to result in direct effects to the Economic discipline have been identified in **Table 9-1**. The potential direct effects resulting from the Project-environment interactions will be confirmed during the IA / EA process and will be based on input received through the Indigenous Knowledge Program and Consultation and Engagement Program, regulatory agency guidance, and professional judgement.

An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in land and resource use could indirectly affect economic conditions for an existing business). **Table 9-3** provides a preliminary identification of how the Economic Environment may be indirectly affected by changes to other environmental disciplines.

Draft

Table 9-3: Potential Discipline Interactions – Economic

Discipline and Associated Valued Components	Aboriginal and Treaty Rights and Interests	Atmospheric Environment	Acoustic and Vibration Environment	Physiography, Geology, Terrain and Soils	Surface Water	Groundwater and Geochemistry	Vegetation	Wildlife	Fish and Fish Habitat	Social	Economy	Land and Resource Use	Human Health and Community Safety	Visual Aesthetics	Archaeological and Cultural Heritage
Economy ■ **Regional Economy** ■ **Labour Force and Employment** ■ **Government Finances**	X	-	-	-	-	-	-	-	-	X		X	X	-	-

Notes: X = Potential pathway for indirect effect as a result of the Project.
- = No pathway for indirect effect is anticipated as a result of the Project.

9.4 Methods for Predicting Future Conditions

The TISG includes a request that localized direct, indirect and induced economic effects be considered in the IS / EA Report. Input-output modelling is the typical method used when conducting assessments of economic effects in Canada including direct, indirect and induced effects. Considering the likely structural economic changes associated with a road access project as indicated by the requirement to assess price changes, it is not relevant to conduct localized input-output modelling at the community-level. Input-output modelling is linear with a simplified macro-economic structure which removes key variables such as price-level, interest rates and unemployment rates (Statistics Canada 2009). Due to the reliance on existing economic relationships, price volatility can corrupt the linear relationships contained within these models making them less reliable, particularly over time (Statistics Canada 2009).

As a result, it is proposed input-output multipliers developed by the Northern Policy Institute be used to consider economic effects at an unorganized district level or provincial-level consistent with the economic RSA (Moazzami 2019a). If this approach is utilized, provincial multipliers will be used to scale the regional multipliers when multipliers are not available through the Northern Policy Institute. Alternatively, Statistics Canada's National Input-Output model will be used to conduct a provincial level assessment of economic effects. The best practices method will be determined depending on the planned procurement of goods and service by the Proponent.

Effects to factors listed in Section 18 of the TISG including changes to type of income (e.g., market, government), specific to small businesses, non-market (or non-financialized economies), and consumer spending do not have multipliers associated with them for a variety of reasons. This includes the National Input-Output Model and the Northern Policy Institutes' estimated multipliers. As a result, changes to these factors are expected to be assessed qualitatively with some quantitative techniques incorporated. For example, consumer spending may be estimated using savings rates from relevant sources and expected labour income from the multipliers. Qualitative descriptions of economic effects to these items should provide sufficient understanding of how the Project is likely to affect the Economic Environment.

Specifics for how items included in the TISG will be addressed has been included in **Section 11**. These items will commonly be addressed through a combination of qualitative and quantitative methods dependent upon the availability of data and primary data provided.

Draft

9.5 Mitigation and Enhancement Measures

Once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects beyond those that are already inherent to the design. These measures will consist of industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, Indigenous and community recommendations and recommendations from industry and environmental professionals based on expertise, scientific publications, experience and judgement.

It is important that mitigation and enhancement measures are achievable, measurable and verifiable and monitored for compliance and effectiveness during all temporal phases as part of the Project follow-up monitoring plan. Required environmental monitoring will verify the potential environmental effects predicted in the IS / EA Report, evaluate the effectiveness of mitigation and enhancement measures, and identify the process the Proponent will follow if mitigation and enhancement measures are not effective.

9.5.1 TISG Section 20 Requirements

The following provides a response to the fulfillment of TISG Section 20 requirements.

Table 9-4: TISG Section 20 Requirements

Item #	TISG Section 20 Requirement	Response
1	■ Describe mitigation measures that are specific to each environmental, health, social or economic effect identified. Mitigation measures are to be written as specific commitments that clearly describe when and how the proponent intends to implement them, what decision-making criteria will be used, and the outcome these mitigation measures are designed to address;	■ The Economic Assessment will include a description of applicable mitigation measures deemed to be required to avoid / minimize adverse economic impacts or enhance positive economic impacts. This will be informed by engagement activities with applicable persons.
2	■ Describe mitigation measures that are specific to identified effects to Indigenous peoples;	■ The Economic Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the IA, including measures that may be specific to Indigenous people This will be informed by engagement activities with applicable Indigenous communities.
3	■ Describe mitigation measures proposed by Indigenous peoples and the consideration of those in the Project;	■ The Economic Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the IA, including measures that may be specific to Indigenous people including measures that may have been suggested by Indigenous people.

Draft

Item #	TISG Section 20 Requirement	Response
4	■ Propose differentiated mitigation measures for all potential adverse effects identified, if applicable, so that adverse effects do not fall disproportionately on vulnerable populations, certain Indigenous groups, or certain communities, and they are not disadvantaged in sharing any development benefits and opportunities resulting from the Project. These mitigation measures should be developed in collaboration with those who are vulnerable and / or disadvantaged;	■ The development of applicable mitigation measures will take into account identified potential impacts on vulnerable populations and developed with the input of interested persons from those vulnerable populations.
5	■ Propose mitigation measures to reduce all potential adverse effects to economic conditions of all potentially impacted communities and Indigenous groups and present opportunities for enhancing positive effects such that benefits are not disproportionate on some;	■ Mitigation measures will be developed to address potential adverse effects on all potentially economically impacted communities. As well, opportunities to enhance positive effects will be recommended where applicable.
6	■ Identify opportunities for enhancing positive effects, such as creation of local employment and infrastructure improvements;	■ Where applicable, recommendations will be made regarding opportunities for enhancing positive effects such as creation of local employment and infrastructure improvements.
7	■ Describe supplier development initiatives, including identification of potential local suppliers, providing them with information about technical, commercial and other requirements, and debriefing unsuccessful bidders;	■ Potential local suppliers will be identified and where applicable, recommendations will be made regarding supplier development initiatives.
8	■ Describe any procurement policies (e.g., bid packaging) that facilitate the opportunities for local companies;	■ Where applicable, recommendations will be made regarding procurement policies for local companies.
9	■ Describe education, training, hiring practices that encourage employment of local people, including the use of the Northern Ontario Network of Indigenous Training Organizations (e.g., the Indigenous Skills and Employment Training network);	■ Where applicable, recommendations will be made regarding the development and implementation of training and hiring practices to promote the hiring of local people.
10	■ Describe technology transfer and research and development programs that will facilitate the use of local suppliers of goods and services, local employees, develop new capabilities related to project requirements;	■ Where applicable, recommendations will be made regarding technology transfer and research and development programs that facilitate the use of local suppliers of goods and services, local employees, develop new capabilities related to project requirements.
11	■ Describe how disproportionate effects that were identified in the GBA+ results were used to inform mitigation and enhancement measures.	■ The Economic Assessment will describe any identified disproportionate effects to sub-populations.

Draft

9.6 Residual Effects

Residual effects are the effects remaining after the application of mitigation measures. The IS / EA Report will describe in detail the potential adverse and positive residual effects in relation to each temporal phase of the Project (e.g., construction, operation). Residual effects will be described using criteria to quantify or qualify adverse and positive effects, taking into account any important contextual factors. The residual effects will therefore be described in terms of the direction, magnitude, geographic extent, duration, frequency, likelihood, and whether effects are reversible or irreversible[9]. Ecological and socio-economic context may also be relevant when describing a residual effect. Context relates to the existing setting, its level of disturbance and resilience to adverse effects. Context can also relate to timing as it applies to assessing the worst-case scenario (e.g., effect during migratory or calving season for wildlife). Where appropriate, information regarding residual effects will be disaggregated by sex, gender, age and other community relevant identifying factors to identify disproportionate residual effects for diverse subgroups.

For magnitude, Economic Environment definitions are required and are proposed below in **Table 9-5**.

Table 9-5: Economic Magnitude Definition

Magnitude Level	Definition	Rationale
Negligible	An effect that may or may not be discernible but is within the historical variability as defined by baseline conditions. The effect is within the capacity of the economic system to respond and / or will not alter the current economic structures.	Negligible effects are small and may not be noticeable. These effects do not represent a change in day-to-day life at a community-level.
Low	An effect that is small but discernable and within historical variability as defined by baseline conditions. The effect is within the capacity of the economic system to respond and / or will not alter the current economic structures.	Low effects are noticeable to community members. These effects do not represent a change in day-to-day life at a community-level
Medium	An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. The effect is within the capacity of the economic system to respond and / or will not alter the current economic structures.	Medium effects are noticeable to community members. These effects may or may not represent a change to day-to-day life but can be adjusted to within the current economic system.
High	An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. The effect is beyond the capacity of the economic system to respond and / or will alter the current economic structures.	High effects are noticeable to community members. These effects represent a change to day-to-day life and cannot be responded to within the current economic system resulting in systemic change.

9. *TISG Section 13.1 identifies additional effects characteristics for certain disciplines (e.g., wetlands, birds, terrestrial wildlife, species at risk). These additional effects characteristics are described in the respective discipline-specific study plans.*

9.7 Consideration of Sustainability Principles

The following provides a generic description of how sustainability principles will be considered in the effects assessment. The extent to which sustainability principles apply to a specific VC will vary depending on the nature of the VC and the potential for Project effects on the VC.

The effects assessment approach for the Project has included the consideration of the sustainability principles outlined in the Project TISG and the Agency's guidance on sustainability. The sustainability principles that have been considered include:

1. Consider the interconnectedness and interdependence of human-ecological systems;
2. Consider the well-being of present and future generations;
3. Consider positive effects and reduce adverse effects of the Project; and
4. Apply the precautionary principle by considering uncertainty and risk of irreversible harm.

The interconnectedness and interdependence of human-ecological systems will be considered through the assessment of potential indirect effects of each alternative. An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in vegetation could indirectly affect wildlife). A preliminary assessment of indirect effects has been included in **Section 9.3**.

The well-being of present and future generations will be considered in the effects assessment through the application of the long-term operations phase temporal boundary of 75 years (**Section 6.1**) and through the effects characteristics description of duration and reversibility for each residual effect predicted.

The consideration of positive effects and reducing adverse effects of the Project is fundamental to the effects assessment methodology through the identification of mitigation measures to reduce potential adverse effects and the identification of the preferred alternative through the evaluation of advantages (e.g., positive effects) and disadvantages (e.g., adverse effects).

The effects assessment will apply the precautionary principle by clearly describing and documenting all uncertainties and assumptions underpinning the analysis and identifying information sources. The effects assessment will consider risk of irreversible harm through the effects characteristics description of reversibility for each residual effect predicted and will describe any uncertainty associated with the assessment of residual effects.

Draft

The scope of the sustainability assessment will be defined by issues of importance identified by Indigenous communities and interested persons through consultation and engagement activities, while also ensuring to be inclusive of the diversity of views expressed. The selection of VCs that will be the focus of the sustainability assessment will be aligned with the issues of importance identified by Indigenous communities and interested persons, as well as residual effects identified through the effects assessment process. The sustainability assessment will describe how the planning and design of the Project, in all phases including follow-up monitoring, considered the sustainability principles.

9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment

The Proponent recognizes that communities and sub-populations within those communities may be impacted differently by the Project with respect to VCs and indicators. As such, the Project aims to collect economic baseline information for the purpose of assessing differential effects and establishing relevant mitigation measures, as further elaborated on in **Section 4.3**. GBA+ will not be limited to community feedback; when offered or discussed in secondary texts, additional sub-population information as is applicable to the relevant assessment will be incorporated.

As noted in **Sections 7.2** and **7.3**, GBA+ will be integrated throughout the Economic Assessment. This analysis will be derived from our matrix-based approach for baseline collection which will be foundational to understanding and assessing differential effects to sub-populations. The approach to GBA+ will be largely qualitative drawing on author's knowledge, best practices and relevant literature.

9.9 Follow-up Programs

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. Section 26 of the TISGs do not specifically outline required Economic-related monitoring activities that are to be included, other than the tracking of economic issues that would be the responsibility of overall Project engagement and consultation activities. The identification of Economic follow-up programs for the Project are not described in this Study Plan as the information needed to determine the need for and form of impact monitoring is dependent on the outcome of the impact assessment and on the results of consultation and engagement with Indigenous communities, agencies and interested persons.

Based on the results of the Economic effects assessment work, follow-up program recommendations will be made subject to their applicability and necessity. These programs may be targeted to specific communities and / or specific adverse effects and / or potential positive effects of the Project.

Draft

10. Assumptions

Any assumption used in the effects assessment, for example the assumed average daily traffic on the CAR, will be clearly identified and a rationale provided in the IS / EA Report. The MFFN CAR Project Team is not aware at this time of key assumptions that will be recognized in the Economic Assessment. These will be determined during the IA / EA work and documented in the IS / EA Report.

Draft

11. Concordance with Federal and Provincial Guidance

This section provides the best information currently available on how federal and provincial requirements identified for the Project to date will be addressed. **Table 11-1** outlines how the Economic Assessment will conform with the TISG. Presented in **Table 11-2** are the comments received on the Draft ToR that relate to the Economic Assessment. **Table 11-3** outlines proposed deviations from the TISG requirements.

The final concordance with federal and provincial requirements will be included in the IS / EA Report, and will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

Draft

Table 11-1: Study Plan Federal and Provincial Concordance – Conformance with Requirements

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
1	TISG Section 11	■ This economic baseline should document the local and regional economic conditions and trends based on the spatial and temporal boundaries selected, and must include economic indicators and activities for all potentially impacted local communities, including municipalities, and Indigenous groups.	■ As required, the economic baseline will be described in this manner for the defined study areas.	■ Section 6.0 ■ Section 7.0
2	TISG Section 11	■ The scope and content of the economic baseline should be tailored to the specific project context, take into account community and Indigenous group input, and should include indicators and information that are useful and meaningful for the effects analysis.	■ Information from Indigenous communities will be obtained and considered as defined in Section 4.2 and Section 5.0. Indicators are defined in Section 9.2, which have been developed in reference to this guidance.	■ Section 4.2 ■ Section 5.0 ■ Section 9.2
3	TISG Section 11	■ The information provided must: – be sufficient to provide a comprehensive understanding of the current state of each VC, including relevant trends; – describe how community and Indigenous knowledge from related populations, including input from diverse groups, was used in establishing baseline conditions; – describe baseline economic conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; – conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; – and describe any relevant indicators.	■ These principles will inform both primary and secondary data collection to support the Economic Assessment. Further, the Proponent will document baseline data consistent with these principles. The exception is data will not be disaggregated by gender as Statistics Canada does not disaggregate based on gender. Data disaggregated based on sex will be included.	■ Section 7.2.1 ■ Section 7.2.2
4	TISG Section 11	■ Labour market: – Labour supply and demand; – Local and regional labour force characteristics, disaggregated by ethnicity or indigeneity, age, sex, gender and other community relevant factors to support analysis, where appropriate, including the employment rate, the unemployment rate, employment by industry, employment status (e.g., full-time, part-time, self-employed, seasonal), average monthly earnings; – known barriers and opportunities to employment for underrepresented groups, proportion of time spent on unpaid domestic and care work, by age, sex and location, and gender division of labour; – information on local construction businesses and joint ventures, equipment availability and general competing projects in the community; – housing and consumer prices; and – a description of housing conditions and needs.	■ The labour market information will be collected from the sources listed in Section 7.2 for the purpose of assessing changes to employment and income as stated in Section 9.2. Information will be disaggregated consistent with available secondary information from Statistics Canada including age and sex. Indigeneity will be considered for regional and municipal study areas but not at the local Indigenous community level due to the lack of a non-Indigenous population. ■ Barriers and labour divisions will be described qualitatively. Information on domestic labour will be described as secondary sources allow and questions to that effect may be included in primary data collection. However, census-level data will not be reported as the data are not available. ■ Information from industry and local business will be considered in the information collection as described in Section 7.2. ■ Pricing for both housing and consumers will be considered in relevant baseline sections of the Economic and Social Assessments as indicated in Section 9.2. ■ Housing pricing, conditions and needs are to be included within the Social Assessment.	■ Section 7.2 ■ Section 9.2 ■ Social Study Plan
5	TISG Section 11	■ Business environment: – sources of individual and community income (e.g., market economy, government transfer payment etc.); – the main industries and largest employers, and any opportunities for local/regional businesses to benefit from the Project; – broader economic contributors to the regional economy, such as small businesses (e.g., nature and outdoor tourism); – local traditional, subsidized and market economies, and current market trends; – any commercial fisheries that may be impacted, including species fished, number of licences, and value of fisheries, where applicable;	■ Sources of income will be considered in Labour market baseline conditions using Statistics Canada data. ■ The regional economy baseline will describe key sectors and employers including the current state of those sectors, which will include trajectory. This will be framed within their contribution to both the local and regional economies. This will include industries such as mining, forestry, tourism, and commercial resource harvesting such as fishing and trapping. Relevant information on these industries will be included such as licenses, target resources and industry value, as is available.	■ Section 5.0 ■ Section 7.0 ■ Section 7.2 ■ Social Study Plan

10. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
		– access, ownership and use of lands and resources (e.g., land tenure, mineral claims, mineral exploration, aggregate, food, water, social infrastructure), including ownership of land surrounding water crossings; and – access and control over resources from a gender perspective (e.g., information knowledge and services).	■ Drawing on primary data collection and the Indigenous Knowledge program, information will be collected on traditional economies. Information will be described in the reporting on access, use, control and ownership of economic resources. When publicly available, it will also be provided from a gendered perspective. ■ Social infrastructure will be considered as part of the Social Assessment.	
6	TISG Section 11	■ Infrastructure: – access to infrastructure and services (transportation, electricity, telecommunications infrastructure and broadband, etc.); – details on the existing road network (all weather and winter roads) and traffic patterns, including any projections of future traffic patterns; – information on the nearest railways and airports; and – an overview of other infrastructure (e.g., power plants, transmission lines, pipelines, dams, water mains, sewage lines) relevant to the Project.	■ The requested information will be considered as part of the Social Study Plan and Assessment	■ Social Study Plan
7	TISG Section 11	■ Public finances: – a brief overview of the state of local public finances.	■ Public finances, including tax revenues and government expenditure, will be documented for municipalities and Indigenous communities in the Economic LSA.	■ Section 6.2 ■ Section 7.2 ■ Section 9.2
8	TISG Section 11	■ Overall economy: – a brief overview of the regional economy in recent years (e.g., if there have been any major investments or closures, if the area's resources and products have been in high or low demand, etc.); – a summary of any existing local or regional economic development plans and forest management plans; – income leakages from the communities to capture services that are being delivered outside of the community; – economic opportunities in and around the community including employment and business opportunities; – service gaps and community capacity to implement economic development plans and initiatives that provide the rationale for the Project; – Financial resources (own-source revenues, government revenues, etc.); – a brief overview of the community's power source, fuel consumption to generate power, and any issues related to power distribution in the community; and – access to capital.	■ An overview of the regional economy will be prepared in support of the regional economy criteria (Section 9.2). ■ A summary of regional and local economic development plans will be documented consistent with information sources in Section 7.2. The forestry industry will also be profiled. Forestry management plans will be summarized as part of the Land and Resource Use baseline. ■ Income leakages will be considered qualitatively in the baseline based on primary data collected on economic activities and available secondary source data. ■ Commentary will be provided on economic opportunity for businesses and individuals. ■ Service gaps will be considered in the study plan and Human Health and Community Safety study plan depending on the nature of the service. ■ Financial resources will be included when available for government and individuals as part of the labour market information (income and source) and public finances (taxation). ■ Community information on power source and use will be included in the Social Assessment. ■ Information on access to capital in the region will be included in the summary of the regional economy.	■ Section 7.2 ■ Section 9.2 ■ Land and Resource Use Study Plan ■ Social Study Plan ■ Human Health and Community Safety Study Plan
9	TISG Section 12.3	■ The baseline conditions requirements set out in the sections above for health, social and economic conditions, include Indigenous peoples and GBA+ specific to Indigenous peoples	■ Baseline economic conditions will consider Indigenous peoples and their economic interests. The study plan commits to following a GBA+ frame work as outlined in Section 4.3.	■ Section 7.0 ■ Section 9.2
10	TISG Section 17.1	■ Describe the predicted effects to services and infrastructure in the study area, including but not limited to the positive and adverse effects to: – housing (cost); – costs of goods and services, including food; and, – existing businesses.	■ The subset of items listed in Section 17.1 will be considered as part of the regional economy assessment including under the pricing and procurement indicators. The results of these assessment will inform the Social Assessment on services and infrastructure.	■ Section 9.2

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
11	TISG Section 18.1	■ The Impact Statement must: – describe the effects of the Project on the local and regional labour markets; – describe the number of new jobs (for each phase of the Project), and the expected rates of pay, and an analysis of differential effects across relevant subgroups, including by sex, age and other relevant identity factors as well as limitations to labour market access; – describe longer-term labour market local and regional labour market effects as a result of the project; – describe plans to encourage local employment; – describe plans to encourage the recruitment, development and retention of underrepresented groups in the Project (e.g., set targets for employment for specific groups); – describe the Project's diversity and inclusion work force development plans (e.g., youth with substance use programs); – describe any skills-matching issues related to the Project, including: • whether there is a sufficient number of local workers with sufficient technical skills; • if not, whether the project will require workers from outside the region; • skills training and education opportunities as a result of the Project; • describe any training or education programs or scholarships the proponent is supporting to enhance employment opportunities for local residents; and • opportunities for diverse groups of women, and underrepresented groups, into higher-skilled jobs through provision of on-the-job training (e.g., surveyors, road safety auditors, and heavy equipment operators).	■ The IS / EA Report will describe changes to direct, indirect and induced employment, which affects the regional labour market. This will include jobs by phase of the Project and will include expected rates of pay. A GBA+ analysis will be undertaken on these opportunities. ■ A qualitative description will also be provided on how the Project may affect the long term labour market including within the discussion of cumulative effects. ■ Impact management measures will describe efforts the Proponent recommends to encourage local employment, including recruitment plans. Information on recruiting developing and retaining workers from underrepresented groups for the Project will also be included such as diversity and inclusion planning. ■ The assessment of the labour market will specifically consider skill matching including if local workers can fill potential employment opportunities. Skill matching will be done based on primary and secondary information collected. Available skill development and training programs to address gaps will also be documented including those led by the Proponent. Specific attention will be paid to opportunities for underrepresented groups.	■ Section 9.2 ■ Section 9.3
12	TISG Section 18.2	■ The Impact Statement must: – describe the predicted positive and adverse effects to accommodation/lodging, including housing supply, housing costs, and rental rates, both during the construction and operation phases; and – describe the effects of the Project on availability of goods and services and consumer prices, in particular for • food; • fuel; and • electricity.	■ Effects to pricing for housing (temporary and permanent), electricity, fuel and food will be considered as part of the assessment consistent with the indicators described in Section 9.2	■ Section 9.2
13	TISG Section 18.3	■ The Impact Statement must: – describe the potential positive and negative effects of the Project on local and regional businesses, during both construction and operation phases of the Project, including: • procurement and contracting opportunities; • an estimate of potential effects of the Project on the traditional economy, including the potential loss of traditional economies and jobs; and • discuss the potential ability of local businesses to compete for project-related contracting.	■ Effects on local businesses will be considered as part of the regional economy indicators (Section 9.2). Indicators for the aforementioned criteria include the procurement opportunities from the Project and traditional economies. Considerations specific to local businesses including their potential ability to compete for contracting will be documented and considered in the assessment.	■ Section 9.2
14	TISG Section 18.4	■ The Impact Statement must: – describe the effects on infrastructure, including: • the extent of new road to be built, the number of connections to existing roads, the effect on travel times, and the additional traffic due to the replacement of winter roads; • whether the Project will result in, or facilitate the construction of other infrastructure (such as railways, airports, power plants, transmission lines, pipelines, dams, water mains, sewage lines, etc.); and • whether the Project will damage any existing infrastructure (same categories as above), how quickly this will be repaired, and how much the proponent will contribute to the repair cost. – Describe how the Project will affect the local/regional energy system, including: • how power will be provided during the construction phase; • once complete, how much power the Project is likely to use; and • whether the Project will improve, or could improve, the local energy transmission system (e.g., by facilitating new transmission lines, by making it easier for repair crews to access the area, etc.).	■ These items will be considered as part of the Social Assessment and Study Plan.	■ Social Study Plan

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
15	TISG Section 18.5	■ The Impact Statement must: – describe the Project's effects on local/municipal, provincial/territorial, federal, and Indigenous group public finances, including: • revenue from tax levies, royalties, revenue sharing and other means, and how this could vary over time; and • the cost of any public contribution, subsidies or tax incentives to support the Project.	■ Effects to municipal, provincial and Indigenous government finances including taxation and expenditure will be documented in the IS / EA Report consistent with the VCs and Indicators in Section 9.2.	■ Section 9.2
16	TISG Section 18.6	■ The Impact Statement must: – describe the Project's impact and consistency with any existing local or regional plans for • economic development; • energy production; • transportation and utilities and communication corridors (including community airports and winter roads); • residential land use; • commercial zoning; • forestry and logging operations; • commercial outfitters; and • other land uses. – provide a qualitative analysis and description of the extent to which the Project may facilitate developments, including mining projects, mineral exploration activities and other resource development in the area; – provide an estimate and description of the Project's direct, indirect, and induced economic impact during construction and operation, such as: • effects on individual and community income (e.g., market economy, government transfer payments etc.); • effects on the broader economic contributors to the regional economy, such as small businesses (e.g., nature and outdoor tourism); • effects to local traditional subsidized and market economies, and current market trends; • any measurable effects on provincial/territorial GDP; and • increased consumer spending. – provide the sources and methodologies used for developing multipliers and estimates to calculate the figures above. – Where a generic multiplier may not accurately reflect the specific situation of the Project being assessed, evidence should be provided of specific economic activity that will result from the Project going ahead.	■ Descriptions of the Project's alignment with community and regional economic planning will be included in the IS / EA Report. ■ A qualitative description will be provided of how the Project may facilitate future developments including reasonably foreseeable developments included within the cumulative effects assessment. ■ Direct, indirect and induced economic effects will be estimated using Input-Output modelling adjusted for regional context when applicable as defined in Section 9.4. ■ Sources and methodologies will be documented in the Economic Assessment reporting. Localized multipliers will be addressed through utilizing regional multipliers from the Northern Policy Institute. Non-market economies will be described qualitatively.	■ Section 7.0 ■ Section 9.4

Table 11-2: Study Plan Draft ToR Provincial Concordance

ID#	Commenter	Requirement / Comment / Concern	Response (from ToR)	Study Plan Reference
1	■ Draft ToR Comment from the Ministry of Economic Development, Job Creation and Trade (ID #30)	■ Our ability to provide valuable feedback or perspective is somewhat limited due to lack of insight and context with respect to the existing First Nations socio-economic situation and viability of the Ring of Fire resource development.	■ Additional detail on the socio-economic context of communities in the study area will be included within the IA/EA. It is not within the mandate of the IA/EA to comment on the viability of private sector developments such as the Ring of Fire area.	■ NA
2	■ Draft ToR Comment from the Ministry of Economic Development, Job Creation and Trade (ID #33)	■ Greater access can only enhance economic activity in the region not only with respect to resource development but tourism and other business opportunities as well.	■ Changes to community services and infrastructure will be considered under the socio-economic assessment within the IA/EA. These potential effects are identified in the ToR in Table 7-6 and Section 7.2.10.	■ Section 9.2
3	■ Draft ToR Comment from the Ministry of Economic Development, Job Creation and Trade (ID #34)	■ Our particular interest in reviewing Environmental Assessments and Terms of Reference is on the descriptions of potential for economic development benefits extending across the province or broad regions of the province. In Sections 5.1 and 6, it is noted that the terminus of the proposed road could serve as a staging point for and extension to the Ring of Fire mineral deposits. We are not qualified to speculate on the likelihood or extent of resource development of the Ring of Fire region and it would be premature to forecast in any degree of detail the indirect economic impact of such resource development to the rest of the province.	■ The MFFN Project Consultant agrees with this assessment and does not consider conducting quantitative analyses of indirect or induced effects as a component of the cumulative effects assessment that is to be included as part of the IA/EA.	■ Section 9.3 ■ Section 9.4
4	■ Draft ToR Comment from the Ministry of Economic Development, Job Creation and Trade (ID #35)	■ However, we suggest that the possibility of broad supply chain economic benefits reaching beyond the local community, should the Marten Falls Community Access Road ultimately help facilitate access to the Ring of Fire, could be acknowledged by a simple statement at some point in the above sections.	■ Section 7.2.10 of the ToR acknowledges that the potential economic effects to the regional economy will be assessed for the Project. A qualitative assessment of these effects to the regional economy will be included in the cumulative effects assessment.	■ Section 9.4
5	■ Draft ToR Comment from Attawapiskat First Nation (ID #265)	■ Section 7.2.11 (p.52-53): The EA must include an assessment of long-term changes to the subsistence economies (hunting, fishing , trapping, gathering) for neighbouring communities including Attawapiskat First Nation, under various development scenarios facilitated by the road project.	■ An assessment of potential effects to subsistence economies within the study area will be included in the EA. We are open to receiving information Attawapiskat First Nation is willing to provide about their activities within the Project area. ■ The socio-economic study area is driven by communities and considers the social and economic activities undertaken by these communities. The land and resource use study and the traditional land and resource use study will address hunting, gathering and other resource harvesting activities undertaken within the spatial project area. Changes to hunting and gathering that impact communities (i.e., subsistence economies) may be considered in the social and economic assessment based on the findings of these other assessments.	■ Section 6.2 ■ Section 9.2
6	■ Draft ToR Comment from Neskantaga First Nation (ID #272)	■ Please share any details/data/studies on the estimated reduction in the price of food, fuel and supplies that will result from the construction of the all season multi purpose road.	■ We will document and reference any studies, data or details on the estimated change to the price of food, fuel and supplies that will result from the Project within the IA/EA.	■ Section 7.0
7	■ Draft ToR Comment from Neskantaga First Nation (ID #392)	■ How the road will achieve sufficient revenue to pay back the capital invested and pay the ongoing operating expenses? Tolls?	■ An IA/EA is not required to assess the feasibility or potential economic returns of the project considered. Commentary on the economic effects of the Project on the relevant study areas will however be provided.	■ Section 6.2 ■ Section 9.2
8	■ Draft ToR Comment from Neskantaga First Nation (ID #395)	■ How will the net economic benefits of the project be measured?	■ Commentary on the economic effects, both positive and negative, of the Project on the relevant study areas will be provided in the IA/EA. Opportunities to comment on assessment methods during the IA/EA (key milestones of the updated Consultation Plan: Notice of Commencement, Effects Assessment Methods, Identification of Preferred Alternatives, and Review of the Draft and Final IS/EA Report, as well as continued opportunity during the review of the Draft and Final IS/EA Report will be provided.	■ Section 6.2 ■ Section 9.2

ID#	Commenter	Requirement / Comment / Concern	Response (from ToR)	Study Plan Reference
9	■ Draft ToR Comment from Ginoogaming First Nation (ID #570)	■ Economic opportunities: GFN is interested in learning more about potential economic development opportunities to support road construction contracts and would like to encourage the construction proponent to source local, First Nation-owned business contractors. Community members are also interested in employment and training opportunities surrounding road construction work, including camp support, aggregate extraction and baseline data collection.	■ The Project Team looks forward to providing information on economic opportunities associated with the Project when information becomes available.	■ N/A
10	■ Draft ToR Comment from Ginoogaming First Nation (ID #571)	■ Increased forestry: GFN understands that the development of the MFCAR will likely result in increased forestry activities in the area. GFN is very active in forestry operations within our homelands and we recognize the economic development opportunities presented by this increased activity (especially in-light of skilled GFN membership in the forest industry).	■ We will ensure the forestry industry is considered within the IA/EA.	■ Section 9.2

Table 11-3: Study Plan Federal Concordance – Required Deviations

ID #	Federal TISG Reference	Requirement / Comment / Concern	Response and Proposed TISG Amendment (Rationale for not meeting requirement)	Study Plan Reference
1	TISG Section 9	■ Level-2 health determinants: economic factors: – income (average), poverty and income inequality, disaggregated by sex and gender.	■ Economic baseline information to inform economic and material determinants of health will be collected consistent with GBA+ principles. ■ Data will be disaggregated by sex and age but not gender as Statistics Canada does not provide information disaggregated by gender.	■ Section 7.0
2	TISG Section 11	■ Overall economy: – income leakages from the communities to capture services that are being delivered outside of the community;	■ Income leakages will be considered qualitatively in the baseline based on primary data collected on economic activities and available secondary source data.	■ Section 7.2
3	TISG Section 11	■ Labour market: – known barriers and opportunities to employment for underrepresented groups, proportion of time spent on unpaid domestic and care work, by age, sex and location, and gender division of labour;	■ Barriers and labour divisions will be described qualitatively. Information on domestic labour will be described as secondary sources allow and questions to that effect may be included in primary data collection. However, census-level data will not be reported as the data are not available.	■ Section 7.0
4	TISG Section 11	■ The information provided must: – describe how community and Indigenous knowledge from related populations, including input from diverse groups, was used in establishing baseline conditions; – describe baseline economic conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; – conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; and describe any relevant indicators.	■ These principles will inform both primary and secondary data collection to support the Economic Assessment. Further, the Proponent will document baseline data consistent with these principles. The exception is data will not be disaggregated by gender as Statistics Canada does not disaggregate based on gender. Data disaggregated based on sex will be included.	■ Section 7.2.1 ■ Section 7.2.2

12. References

211 Ontario North, 2020:

Marten Falls First Nation: Agency Profile.: https://211north.ca/record/65300596/agency/

Advantage Northwest, 2013:

Mining Readiness Strategy: An Integrated Regional Economic Development Plan. http://www.noma.on.ca/upload/documents/mining-readiness-strategy.pdf

AECOM Canada Ltd., 2020:

Marten Falls First Nation Proposed Terms of Reference Marten Falls Community Access Road – Environmental Assessment, Appendix B: Consultation & Engagement Plan to Support the Environmental Assessment / Impact Statement

Ambassador's Northwest, 2012:

Mining in Northwestern Ontario – Opportunities and Challenges. http://www.thunderbayventures.com/upload/documents/mining-in-northwestern-ontario.pdf

Centre for the North, 2014:

Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities. http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf

First Nations Information Governance Centre, 2020:

Our Data. Our Stories. Our Future. https://fnigc.ca/splash/

Gamble, J., 2017:

What's at Stake in Ontario's Ring of Fire. https://www.canadiangeographic.ca/article/whats-stake-ontarios-ring-fire

Greenstone Economic Development Corporation, 2018:

Greenstone Business Capacity Inventory. http://www.gedc.ca/article/gedc-reports--1130.asp

Greenstone Gold, 2017:

Hardrock Project Environmental Assessment. https://www.greenstonegoldmines.com/environment-documents

Draft

Impact Assessment Agency of Canada, 2019:
Impact Assessment Act. https://laws-lois.justice.gc.ca/eng/acts/I-2.75/

Impact Assessment Agency of Canada, 2020:
Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133934E.pdf

Impact Assessment Agency of Canada, 2020a:
Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133936E.pdf

Impact Assessment Agency of Canada, 2020b;
Glossary of Terms for the impact assessment of designated projects under the IAA. https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/glossary-of-terms.html

Impact Assessment Agency of Canada, 2020c:
Tailored Impact Statement Guidelines for the Marten Falls Community Access Road Project. https://iaac-aeic.gc.ca/050/documents/p80184/133937E.pdf

Martel, A. and J. Noiseux, 2017:
Community Labour Market Report. The Northern Policy Institute. https://www.northernpolicy.ca/martenfallsclmr

Matawa, 2014:
Marten Falls First Nation: Community Profile. http://community.matawa.on.ca/wp-content/uploads/2014/02/CULPOR_Marten-Falls_Profile.pdf.

Ministry of Finance, 2019:
A Plan to Built Ontario Together. 2019 Ontario Economic Outlook and Fiscal Review. https://budget.ontario.ca/2019/fallstatement/pdf/2019-fallstatement.pdf

Ministry of Northern Development, Mines and Forestry (ENDM), 2011:
Growth Plan for Northern Ontario. https://www.ontario.ca/document/growth-plan-northern-ontario

Moazzami, B., 2019a:
Income and Employment Multipliers for 20 Industries in 11 Census Divisions in Northern Ontario. https://www.northernpolicy.ca/upload/documents/publications/reports-new/report_moazzami-employment-multipliers-e004.pdf. Accessed April 24, 2020.

Draft

Moazzami, B., 2019b:
Northern Projections – Human Capital Series. https://www.northernpolicy.ca/article/publications-search-245.asp?Category=38765

Municipality of Greenstone, 2016:
Community Profile: Labour Force. http://www.greenstone.ca/content/labour-force

Municipality of Greenstone, 2018:
Financial Statements. Available at: http://www.greenstone.ca/content/financial-statements

Ontario Government, 1990a:
Environmental Assessment Act. https://www.ontario.ca/laws/statute/90e18

Ontario Government, 2019:
Plan to Build Ontario Together Act (long title: *An Act to implement Budget measures and to enact, amend and repeal various statutes*). https://www.ontario.ca/laws/statute/s19015

Ontario Ministry of Tourism, Culture and Sport (MTCS), 2017:
Regional Tourism Profiles. http://www.mtc.gov.on.ca/en/research/rtp/rtp.shtml

Statistics Canada, 2009:
User's Guide to the Canadian Input-Output Model. Available upon request from Statistics Canada.

Draft

Appendix A

Preliminary List of Data Sources

Draft

211 Ontario North, 2020:
Marten Falls First Nation: Agency Profile.: https://211north.ca/record/65300596/agency/

Advantage Northwest, 2013:
Mining Readiness Strategy: An Integrated Regional Economic Development Plan.
http://www.noma.on.ca/upload/documents/mining-readiness-strategy.pdf

Ambassador's Northwest, 2012:
Mining in Northwestern Ontario – Opportunities and Challenges.
http://www.thunderbayventures.com/upload/documents/mining-in-northwestern-ontario.pdf

Centre for the North, 2014:
Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities.
http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf.

Gamble, J., 2017:
What's at Stake in Ontario's Ring of Fire. https://www.canadiangeographic.ca/article/whats-stake-ontarios-ring-fire

Greenstone Gold, 2017:
Hardrock Project Environmental Assessment. https://www.greenstonegoldmines.com/environment-documents

Greenstone Economic Development Corporation. 2018:
Greenstone Business Capacity Inventory. http://www.gedc.ca/article/gedc-reports--1130.asp

Martel, A. and J. Noiseux, 2017:
Community Labour Market Report. The Northern Policy Institute.
https://www.northernpolicy.ca/martenfallsclmr

Matawa, 2014:
Marten Falls First Nation: Community Profile. http://community.matawa.on.ca/wp-content/uploads/2014/02/CULPOR_Marten-Falls_Profile.pdf.

Ministry of Finance, 2019:
A Plan to Built Ontario Together. 2019 Ontario Economic Outlook and Fiscal Review.
https://budget.ontario.ca/2019/fallstatement/pdf/2019-fallstatement.pdf

Draft

Ministry of Northern Development, Mines and Forestry, 2011:
Growth Plan for Northern Ontario. https://www.ontario.ca/document/growth-plan-northern-ontario

Moazzamni, B., 2019:
Northern Projections – Human Capital Series. https://www.northernpolicy.ca/article/publications-search-245.asp?Category=38765

Municipality of Greenstone, 2016:
Community Profile: Labour Force. http://www.greenstone.ca/content/labour-force

Municipality of Greenstone, 2018:
Financial Statements. Available at: http://www.greenstone.ca/content/financial-statements

Ontario Ministry of Tourism, Culture and Sport (MTCS), 2017:
Regional Tourism Profiles. http://www.mtc.gov.on.ca/en/research/rtp/rtp.shtml

Draft

Appendix B

Agency Comments on the Draft Study Plan

Draft

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
General Comment	■ GC	■ N/A	■ In addition to the required actions detailed below, other required actions to be addressed in the update to this study plan are detailed in a separate table titled "2020-07-02 – IAAC to MFFN - General Comments on MFCAR Draft Study Plans". The Agency has provided these other required actions to highlight common sections of the Tailored Impact Statement Guidelines (the Guidelines) where requirements were not met in the draft study plans submitted to the Agency. These additional actions must be addressed in the updated study plans.		■ We have reviewed the relevant comments and incorporated where appropriate. Please refer to the General Comments Table Response submitted separately to the Agency for specific responses.	■ Various Sections
	■ Section 4.1 Potentially Impacted Indigenous Groups	■ Section 6 of the Guidelines	■ Section 4.1 of the study plan states that "data collection will focus on the communities most likely to be affected by the Project including Marten Falls and Aroland First Nations."… "These communities are likely to experience the most Project-related change due to the location of the Project and its resulting access." ■ This section does not mention how the other Indigenous groups listed in the Indigenous Engagement and Partnership Plan (IEPP) have been, or will be engaged to gather baseline data and to inform the assessment of potential economic impacts for the preparation of the Impact Statement. ■ The Agency expects the proponent to engage with, at a minimum, the Indigenous groups listed in the IEPP, as is directed in Section 6 of the Guidelines. The proponent must also provide Indigenous groups with an opportunity to comment on the list of valued components and indicators.	■ Update the study plan to include the list of all Indigenous groups that will be engaged, at a minimum the Indigenous groups listed in the IEPP, as part of the baseline data collection, defining the list of criteria and indicators, and effects assessment analysis. The list should be consistent throughout the study plan.	■ Table 4-1 in the updated Study Plan provides a list of Indigenous communities that will be engaged and consulted with on the Project, which is inclusive of all the groups listed in the IEPP provided by the Agency.	■ Table 4-1
	■ Section 3 Input from Engagement and Indigenous Knowledge	■ Section 6.2 of the Guidelines	■ Section 3 of the study plan states that "In addition to information obtained from engagement activities, it is expected that provided and collected Indigenous Knowledge will be integrated into the Economic Assessment, where applicable. This may include information on economic issues, community challenges, and other information tied to economic criteria (Section 5.2) but will not include confidential data." ■ Section 6.2 of the Guidelines requires a description of the type of confidential information provided by each Indigenous group that does not compromise any stipulations in the confidentiality agreements and the description shall state how that information impacted the project design, baseline data, effects assessment or mitigation measures. The proponent is required to provide evidence to the Agency in the form of a letter from the Indigenous group that provided confidential information, confirming that: – the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; – the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed. It is unclear how the approach proposed in the study plan will meet the requirements of Section 6.2 of the Guidelines.	■ Provide further details on how input received from Indigenous groups will be tracked, considered, and reported to the Agency in the Impact Statement, as per the expectations of Section 6 of the Guidelines.	■ Indigenous communities will be engaged with as part of the overall consultation and engagement program for the Project, which is summarized in Section 4 of the updated Study Plan. All information and comments received from Indigenous communities will be logged, tracked and responses generated where applicable. Section 5 of the Study Plan describes the Indigenous Knowledge Program, another avenue for Indigenous communities to provide input on the Project. Section 2.1 has additional information on the Project's approach to handling confidential information.	■ Section 2.1 ■ Section 4 ■ Section 5

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ Section 4 and 4.3 Gender Based Analysis Plus	■ Sections 5.2 and 6.3 of the Guidelines	■ Section 4.0 of the study plan identified the following objectives:“Describe economic conditions using disaggregated data and gender statistics, where publically available or volunteered by knowledge holders:- Identity factors that cannot be disaggregated through secondary source data will be considered qualitatively. Where available, these identity factors will be referenced and considered in existing conditions reporting and analysis.”Section 4.3 of the study plan states “it is expected that there will be a multitude of data issues and limitations based on the Project area.”…“These issues may limit the information available to be reported by the proponent as part of the Impact Assessment, particularly related to disaggregated data to support a Gender Based Analysis plus (GBA+).”The study plan does not provide enough information on how the GBA+ analytical framework will be applied to data collection methodology and analysis. Refer to Agency guidance for more information on the GBA+ approach: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html. The proponent should seek to solicit information necessary to support the GBA+, and if unsuccessful, efforts made should be described in the Impact Statement. Section 5.2 of the Guidelines states that the Impact Statement must include, at a minimum, a description of efforts made by the proponent to engage diverse populations, including groups identified by gender, age or other community relevant factors (e.g., recreational hunters) to support the collection of information needed to complete the GBA+. Section 6.3 of the Guidelines states that the Impact Statement must include, at a minimum, a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+.	■ Describe in the study plan how the proponent will engage diverse populations to collect information necessary to support the GBA+ and how that information will be tracked, considered and reported in the Impact Statement.	■ The Economic Study Plan will integrate a GBA+ framework into the Economic data collection and assessment program.	■ Section 4.3
	■ Section 4.1 List of Public Groups	■ Section 5 of the Guidelines	■ Section 4.1 of the study plan highlights the Municipality of Greenstone to be included in the primary data collection. ■ No other member of the public or public community is identified for the primary or secondary data collection in the study plan. ■ As per Section 5 of the Guidelines, the proponent is required to engage with, at a minimum, the members of the public listed in the Public Participation Plan (PPP).	■ Update the study plan to include the list of the members of the public and public groups that will be engaged, at a minimum the public participants listed in the PPP, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan.	■ Considering the Economic VCs as presented in Table 9.2, and the study areas presented in Section 6.2, the Municipality of Greenstone is the primary public body that will be engaged with for data collection purposes to support the Economic assessments. There are no other public interests (non-Indigenous communities) in the LSA expected to experience Economic impacts from the project. Other public interests such as land users will be engaged with to support the Land and Resource Use assessment. The study plan for that discipline should be referred to for a list of public interests that will be engaged with.	■ Section 6 ■ Table 6-1

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ Section 4.1 Primary Data Collection	■ Section 11 of the Guidelines	■ The study plan provides inadequate detail on the methodology of baseline primary information collected for the Agency and federal experts to understand the work that the proponent is planning to undertake. Additional details on the methodologies for primary information sources that will be used to describe the baseline economic conditions are needed, as required in Section 11 of the Guidelines, including:- Define who is considered a key community member, and how these key community members will be identified prior to being approached for interviews, focus group studies and other discussions.- Describe how Indigenous knowledge will be used to inform types of engagement activities and participant selection, including the identification of key community members.- Specify the types of engagement activities (such as surveys, questionnaires, community sessions, chief and council sessions, workshops etc.).- Describe how GBA+ has been applied to the consideration of engagement activities. Identify any specific methods targeted to specific subgroups.- Describe who is considered a relevant identity group for the community and identify any specific engagement methods that are targeted to the relevant identity groups, including women, youth and elders.- Specify participants in engagement activities (reflecting the Indigenous groups listed in the IEPP and members of the public listed in the PPP) including rationale for how the selection of participants meets the objectives of the study and demonstrates accessibility considerations (e.g., language requirements) and GBA+.- Describe the approach the proponent intends to take to encourage or attract participation, including how opportunities to participate will be planned and advertised.- If sample questionnaires, interview questions, or other data collection tools exist, identify them in an appendix to the study plan, and provide clear links to how they relate to the economic criteria.- Identify past public or Indigenous engagement activities that have taken place and are being used to inform this study plan.	■ Update the study plan to include additional details on what will be sourced from primary sources, and what will be sourced from secondary information sources so that it is clear where information is being sourced for the criteria and indicators listed in the study plan.Update the study plan to provide additional detail on how the collection methodology of primary information would meet the expectations of Section 11 and other relevant sections of the Guidelines.	Primary data sources are identified in Section 7.2.2. As noted in Table 3-1, discussions with the Agency indicated that primary collection would be collected to fill in the gaps from secondary data sources. ■ Section 9.2 of the Study Plan identifies relevant VCs and indicators for the Economic Environment and how primary information will be considered.	■ Section 7.2.2 ■ Section 9.2
	■ Section 4.2 Secondary Data Collection	■ Section 11 of the Guidelines	■ The study plan provides inadequate detail on the methodology of baseline secondary information collected for the Agency and federal experts to understand the work that the proponent is planning to undertake. Additional details on the methodologies for secondary information sources that will be used to describe the baseline economic conditions are needed, as required in Section 11 of the Guidelines. ■ The study plan should provide a clear outline of which criteria and indicator data will come from existing secondary sources and what those sources are. Necessary detail includes: – Describe how the proponent has considered GBA+ requirements in the identification of secondary information sources. – Section 4.2 “Secondary Data Collection” of the study plan states that “attention will be paid to norms; roles and relations; power structures; and needs, constrains and opportunities” when considering the disproportionate effects on subgroups from the Project. Clarify how this will be applied to the collection of secondary information, and for which criteria and indicators they apply to.	■ Update the study plan to provide additional detail on how the collection methodology of secondary information would meet the expectations of Section 11 and other relevant sections of the Guidelines, including information sources to be used, and for which criteria and indicators they apply.	■ A list of secondary data sources can be found in Section 7.2.1. Section 9.2 of the Study Plan identifies relevant VCs and indicators for the Economic Environment and which sources of information will be considered.	■ Section 7.2.1 Section 9.2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ Section 5.1.2 Study Areas	■ Sections 5, 6 and 7.4 of the Guidelines	■ Section 5.1.2 of the study plan states that:“The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in socio-economic effects. To be included in the economic LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint”. "While many Indigenous communities are located within the regional study area, these communities will not be profiled individually given their relation to the Project is predominantly focused on cumulative effects from future developments”, and “Based on the information provided, the proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas”.Sections 5 and 6 of the Guidelines provide direction on the Agency’s expectations for meaningful engagement with members of the public and public groups (at a minimum those listed in the PPP), as well as Indigenous groups (at a minimum those listed in the IEPP) during the impact assessment process. The Agency expects the proponent to engage equitably with the members of the public and public groups identified in the PPP and all Indigenous groups listed in the IEPP to gather baseline data and to assess the Project’s effects.Additionally, Section 7.4 of the Guidelines explains that the spatial and temporal boundaries determined and established for the impact assessment with will vary depending on the valued component and are considered separately for each valued component, including valued components related to the environmental, health, social and economic conditions of Indigenous peoples, or other potential effects and impacts. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups. It is unclear how the approach proposed in the study plan will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines.	■ Revise the study plan to describe a methodology and engagement approach that will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines.Provide further detail on the rationale that is used to define the PSA, Local Study Area (LSA) and Regional Study Area (RSA) for each valued component, and describe how Indigenous groups and the public have been, or will be, provided an opportunity to inform the spatial and temporal boundaries.	■ Section 6.2 of the Study Plan identifies how the PDA (formerly PSA), LSA and RSA have been defined for the Project, including for the Economic Environment. Section 6.2.1 of the Study Plan identifies that the study areas can be further refined based on input from neighbouring Indigenous communities and interested persons.	■ Section 6.2
	■ Section 5.1.2 Study Areas	■ Section 1.1 of the Guidelines	■ Section 5.1.2 of the study plan states “The economic study areas are defined to capture the potential effects of the Project on the surrounding environment. For each criteria, a local study area (LSA) and regional study area (RSA) are defined to reflect the extent to which the Project has the potential to affect the environment. The extent of the potential effects includes both direct and indirect effects.” ■ Section 1.1 of the Guidelines states that “the factors [to be considered in an impact assessment] are listed in subsection 22(1) of IAA and prescribe that the impact assessment of a designated project must take into account: a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by the carrying out of the designated project, including:…” ■ The assessment of effects on the economic conditions should not only consider the extent to which Project has the potential to affect the environment but include potential changes to health, social or economic conditions. The economic study area should be defined to capture the economic area of influence of the Project, including effects not directly linked to adverse effects of the Project to the environment.	■ Update the study plan to define study areas that capture the Project’s economic effects due to potential changes to environment, health, social and economic conditions.	■ As currently defined, the Economic study areas are defined to capture the potential Economic effects of the Project on the surrounding environment. The study areas are also reflective of potential changes to land use, health, and social conditions that could directly or indirectly impact Economic considerations.	■ Section 6.2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ Section 5.2 Criteria and Indicators	■ Sections 11 and 18 of the Guidelines	■ The study plan provides inadequate detail on the criteria and indicators depicted in Table 3 to determine their adequacy to describe the economic baseline condition and to assess Project's effects.Section 11 of the Guidelines requires specific information related to the economic condition within the spatial and temporal boundaries selected.Section 18 of the Guidelines requires the effects assessment of the Project on the economic valued components during all phases of the Project. Additional details on the indicators that will be used to describe each criterion are needed. Indicators must provide data (either quantitative or qualitative) that can be measured and used to identify changes due to the Project. The three indicators presented below represent a sample from the study plan that require more detail. This sample is not a complete list of the indicators that require more detail:- Example 1: Rationale for use of the indicator "Economic Opportunity" for the criterion of "Regional Economy" - The study plan indicates that the rationale for "Economic Opportunity" is that "the Project has the potential to change the composition of the economy and later the industrial and commercial activities available within the area". This rationale does not provide adequate detail on what will be evaluated or measured (for change) by the proponent in relation to the criterion of "Regional Economy".- Example 2: Rationale for the use of the indicator "Traditional Economies" for the criterion of "Regional Economy" - The study plan indicates that the rationale for "Traditional Economies" is that "the Project may influence the traditional economies of local communities". This rationale does not provide adequate detail on which indicators will be used to describe the influence of the Project on "local communities".- Example 3: Description of the "Expression of Change" of the indicator "Price of Goods" for the criterion of "Regional Economy" – The description, "Changes in the price in the price of goods including food, electricity and housing", does not provide adequate detail on what will be evaluated or measured (for change) by the proponent in relation to the "Regional Economy" criterion.	■ Update the study plan to include detailed and measurable indicators that meet the requirements in Sections 11 and 18 of the Guidelines. Demonstrate how input received from Indigenous groups through engagement activities were incorporated into the development of the criteria and indicators.	■ Table 9-2 identifies the valued components, indicators, and sub-indicators that will be considered in the Economic assessment for the Project. This table includes the rationale for selection and potential sources of information. Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Economic discipline.	■ Table 9-2 ■ Section 9.2
	■ Section 5.2 Criteria and Indicators	■ Section 18 of the Guidelines	■ Section 5.2 of the study plan states "As the socio-economy has an abundance of interlinkages and overlaps, certain aspects of the economic environment are considered in other study plans, and have their baseline information documented in other relevant reports. The Socio-community Assessment will document information on housing and infrastructure. The Land and Resource Use Assessment includes information on industrial land uses and tourism establishments. Elements of the traditional economy are covered in the Indigenous Knowledge Assessment. Findings and data included in these sections are considered under relevant components of the Economic Assessment." ■ Section 18 of the Guidelines states that the assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided. ■ The study plan provides inadequate detail on the data described in other study plans (such as the socio-community study plan) that will be collected and analyzed to meet the economic baseline data collection and economic effects assessment requirements described in Sections 11 and 18 of the Guidelines, respectively.	■ Update the study plan to provide further detail on the specific economic criteria and indicators that will be collected and assessed through other study plans. At a minimum, provide a cross reference as to where the specific economic criteria and indicators can be found in the other plans.	■ Section 9.2 identifies which other plans will be collecting data relevant to the Economic Environment. ■ The Social Assessment will document information on housing and infrastructure. The Land and Resource Use Assessment includes information on industrial land uses and tourism establishments. Elements of the traditional economy are covered in the Aboriginal and Treaty Rights and Interests Assessment. Findings and data included in these disciplines will be considered under relevant components of the Economic Assessment, as applicable.	■ Section 9.2; ■ Social Study Plan ■ Land and Resource Use Study Plan ■ Aboriginal and Treaty Rights and Interests Study Plan

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ Section 7, Table 5 Concordance with Federal and Provincial Guidance	■ Section 18.4 of the Guidelines	■ More detail is required within the “Response” column on how the study plan is meeting the requirements of the Guidelines. This is not clear in the “Study Plan Reference” column, as the referenced sections do not provide sufficient detail on the type of indicators that would be used to collect baseline information for the effects assessment. The two examples below show responses from the concordance table that require more detail. This is not a complete list of the responses that require more detail in the study plan, but serves as a representative sample:- Example 1: In Table 1 ID # 9, the concordance table indicates that “income leakages will be considered qualitatively in the baseline based on primary data collected on economic activities and available secondary source data.” It is unclear which qualitative indicators will be used to measure “income leakages”. It is also unclear to what “data collected on economic activities” is referring.- Example 2: In Table 1 ID # 15, the concordance table indicates that Section 18.4 of the Guidelines requires that the Impact Statement must describe the effects on infrastructure. As a response to this requirement, the concordance table indicates “these items will be considered as part of the Socio-community Assessment and Study Plan”. It is unclear how the Socio-community study plan will meet the requirements from Section 18.4 of the Guidelines.	■ Demonstrate that this study plan reflects the inclusion of all requirements outlined in the Guidelines and describe the approaches to collect the information.	■ Table 11-1 is a comprehensive list of the requirements of the Guidelines. This table responds to each requirement from the Guidelines and provides an updated Study Plan reference section to clearly identify where within the Study Plan each requirement is being considered. In the Economic study plan, Table 11-3 identifies the areas of non-conformance along with their justification.	■ Table 11-1 ■ Table 11-3

Appendix C

Table Example: Employment by Age and Sex in the Marten Falls First Nation Community

Draft

Appendix C: Table Example: Employment by Age and Sex in the XXXX First Nation Community

Note: This table is illustrative. The purpose of the table is to demonstrate how Statistics Canada data is likely to be disaggregated.

		Total - Age Groups	0 to 14 years	15 years and over	15 to 24 years	25 to 54 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 years and over
Total	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	160	0	160	60	75	30	20	20	10	15
	In the labour force	80	0	80	15	50	15	15	15	10	0
	Employed	65	0	65	10	45	15	10	15	10	10
	Unemployed	20	0	15	10	10	0	0	0	0	0
	Not in the labour force	85	0	80	40	25	15	10	0	0	10
	Participation rate (%)	50	0	50	25	66.7	50	75	75	100	0
	Employment rate (%)	40.6	0	40.6	16.7	60	50	50	75	100	66.7
	Unemployment rate (%)	25	0	18.8	66.7	20	0	0	0	0	0
Male	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	90	0	85	30	40	15	10	10	10	0
	In the labour force	40	0	45	10	30	10	10	10	10	0
	Employed	35	0	35	10	20	0	0	10	0	0
	Unemployed	15	0	10	0	10	0	0	0	0	0
	Not in the labour force	50	0	45	25	10	10	0	0	10	0
	Participation rate (%)	44.4	0	52.9	33.3	75	66.7	100	100	100	0
	Employment rate (%)	38.9	0	41.2	33.3	50	0	0	100	0	0
	Unemployment rate (%)	37.5	0	22.2	0	33.3	0	0	0	0	0
Female	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	75	0	75	25	35	20	10	10	0	0
	In the labour force	40	0	40	10	20	10	10	0	0	10
	Employed	30	0	30	0	20	10	10	0	10	10
	Unemployed	10	0	0	0	0	0	0	0	0	0
	Not in the labour force	35	0	35	15	15	10	0	0	0	0
	Participation rate (%)	53.3	0	53.3	40	57.1	50	100	0	0	0
	Employment rate (%)	40	0	40	0	57.1	50	100	0	0	0
	Unemployment rate (%)	25	0	0	0	0	0	0	0	0	0

Comments from the Federal Review Team on Marten Falls Community Access Road Project Economic Study Plan – October 25, 2021

It is essential that the Impact Statement for the Marten Falls Community Access Road Project (the Project) address all requirements outlined in the Tailored Impact Statement Guidelines (the Guidelines), and that the study plans outline a clear approach to achieving these requirements. The Impact Assessment Agency of Canada (the Agency) has highlighted sections of the Guidelines where requirements for the Impact Statement may not be met, based on content of the draft study plan submitted to the Agency. Note that this table does not provide an exhaustive list of the requirements described in the Guidelines. The Guidelines should be reviewed in their entirety, including the sections identified below.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Tailored Impact Statement Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
GC-01	**Section 5 - Public Participation and views (including 5.1, 5.2)**	Provide a clear description in the study plans of how public engagement opportunities have been and/or will be integrated into the impact statement phase. This must include detail on how the public will have opportunities to provide input to contribute to the development of the Impact Statement, as required in Section 5 of the Guidelines. Describe what engagement with the members of the public listed in the Public Participation Plan has been done in the development of the study plans, and/or any planned engagement with members of the public on the proposed study plans.	Section 4: describes how the Proponent will provide Project notices and opportunities with members of the public listed in the Public Partnership Plan. This will also include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date.	**Section 4.1** "A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input."	Section 4.1 of the study plan mentions that "*a variety of activities will be offered*", however, no details on the likely engagement activities are provided. As required by Section 5 of the Guidelines, the Impact Statement must provide a record of engagement that describes all efforts taken to seek the views of local communities and other stakeholders with respect to the Project, including on the study plans. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement, including prior to and during the planning phase, and in the preparation of the Impact Statement. Provide details on the timeline for public engagement relative to the project workplan, including engagement relative to the schedule for baseline work, and in consideration of the project team's timeline for the development of the Impact Statement. Demonstrate in the Impact Statement how comments provided by members of the public on the economic conditions were taken into consideration. Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions
GC-02	**Section 6 - Description of Engagement with Indigenous Groups (including 6.1, 6.2, 6.3)**	Provide a clear description in the study plans of how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will have opportunities to provide Indigenous knowledge, including the validation of how information they provided was applied. The study plan should include a description of the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the group, to demonstrate that the guidance outlined in Section 6.2 of the Guidelines has been incorporated into the study plans.	In Section 4.2 it is noted that the Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in the Indigenous Partnership and Engagement Plan. A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. Section 2.1.1 outlines the approach to handling confidential information, by means of permission from Indigenous communities to include Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge.	**Sections 4.2** "…A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input…" "…Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process…"	Section 4.2 of the study plan states that "*a variety of activities will be offered*", however, no details on the planned engagement activities are provided. Section 4.2 of the study plan also states that "*Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process*", however, it is unclear on which components of the study plan the project team plans to engage. It is also unclear whether Indigenous groups will be provided with a meaningful opportunity to provide input on a preliminary approach/method for baseline data collection, as required in Section 6 of the Guidelines, or if engagement will take place after the baseline data collection is complete.

[1] Refer to complete sections of the Guidelines for more context.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Tailored Impact Statement Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		Describe what engagement with all the Indigenous groups listed in the Indigenous Engagement and Partnership Plan has been done in the development of the study plans, and/or any planned engagement with Indigenous groups on the proposed study plans, particularly in relation to collection of Indigenous knowledge (i.e. develop the work plan in collaboration with those Indigenous groups that would need to provide knowledge).	The study plans have recognized Indigenous community input received on the Project to date.		Provide details on the timeline for Indigenous engagement on the economic study plan, including engagement relative to the schedule for baseline work, and spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge, and in consideration of the project team's timeline for the development of the Impact Statement. Demonstrate in the Impact Statement that comments provided by Indigenous groups on the economic conditions were taken into consideration. Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions
GC-03	**Section 6.2 - Analysis and response to questions, comments, and issues raised**	Revise the study plans to include an approach to handling confidential information that demonstrates adherence to the guidance provided in Section 6.2 of the Guidelines.	Section 2.1.1: Section has been updated to include information regarding both confidentiality and permission information on all collected Indigenous Knowledge, regardless of the source. This section also includes how information regarding the Indigenous Knowledge Sharing Agreements will be established by the Proponent and Indigenous community participating in the Program.	**Section 2.1.1** "…Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared)…"	As required in Section 6 of the Guidelines describe the confidential information provided by each Indigenous group. Present the content in sufficient detail to support understanding of the potential effects and impacts on rights, while also protecting confidential/sensitive specifics and respecting stipulations in the confidentiality agreements (e.g, use buffer areas instead of specific locations, etc.). Provide to the Agency, in the form of a letter from the Indigenous group that shared confidential information, a letter confirming that: • the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; • the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed.
GC-04	**Study plans spatial boundaries**	Describe the approach to be implemented to demonstrate how the definitions of the proposed study area boundaries: • encompass the anticipated boundaries of the Project's effects, including all potentially impacted local communities, municipalities and all Indigenous groups listed in the Indigenous Engagement and Partnership Plan; and • take into account community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; physical, ecological,	Section 6.2: General information on study areas for the Project, including a detailed list of what was considered to develop the discipline-specific local and region study areas, is included in each study plan. Each study area has been proposed taking into consideration community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices, physical, ecological, technical, social, health, economic and cultural considerations available at this time. The proposed discipline-specific study areas are preliminary. The proposed study areas will be	**Section 6.2.1** "The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4."	Section 7 of the Guidelines, states that "The size, nature and location of past, present and foreseeable future projects and activities are factors that should be included in the definition of spatial boundaries." It is unclear how a Local Study Area of 2.5 km from the centreline of the Project would be appropriate to assess direct effects on economic conditions. At a minimum, the upgrades to the Anaconda and Painter Lake forestry access roads, the Northern Road Link Road Project, the Webequie Supply Road Project, as well as winter roads, activities and communities connected through these roads should be included in the Local Study Area.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Tailored Impact Statement Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		technical, social, health, economic and cultural considerations; and the size, nature and location of past, present and foreseeable future projects and activities.	consulted and engaged on early in the IA / EA process. In addition, the Indigenous Knowledge Program provides additional opportunities for community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples to be shared in greater detail.		Update the study plan to demonstrate that factors outlined in Section 7 of the Guidelines where taken into account in defining preliminary spatial boundaries for the Project. As required in Section 7.4.1 of the Guidelines, provide information regarding how the following were/will be taken into account in defining the spatial boundaries: community knowledge and Indigenous knowledge; current and traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights, including cultural and spiritual practices; physical, ecological, technical, social, health, economic and cultural considerations; and the size, nature and location of past, present and reasonably foreseeable future projects and activities. Ensure that the economic conditions Regional Study Area encompasses the spatial boundary of cumulative effects. Provide the above information in a way that allows those who provided the knowledge to the proponent and the Agency to see their input reflected in the Impact Statement. It is not sufficient to state that "input from participants will be/was taken into account".
GC-05	**Section 7 - Baseline Methodologies (Including 7.1, 7.2, 7.3, 7.4)**	Provide clear descriptions in the study plans of the proposed study areas and the criteria used to define the study areas for each valued component. Provide clear descriptions of the timing of previously collected data (days/month/year) and future approximate (month/year or season/year) for every field work planned and the criteria used to tailor the temporal boundaries to the valued components under consideration. Describe how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will be, or have been, engaged to provide input on spatial and temporal boundaries. Explain how the Agency will be provided opportunities to validate spatial and temporal boundaries.	Local Study Area (LSA) and Regional Study Area (RSA) for each valued component are described in Table 6-1, including rationale used to define the area. Study plans have been designed considering historical information, where applicable and available. Study plans will be updated with appended Work Plans, to be submitted at a future date, which will detail upcoming planned field activities. As detailed in both Section 4.2 and Section 6.2 the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs. Government agencies and interested persons will have the opportunity to comment on component of the study plans throughout the IS / EA Report consultation and engagement process	**Sections 4.3, 4.4, 7.2.2 and 7.3** **Section 4.3** "…The economic data collection program will include primary data collection activities that may involve for example, targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in economic secondary data…" **Section 4.4** "…For the Indigenous communities that express specific economic concerns, targeted economic data collection will be implemented through the economic data collection program, consistent with the likelihood of effect anticipated to the community as defined by the MFFN CAR Project Team…" **Section 7.2.2** "…Focused data collection on gaps identified in the secondary sources related to VCs and indicators such as quality factors for services and infrastructure…" **Section 7.3**	To ensure that baseline data collection will meet the requirements of the Guidelines, the Agency advises the project team to share a workplan describing how the survey for economic data collection will be conducted. If it is not possible to provide this information in the study plans or workplans, the Agency requires an opportunity to review the collected baseline data/baseline reports prior to the preparation of the Impact Statement documentation. Include in the Impact Statement a baseline community profile for each Indigenous group listed in the Indigenous Engagement and Partnership Plan and for each local community listed in the Public Participation Plan, to meet the requirements of Section 11 of the Guidelines. The baseline community profiles should be used to inform the effects assessment required by Section 18 of the Guidelines. It is unclear whether any secondary baseline studies have been conducted to identify potential gaps in the baseline information requirements described in Section 11 of the Guidelines. Primary data collection should be used where secondary sources are unable to provide the required information. Update the study plan to provide the current status of the secondary baseline data collection analysis and specify

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Tailored Impact Statement Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
				"…The primary economic data collection is anticipated to be conducted during the Spring and Summer of 2021, however this timing is subject to change and dependent on the larger Project schedule, including engagement and consultation activities…"	where gaps need to be addressed to meet the requirements in Section 11 of the Guidelines.
GC-06		Provide further details in the study plans on how GBA+ has been integrated into all aspects of data collection methodology, as per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 13, 20, 21, and others, related to effects assessments of the Guidelines.	Section 4.3 has been updated to include the consideration of Identity and Gender-Based Analysis Plus (GBA+) including both Indigenous communities and their relevant subpopulations and non-Indigenous communities and their subpopulations. During consultation and engagement activities these groups (and any others defined during consultation) will be engaged with on targeted input.	**Sections 4.3 and 9.8**	A GBA+ framework should be applied to analyze historic and current power relations, decision-making processes, and how gender intersects with health, social, and economic conditions. Include equity considerations as a tool to ensure inclusiveness in the engagement process. Describe how GBA+ has been and will be applied to the consideration of engagement activities. Identify specific methods targeted to specific subgroups. Provide detail on how GBA+ has been integrated into all aspects of data collection methodology, including for the definition of indicators, as per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 13, 20, 21, and others, related to effects assessments of the Guidelines. It is not sufficient to mention that Gender-Based Analysis Plus will be applied to the assessment. Clear descriptions of how GBA+ was integrated (including to which variables, method, and how it influenced results' interpretation) are needed in the Impact Statement.
GC-07	**Section 13 - Effects Assessment (including 13.1, 13.2)**	Provide details to demonstrate how the Project's potential effects will be considered, as per the requirements in Sections 13 to 19 of the Guidelines. Ensure that the effects assessment considers the effects of each of the project components and physical activities, in all phases, and that it is based on a comparison to the proposed baseline work. Provide detail on how engagement with all Indigenous groups listed in the Indigenous Engagement and Partnership Plan and the public will inform the effects assessment and the selection of mitigation measures and follow-up program measures.	Project environmental interaction are separated into Project phases, and Project activities for each environmental discipline in their VC-specific study plan listed as Table 9-1. Information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs.	**Throughout the study plan, Sections 6.2 and 9**	As required in Sections 7 and 13 of the Guidelines, ensure that the effects assessment considers the effects of each of the project components (including but not limited to all alternative routes brought forward in the Impact Statement, all aggregates sources, access roads, etc.) and physical activities, in all phases, and that the assessment is based on a comparison to the data and information gathered during the proposed baseline work. Clarify the level of information that will be shared with, and explained to, the Indigenous Knowledge Program leads and whether study plans will be made available to all Indigenous groups listed in the Indigenous Engagement and Partnership Plan.
GC-08	**Section 13.1**	Provide clear descriptions of the rationale behind the assumptions, including but not limited to the assumed average daily traffic and vehicles composition during the construction and	Section 10: Current assumptions to be used in the effects assessment have been identified. Any additional assumptions will be identified and rationale will be provided in the IS / EA Report.	**Section 10**	Before conducting the effects assessment analysis, the Agency advises the proponent to seek the Federal Review Team's confirmation of the assumptions that will be used in the analysis or, at a minimum, to discuss the type of assumptions that will be considered.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Tailored Impact Statement Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		operation phases that will be considered for the effects assessment and the cumulative effects assessment.			As required by Section 13.1 of the Guidelines, ensure that the Impact Statement clearly outlines the assumptions used for the assessment of effects, including cumulative effects, on each valued component.
GC-09	**Section 19.2 - Impacts on the Exercise of Aboriginal and Treaty Rights**	Describe an approach for identifying the potentially impacted rights of Indigenous peoples of Canada that are recognized and affirmed by section 35 of the *Constitution Act, 1982*, and for integrating the potential impacts on those rights into the collection of baseline information and the effects assessment.	All study plans reference how potential effects on Indigenous rights will be assessed in the Aboriginal and Treaty Rights and Interests Study Plan. Impacts on Rights considerations are explained in the rationale for defining a Local Study Area and Regional Study Area for Aboriginal and Treaty Rights and Interests VCs. Further information for this is listed in Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan.	**Section 5, and Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan**	Feedback will be provided in the Federal Review Team's comments package on the Aboriginal and Treaty Rights and Interests Study Plan.
GC-11	**Section 25 – Description of the Project's contribution to sustainability**	Provide detail on the approach to meeting the requirements of Section 25 of the Guidelines regarding the description of the Project's contribution to sustainability.	Section 9: the sustainability assessment for the Project will be undertaken on the preferred alternative and will characterize the Project's contribution to sustainability incorporating the requirements set out in Section 25 of the Guidelines.	**Section 9.7**	Section 9.7 of the study plan is listing the requirements outlined in Section 25 of the Guidelines. Ensure that the Impact Statement provides a description of the method or approach followed to meet the requirements of Section 25 of the Guidelines.

Response to Preliminary Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Economic Study Plan submitted on May 22, 2020:						
#	**Study Plan Section**	**TISG Section[2]**	**Required Action for Proponent**	**Proponent Response**	**June 2021 Study Plan Reference**	**Agency Response**
EC-01	**Section 4.1**	**Section 6**	Required Action # 1: Update the study plan to include the list of all Indigenous groups that will be engaged, at a minimum the Indigenous groups listed in the IEPP, as part of the baseline data collection, defining the list of criteria and indicators, and effects assessment analysis. The list should be consistent throughout the study plan	Table 4-1 in the updated Study Plan provides a list of Indigenous communities that will be engaged and consulted with on the Project, which is inclusive of all the groups listed in the IEPP provided by the Agency.	**Table 4-1, Section 4.3, Section 7.2**	Required Action # 1 was partially addressed. Section 7.2 of the study plan states that "Indigenous communities identified in Table 4-1 may be engaged for the purposes of economic data collection". Provide a workplan that clearly outlines the approach to engage Indigenous groups listed in the Indigenous Engagement and Partnership Plan in determining the spatial and temporal boundaries specifically for the economic conditions valued component. The Impact Statement should clearly outline all perspectives and input received on spatial and temporal boundaries, including Indigenous and community knowledge, and demonstrate how these were integrated into or contributed to decisions regarding the Project (e.g., project design). If the Proponent determined that some perspectives and input received during engagement activities did not warrant consideration or integration into the decisions regarding the Project, a detailed description of the input and rationale for exclusion must be provided in the Impact Statement. In addition, Section 7.2 of the study plan states that "The economic primary data collection program will select key socio-economic knowledge holders to participate in the program." Clarify how key socio-economic knowledge holders were selected.
EC-02	**Section 3**	**Section 6.2**	Required Action # 2: Provide further details on how input received from Indigenous groups will be tracked, considered, and reported to the Agency in the Impact Statement, as per the expectations of Section 6 of the Guidelines.	Indigenous communities will be engaged with as part of the overall consultation and engagement program for the Project, which is summarized in Section 4 of the updated Study Plan. All information and comments received from Indigenous communities will be logged, tracked and responses generated where applicable. Section 5 of the Study Plan describes the Indigenous Knowledge Program, another avenue for Indigenous communities to provide input on the Project. Section 2.1 has additional information on the Project's approach to handling confidential information	**Sections 2.1, 4 and 5**	Required Action # 2 was partially addressed. See comment GC-03.
EC-03	**Sections 4 and 4.3**	**Sections 5.2 and 6.3**	Required Action # 3: Describe in the study plan how the proponent will engage diverse populations to collect information necessary to support the GBA+ and how that information will be tracked, considered and reported in the Impact Statement.	The Economic Study Plan will integrate a GBA+ framework into the Economic data collection and assessment program.	**Section 4.3**	Required Action # 3 was partially addressed. See comment GC-06.
EC-04	**Section 4.1**	**Section 5**	Required Action # 4: Update the study plan to include the list of the members of the public and public groups that will be engaged, at a minimum the public participants listed in the	Considering the Economic VCs as presented in Table 9.2, and the study areas presented in Section 6.2, the Municipality of Greenstone is the primary public body	**Section 6, Table 6-1**	Required Action # 4 was partially addressed. See comments GC-04 and GC-05.

[2] Refer to complete sections of the Guidelines for more context

Response to Preliminary Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Economic Study Plan submitted on May 22, 2020:						
#	**Study Plan Section**	**TISG Section[2]**	**Required Action for Proponent**	**Proponent Response**	**June 2021 Study Plan Reference**	**Agency Response**
			PPP, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan.	that will be engaged with for data collection purposes to support the Economic assessments. There are no other public interests (non- Indigenous communities) in the LSA expected to experience Economic impacts from the project. Other public interests such as land users will be engaged with to support the Land and Resource Use assessment. The study plan for that discipline should be referred to for a list of public interests that will be engaged with.		Provide a workplan that clearly outlines the approach to engage the members of the public listed in the Public Participation Plan in determining the spatial and temporal boundaries specifically for the economic conditions valued component. To meet the requirements of Section 5 of the Guidelines, engagement opportunities must be offered to <u>all</u> members of the public listed in the Public Participation Plan to gather input on the preliminary spatial boundaries proposed by the project team.
EC-05	**Section 4.1**	**Section 11**	Required Action # 5: Update the study plan to include additional details on what will be sourced from primary sources, and what will be sourced from secondary information sources so that it is clear where information is being sourced for the criteria and indicators listed in the study plan. Required Action # 6: Update the study plan to provide additional detail on how the collection methodology of primary information would meet the expectations of Section 11 and other relevant sections of the Guidelines.	Primary data sources are identified in Section 7.2.2. As noted in Table 3-1, discussions with the Agency indicated that primary collection would be collected to fill in the gaps from secondary data sources. Section 9.2 of the Study Plan identifies relevant VCs and indicators for the Economic Environment and how primary information will be considered.	**Section 7.2.2** "Primary data collection will include field work to collect qualitative data on the Economic Environment within communities potentially affected by the Project (included in Table 6-1)." **Section 9.2**	Required actions # 5 and # 6 were partially addressed. It is unclear how the determination to only collect qualitative data through the primary data collection field work was made. As a first step in the analysis, secondary sources should be studied to understand the gaps in the available baseline data. Subsequently, to fill potential gaps, primary data collection, qualitative and/or quantitative, may be required. This includes data collection to fill potential information gaps related to GBA+ and baseline economic conditions, as required in Sections 7.1 and 11 of the Guidelines. Provide a rationale on the determination to only collect qualitative data from the anticipated primary data collection field work. In your rationale, include the data gaps and indicators that have not been identified through your secondary data collection that require field work to meet the requirements of Section 11 of the Guidelines.
EC-06	**Section 4.2**	**Section 11**	Required Action # 7: Update the study plan to provide additional detail on how the collection methodology of secondary information would meet the expectations of Section 11 and other relevant sections of the Guidelines, including information sources to be used, and for which criteria and indicators they apply.	A list of secondary data sources can be found in Section 7.2.1. Section 9.2 of the Study Plan identifies relevant VCs and indicators for the Economic Environment and which sources of information will be considered.	**Sections 7.2.1 and 9.2**	Required Action # 7 was addressed.
EC-07	**Section 5.1.2**	**Sections 5 and 6**	Required Action # 8: Revise the study plan to describe a methodology and engagement approach that will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines. Required Action # 9: Provide further detail on the rationale that is used to define the PSA, Local Study Area (LSA) and Regional Study Area (RSA) for each valued component, and describe how Indigenous groups and the public have been, or will be, provided an opportunity to inform the spatial and temporal boundaries.	Section 6.2 of the Study Plan identifies how the PDA (formerly PSA), LSA and RSA have been defined for the Project, including for the Economic Environment. Section 6.2.1 of the Study Plan identifies that the study areas can be further refined based on input from neighbouring Indigenous communities and interested persons.	**Section 6.2**	Required actions # 8 and # 9 were partially addressed. See comments EC-01 and EC-04.
EC-08	**Section 5.1.2**	**Section 1.1**	Required Action # 10: Update the study plan to define study areas that capture the Project's economic effects due to potential changes to	As currently defined, the Economic study areas are defined to capture the potential Economic effects of the Project on the surrounding environment. The study areas are also reflective of potential changes to land	**Section 6.2.2** "The Economic LSA and RSA were defined based on secondary source information, including existing mapping	Required Action # 10 was partially addressed. Section 7.4 of the Guidelines states that the spatial boundaries should vary depending on the valued component

Response to Preliminary Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Economic Study Plan submitted on May 22, 2020:						
#	**Study Plan Section**	**TISG Section[2]**	**Required Action for Proponent**	**Proponent Response**	**June 2021 Study Plan Reference**	**Agency Response**
			environment, health, social and economic conditions.	use, health, and social conditions that could directly or indirectly impact Economic considerations.	and reports profiling relevant communities, to understand the extent to which community-level socio-economic interest was apparent in the PDA. More specifically, this included assessing the use of the PDA and / or a connection to the Project that has the potential to alter the Economic Environment of a community." **Section 6.2.2** "Communities in the Economic LSA are those who are anticipated to experience noticeable changes due to the Project. Comparatively, communities in the Economic RSA, which is regionally defined, are likely to be impacted by the Project in a less noticeable and more variable manner due largely to their limited use and connection to the PDA and future transportation infrastructure." **Table 6-1** "Communities located in close proximity to the access road such that the Project or resulting ac-cess has the potential to directly influence the Economic Environment of these areas. This is the area where most economic impacts are expected." **Section 7.2.2** "The specific scope of the primary data collection program will be informed by the final Economic study areas. However, it is anticipated primary data collection will focus on the communities most likely to be affected by the Project including MFFN and Aroland First Nation (Section 6.2)."	and that the proponent should validate with the Agency the spatial boundaries for each valued component. The local study area proposed in the economic study plan is very narrow and too geographically linked to the Project's footprint to represent the area of influence and fully capture the potential impacts of the Project on the economic conditions valued component. See also GC-02, GC-04, EC-01 and EC-07.
EC-09	**Section 5.2**	**Sections 11 and 18**	Required Action # 11: Update the study plan to include detailed and measurable indicators that meet the requirements in Sections 11 and 18 of the Guidelines. Demonstrate how input received from Indigenous groups through engagement activities were incorporated into the development of the criteria and indicators.	Table 9-2 identifies the valued components, indicators, and sub-indicators that will be considered in the Economic assessment for the Project. This table includes the rationale for selection and potential sources of information. Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to	**Table 9-2, Section 9.2**	Required Action # 11 was partially addressed. The indicators and sub-indicators presented in Table 9-2 do not adequately specify the indicators that would be collected and assessed to meet the requirements of Sections 11 and 18 of the Guidelines. Specifically, the sub-indicators identified in Table 9-2 lack appropriate detail required to provide useful and meaningful information for the effects assessment. Table 11-1 of the study plan does provide an explanation as to how the requirements of Sections 11 and 18 of the

Response to Preliminary Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Economic Study Plan submitted on May 22, 2020:						
#	**Study Plan Section**	**TISG Section[2]**	**Required Action for Proponent**	**Proponent Response**	**June 2021 Study Plan Reference**	**Agency Response**
				inform the selection of the VCs and indicators for the Economic discipline		Guidelines would be met, which includes a qualitative discussion on the type of indicators that may be used as part of the baseline data requirements. However, Table 11-1 still does not provide specific and measurable indicators, whereas Appendix C of the study plan includes an appropriate example of potential indicators used to measure changes to the labour market. For example, row #5 in Table 11-1 notes that "Sources of income will be considered in Labour market baseline conditions using Statistics Canada data". Additional detail on the specific income-based indicators sourced from Statistics Canada is required to understand how the requirements of Sections 11 and 18 of the Guidelines would be met. Please refer to Appendix C of the study plan for examples of labour market indicators that could be used to meet the requirements of Sections 11 and 18 of the Guidelines. Include additional indicators of the same specificity for the other baseline information requirements as required in Sections 11 and 18 of the Guidelines. Update the study plan to provide additional detail to the response column in Table 11-1 with respect to the specific indicators that would be used to meet the requirements of Sections 11 and 18 of the Guidelines. This should include both quantitative and qualitative indicators that are specific, measurable, and accessible to source.
EC-10	**Section 5.2**	**Sections 11 and 18**	Required Action # 12: Update the study plan to provide further detail on the specific economic criteria and indicators that will be collected and assessed through other study plans. At a minimum, provide a cross reference as to where the specific economic criteria and indicators can be found in the other plans.	Section 9.2 identifies which other plans will be collecting data relevant to the Economic Environment. - The Social Assessment will document information on housing and infrastructure. - The Land and Resource Use Assessment includes information on industrial land uses and tourism establishments. - Elements of the traditional economy are covered in the Aboriginal and Treaty Rights and Interests Assessment. Findings and data included in these disciplines will be considered under relevant components of the Economic Assessment, as applicable.	**Section 9.2; Social Study Plan Land and Resource Use Study Plan, Aboriginal and Treaty Rights and Interests Study Plan**	Required Action # 12 was addressed.
EC-11	**Section 7, Table 5**		Required Action # 13: Demonstrate that this study plan reflects the inclusion of all requirements outlined in the Guidelines and describe the approaches to collect the information.	Table 11-1 is a comprehensive list of the requirements of the Guidelines. This table responds to each requirement from the Guidelines and provides an updated Study Plan reference section to clearly identify where within the Study Plan each requirement is being considered. In the Economic study plan, Table 11-3 identifies the areas of non-conformance along with their justification.	**Tables 11-1 and 11-3**	Required Action # 13 was addressed. Proposed amendments and/or deviations from the Guidelines will not be reviewed or approved during the study plans review process. The Agency will provide guidance on the process to propose amendments and/or deviations to the Guidelines to the project team.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
EC-12	**Section 4.2 Indigenous Communities - Table 4-1: "…**Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations…"	**Section 19.1** "…As a best practice, proponents are encouraged to also include the following: - a commitment to preferentially employ Indigenous people from Indigenous groups identified in the *Indigenous Engagement and Partnership Plan* and use of the Northern Ontario Network of Indigenous Training Organizations (e.g., Indigenous Skills and Employment Training network);…" **Section 20** "…The Impact Statement must: - describe education, training, hiring practices that encourage employment of local people , including the use of the Northern Ontario Network of Indigenous Training Organizations (e.g., the Indigenous Skills and Employment Training network);…"	The study plan indicates that consultation and engagement activities and key informant interviews would take place with Indigenous groups and/or local municipalities; however, there is a need to ensure that the Northern Ontario Network of Indigenous Training Organizations {e.g. Indigenous Skills and Employment (ISET) Program network} is knowledgeable of the activities related to the Project. It is important that communities are informed of all programs related to the Project, including the timeframe for the employment or opportunity, how long such opportunities will be available, types of jobs available, plans that would encourage employment, procurement and contracting opportunities for Indigenous peoples and communities.	Describe in the Impact Statement the education, training and hiring practices that would encourage employment of local people, including the use of the Northern Ontario Network of Indigenous Training Organizations, to meet the requirements of Section 20 of the Guidelines. It is recommended that the **ISET Program service delivery network** be mentioned in Section 4.2 and in Table 4-1 of the study plan. Additional information pertaining to the ISET Program service delivery network: There are currently 22 Indigenous service delivery organizations across Ontario (the link to the current service delivery network: https://www.canada.ca/en/employment-social-development/programs/indigenous-skills-employment-training/service-delivery-organizations.html#a4). In Northern Ontario there are currently nine service delivery organizations. Details of the nine service delivery organizations in Northern Ontario are below. {Kiikenomaga Kekenjigewen Employment and Training Services (KKETS) is the local service delivery organization.} **ISET Service Providers in Northern Ontario:** **1.** **Wabun Tribal Council (Mamo-Nuskomitowin)** - which is located in Timmins and serve the North East communities of Brunswick House, Chapleau Ojibway, Flying Post, Matachewan, Mattagami, Wahgoshig) **2.** **Kiikenomaga Kikenjigewen Employment and Training Services (KKETS)** - based Thunder Bay, serves the Matawa First Nations, including Marten Falls and Webequie. **3.** **Wikwemikong Unceded Indian Reserve** **-** provides services to First Nations on and near Manitoulin Island (e.g. Wiki, Curve Lake), as well as Sudbury ON and the surrounding areas. **4.** **Mamaweswen – The North Shore Tribal Council** **-** based out of Cutler, Ontario. Serves the First Nations in the area near Elliot Lake, Blind River, Algoma, etc. **5.** **Anishinabek Nation (Union of Ontario Indians)** - based in North Bay but serves clients from NE to NW Ontario - Thunder Bay (Biinjitiwaabik Zaaging Anishinaabek/Rocky Bay, Binqwi Neyaashi Anishinaabek/Sandpoint, Kiashke Zaaging Anishinaabek/Gull Bay, Animbiigoo Zaagi'igan Anishinaabek/Lake Nipigon, Michipicoten, Ojibways of Pic River, Pays Plat, Pic Mobert, Red Rock/Lake Helen). **6.** **Aboriginal Labour Force Development Circle (First Nation)** **-** provides services to people living in urban settings and on-reserve, including Batchewana Bay, Sudbury, Sault Ste. Marie and more in Northern Ontario. **7.** **Shooniyaa Wa-Biitong** - based in Kenora NW Ontario, with a catchment area throughout Treaty 3 which includes Kenora (Anishnaabeg of Naongashiing/Big Island, Big Grassy,

[3] Refer to complete sections of the Guidelines for more context.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
				Couchiching, Grassy Narrows, Iskatewizaagegan # 39, Lac Des Mille Lacs, Lac La Croix, Naicatchewenin, Naotkamegwanning/Whitefish Bay, Nicickousemenecaning, Northwest Angle # 33, Northwest Angle # 37, Lac Seul, Ochiichagwe'babigo'ining/Dalles, Ojibways of Onegaming/Sabaskong, Onigaming, Rainy River, Nicickousemenecaning, Seine River, Shoal Lake #40, Stanjikoming, Wabaseemoong/Islington, Wabauskang, Washagamis Bay, Wauzhushk Oningum/Rat Portage). **8.** **Sioux Lookout Area Aboriginal Management Board (SLAAMB) –** based in Sioux Lookout NW Ontario, with a catchment area that includes Sioux Lookout (Bearskin Lake, Cat Lake, Deer Lake, Fort Severn, Kasabonika, Kee-Way-Win, Kingfisher, Kitchenuhmaykoosib Inninuwug/Big Trout Lake, Koocheching, Eagle Lake, McDowell Lake, Mishkeegogamang/Osnaburgh, Muskrat Dam, New Slate Falls, North Caribou Lake, North Spirit Lake, Pikangikum, Poplar Hill, Sachigo, Sandy Lake, Saugeen/Savant Lake, Wapekeka, Wabigoon Lake, Wawakapewin/Long Dog, Wunnumin). 9. **Mushkegowuk Council Employment & Training Service (METS) -** serves the communities of Moose Factory (Fort Albany Attawapiskat, Chapleau Cree, Kashechewan, Missanabie Cree, Mocreebec, Moose Cree, Taykwa Tagamou, Weenusk/Peawanuck).
EC-13	**Section 4.3** "…When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan. Specific to Gender-Based Analysis Plus (GBA Plus) objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement…"	**Section 11** **"**This economic baseline should document the local and regional economic conditions and trends based on the spatial and temporal boundaries selected, and must include economic indicators and activities for all potentially impacted local communities, including municipalities, and Indigenous groups. The scope and content of the economic baseline should be tailored to the specific project context, take into account community and Indigenous group input, and should include indicators and information that are useful and meaningful for the effects analysis. The information provided must: - be sufficient to provide a comprehensive understanding of the current state of each valued component, including relevant trends; - describe how community and Indigenous knowledge from related populations, including input from diverse groups, was used in establishing baseline conditions; - describe baseline economic conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; - conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; and - describe any relevant indicators.**"**	The study plan outlines opportunities for engagement with neighbouring Indigenous communities and non-Indigenous communities; however, there is no clear indication that this data will be disaggregated as required by Section 11 of the Guidelines. Summary statistics will not provide an intersectional gender analysis and will not achieve GBA Plus objectives that are needed to ensure diverse and inclusive engagement has occurred.	Update the study plan to demonstrate how engagement activities and surveys are designed to collect disaggregated data of diverse groups and subgroups to clearly identify the segments of the population that were/will be consulted and engaged during the preparation of the Impact Statement in order to meet the requirements of Sections 11 and 18 of the Guidelines.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
		Section 18 "…The proponent must analyze the community and Indigenous knowledge across diverse subgroups where possible to identify differential effects highlighted by these groups…" "…In assessing effects to valued components listed [in Section 18], the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders)…"		
EC-14	**Section 4.4** "…As part of the IS / EA Consultation Plan (AECOM 2020) and Indigenous Knowledge Program, Indigenous communities identified in Table 4-1 will be contacted to determine their level of interest in the Project and their concerns related to potential economic impacts. For the Indigenous communities that express specific economic concerns, targeted economic data collection will be implemented through the economic data collection program, consistent with the likelihood of effect anticipated to the community as defined by the MFFN CAR Project Team. In addition, interested persons identified through the general engagement program and listed in the Public Participation Plan (the Agency 2020) may also be engaged on potential economic concerns and impacts. Section 7.2 provides additional details on the targeted economic data collection approach…"	**Section 6.2** "…The Impact Statement must also document how the proponent responded to questions, comments and issues raised by Indigenous groups, and how unresolved matters have been addressed. Any proposed mitigation measures are to be clearly linked, to the extent possible, to valued components in the Impact Statement as well as to specific project components or activities. The analysis and responses are to include: - a comprehensive list of all issues, questions and comments raised during the engagement activities by each Indigenous group and the proponent's responses, including how matters have been addressed in the Impact Statement or will be addressed through the impact assessment (including but not limited to avoidance, mitigation or other measures to address potential effects or impacts on the exercise of rights of Indigenous peoples);..." …- if engagement with certain Indigenous groups is not possible, rationale must be provided, including, as applicable, an outline of efforts made;… - where and how Indigenous groups' knowledge, perspectives and input were integrated into or contributed to decisions regarding the Project (e.g., project design), including: o scoping, development and collection of baseline information; o plans for construction, operation, decommissioning, abandonment, and maintenance; and o follow-up and monitoring. -where and how Indigenous groups' knowledge, perspectives and input were integrated in the characterization of the nature of environmental, health, social and economic effects and impacts expected from the Project for each Indigenous group; …" **Section 12** "…If an Indigenous group has	The study plan does not describe how information will be shared with participants that may be interested but face barriers to participate. Certain populations may be less likely to express their views voluntarily, and steps should be taken to remove barriers to ensure their participation. A description of efforts to engage with individuals or groups that may face barriers to participate should be provided to demonstrate engagement effort, as per Sections 6.2 and 12 of the Guidelines.	Describe in the study plan actions taken and to be taken to raise interest in the Project from Indigenous groups who may face barriers to participate in engagement activities. Clarify how information will continue to be shared with participants and Indigenous groups who may face barriers to participate in engagement activities. For the Indigenous groups that do not wish to participate, provide a rationale in an updated study plan by describing the barriers and the efforts made to overcome them, as per Sections 6.2 and 12 of the Guidelines. Include in the Impact Statement detailed descriptions of the Indigenous groups that are being engaged and of those that do not wish to participate.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
		chosen not to participate, the proponent should identify the community and provide evidence of efforts to engage… …Where Indigenous groups do not wish to participate, the proponent is encouraged to continue sharing information and analysis with the Indigenous groups of the potential effects of the Project, and to use available public sources of information to support the assessment….”		
EC-15	**Section 7.3** **“…**The study methods that will be employed to characterize the economic baseline conditions include data collection, data analysis and qualitative descriptions and profiling. Multiple sources of data, including primary, secondary, engagement and Indigenous Knowledge, will be utilized for the purposes of economic data collection. Data collection methods are detailed in Section 7.2. The data collection process can be conceptualized as a matrix. For each indicator listed in Section 9.2, data will be collected for different groups of interest (e.g., communities, subgroups within the community). The data collected will be tracked and assessed using this approach, and, when required, primary data collection will target information gaps identified in the matrix. Data analysis will involve classifying, comparing and interpreting the data collected in line with this matrix approach….”	**Section 7.1** **“**The Impact Statement must provide a description of the environmental, health, social and economic setting directly and incidentally related to the Project. This should include the existing environmental, health, social and economic components, interrelations and interactions as well as the variability in these components, processes and interactions over time scales and geographic boundaries appropriate to the Project,…” **Section 13.1** “…The assessment of the effects of each of the project components and physical activities, in all phases, must be based upon a comparison of baseline environmental, health, social and economic conditions and the predicted future conditions with the Project and the predicted future conditions without the Project….”	Information regarding the methodology for conducting economic analysis, estimating figures and impacts, and forecasting is not provided in sufficient detail to meet the requirements of Sections 7 and 13 of the Guidelines.	Update the study plan to provide further detail on the methodology that was/will be used to conduct economic analysis, estimating figures and impacts, and forecasting in order to meet the requirements of Sections 7 and 13 of the Guidelines.
EC-16	**Section 9, Table 9.2 - Economic Indicators** “…Economic Opportunity Sub Indicators ▪ Change in business opportunity ▪ Change in regional economic activity ▪ Change in output ▪ Change in GDP value-added Procurement Sub indicators ▪ Value of procurement opportunities associated with the Project Employment Sub Indicators ▪ Change in job opportunities ▪ Change in labour incomeTraining opportunities…”	**Section 11** “…The information provided must: … o conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; and o describe any relevant indicators…”	When describing an indicator, the wording “change” by itself does not capture what will be evaluated (e.g. number of jobs created, new businesses opened/closed, and value of procurement to local or regional Indigenous / non Indigenous businesses). For example, change in business opportunity in itself is not a measurable indicator and it is not specific. Clarification is needed to help understand the scope and magnitude of the “change” overall and also among the sub-groups of local and regional population through an intersectional analysis, and offer a systematic approach to the next steps of measurement and monitoring. In order to fully understand the economic changes and its associated impacts, the change itself, whether positive, negative, or unintended, needs to be outlined and explained. The study plan does not provide sufficient details about “Training opportunities” related to the Project to meet the requirements of Section 11 of the Guidelines.	Update the study plan to specify each variable that will be used to characterize the “change” (positive, negative, or unintended) related to the indicators identified, to meet the requirements of Section 11 of the Guidelines. Update the study plan to provide more details about “Training opportunities” related to the Project. Consider describing potential training that would be provided to local and regional individuals to fit the Project’s needs.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
EC-17	**Section 9.2 -Table 9-2** "…Economic opportunity, change in business opportunity and change in regional economic activity…"	**Section 11** "…Overall economy: o a brief overview of the regional economy in recent years…" **Section 18.1** "The Impact Statement must: o describe the effects of the Project on the local and regional labour markets;..." **Section 18.3** "The Impact Statement must: o describe the potential positive and negative effects of the Project on local and regional businesses, during both construction and operation phases of the Project,…"	The study plan does not define the indicator "Economic opportunity" and the sub-indicators "change in business opportunity" and "change in regional economic activity" presented in Table 9-2 with sufficient detail to meet the requirements of Sections 11, 18.1 and 18.3 of the Guidelines.	Update the study plan to provide further detail to clearly define the indicators presented in Table 9-2 and how changes will be evaluated and interpreted within those variables.
EC-18	**Section 9.2, Table 9-2** "…estimated price changes at an order of magnitude level for key consumptive goods…"	**Section 11** "…The Impact Statement must provide information on the following economic conditions related to the Project and the economic opportunities: • Labour market: … o housing and consumer prices;…" **Section 18.2** "The Impact Statement must: … • describe the effects of the Project on availability of goods and services and consumer prices, in particular for o food; o fuel; and o electricity."	The study plan does not define the sub-indicator "estimated price changes at an order of magnitude level for key consumptive goods" with sufficient detail to meet the requirements of Section 18.2 of the Guidelines. It is not clear what is meant by "estimated price changes at an order of magnitude level."	Update the study plan to specify the key consumer goods to define the sub-indicator "estimated price changes at an order of magnitude level for key consumptive good", in order to meet the requirements of Section 18.2 of the Guidelines. In addition, clarify the meaning of "estimated price changes at an order of magnitude level". Does this mean that price changes will only be registered if they change by a factor of ten? If so, more precision is needed with respect to price levels.
EC-19	**Section 9.2 - Table 9-2** "…traditional economies…"	**Section 11** "…Overall economy: o a brief overview of the regional economy in recent years..." **Section 18.1** "The Impact Statement must: o describe the effects of the Project on the local and regional labour markets…." **Section 18.3** "The Impact Statement must: o describe the potential positive and negative effects of the Project on local and regional businesses, during both construction and operation phases of the Project,…"	The study plan does not define the indicator "traditional economies" with sufficient detail to meet the requirements of Sections 11, 18.1 and 18.3 of the Guidelines.	Provide further detail to define clearly the indicator "traditional economies" and how changes will be evaluated and interpreted.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
EC-20	**Section 9.2, Table 9-2** "…change in job opportunities…"	**Section 11** "…The Impact Statement must provide information on the following economic conditions related to the Project and the economic opportunities:… • Overall economy: o a brief overview of the regional economy in recent years (e.g., if there have been any major investments or closures, if the area's resources and products have been in high or low demand, etc.);…." **Section 18.1** " The Impact Statement must: • describe the effects of the Project on the local and regional labour markets," and "describe any skills-matching issues related to the Project…"	Due to the limited data available at the regional level, it will be difficult to evaluate the regional change in job opportunities (as opposed to change in employment) caused by the Project. Consider replacing this sub-indicator with "permanent change in employment" and "temporary change in employment," which would be easier to evaluate.	
EC-21	**Section 9.2 -Table 9-2** "…training opportunities…"	**Section 11** "…Overall economy: o a brief overview of the regional economy in recent years…" **Section 18.1** " The Impact Statement must: o describe the effects of the Project on the local and regional labour markets," and "describe any skills-matching issues related to the Project…"	The study plan does not define the sub-indicator "training opportunities" with sufficient detail to meet the requirements of Section 18.1 of the Guidelines. (Does it refer to training opportunities by the proponent, whether on-location or not, or to training opportunities in other locations that will become more easily accessible once a road is built, or to both?)	Update the study plan to provide further detail to define clearly the sub-indicator "training opportunities" offered and how changes will be evaluated and interpreted, in order to meet the requirements of Section 18.1 of the Guidelines.
EC-22	**Section 9.2 -Table 9-2** …Value Component, Labour Force and Employment – specifically under sub-heading Source of Information…"	**Section 20** "…The Impact Statement must: … • describe education, training, hiring practices that encourage employment of local people, including the use of the Northern Ontario Network of Indigenous Training Organizations (e.g., the Indigenous Skills and Employment Training network);…"	The study plan mentions that engagement activities and key informant interviews would take place with Indigenous groups, however, there is a need to ensure that the Northern Ontario Network of Indigenous Training Organizations (e.g. ISET Program service delivery network) is made aware of all training or education programs or scholarships the proponent is supporting to enhance employment opportunities for local residents. It is recommended to include under the value component "Labour Force and Employment" and specifically under sub-heading "Source of Information" the **ISET Program service delivery network**.	
EC-23	**Section 9.2 -Table 9-2**	**Section 2.2** **"…**If the Project is part of a larger sequence of projects, the Impact Statement must outline the larger context, including likely future developments by other proponents that may use project infrastructure, and activities that may be enabled by the current Project."	Consider the following two reports as sources of information for economic analysis: o The Mining Industry in Northwestern Ontario: An Analysis of Recent Development and the Strategy for Success (Northern Policy Institute, 2016) o Mining and Exploration Report (Thunder Bay Community Economic Development Commission, 2019)	
EC-24	**Section 9.2 -Table 9-2** "…Economic Opportunity…"	**Sections 11 and 18**	Table 9-2 lists the indicator "*economic opportunity*" and four sub-indicators, including "*change in business opportunity*" and "*change in regional economic activity*". However, the study plan does not provide any additional information on these sub-indicators, including what would be measured or how it would be measured. The information provided is not sufficient to clarify the approach planned to estimate project impacts on economic opportunities will be estimated and to determine	Include in the updated study plan further detail on the proposed variables identified to measure changes to economic opportunities and to economic activities, in order to demonstrate how the requirements of Section 18 of the Guidelines will be met.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
			whether the requirements of Section 18 of the Guidelines would be met.	
EC-25	**Section 9.2 -Table 9-2** "…Procurement • The Project will require the procurement of goods and services – possibly from firms within the local area…"	**Section 11** "…The Impact Statement must provide information on the following economic conditions related to the Project and the economic opportunities: … • Business environment:… o broader economic contributors to the regional economy, such as small businesses (e.g., nature and outdoor tourism);…"	Information regarding how the potential for local businesses to fulfill procurement needs will be estimated should be provided to meet the requirements of Section 11 of the Guidelines. For example, are there efforts to assess capacity of local companies to participate in procurement processes?	Include in the updated study plan further detail on how the potential for local businesses to fulfill procurement needs will be estimated, in order to meet the requirements of Section 11 of the Guidelines. The Impact Statement should describe the overall procurement needs and share to be fulfilled by local businesses.
EC-26	**Section 9.2 -Table 9-2** "…Price of Goods…"	**Section 18.2** "The Impact Statement must: • describe the predicted positive and adverse effects to accommodation/lodging, including housing supply, housing costs, and rental rates, both during the construction and operation phases; and…"	The current source of information is primary data, which would only cover existing/current prices. It is unclear how predicted adverse and positive effects over the life of the Project would be forecasted.	Include in the updated study plan further information on how changes in the price of goods through the project life will be forecasted, in order to meet the requirements of Section 18.2 of the Guidelines.
EC-27	**Section 9.2 -Table 9-2** "…Employment…"	**Section 18.3** "The Impact Statement must: • describe the potential positive and negative effects of the Project on local and regional businesses, during both construction and operation phases of the Project, including: … o an estimate of potential effects of the Project on the traditional economy, including the potential loss of traditional economies and jobs; and…"	Section 18 of the Guidelines requires a description of positive and negative economic impacts of the Project on the economic conditions. The study plan seems to focus mostly on the potential positive effects (rational for selection); however, negative effects should be considered as well.	Include in the updated study plan details on how job shifts in the local community will be assessed, including potential negative impacts such as loss of local employment, in order to meet the requirements of Section 18.3 of the Guidelines.
EC-28	**Editorial** **Section 9.2 -Table 9-2:** "…Primary data (e.g., interviews with community members / key contacts; area businesses, municipal economic development office);…"	**Section 18** "…The proponent must analyze the community and Indigenous knowledge across diverse subgroups where possible to identify differential effects highlighted by these groups…"	The study plan seems to indicate that the valued component "Labour Force and Employment" described in Table 9-2 will be informed by Indigenous knowledge as primary data source of information, but that is not clearly indicated in the table.	Update Table 9-2 of the study plan to list "Indigenous knowledge" amongst the "sources of information" in addition to "community interviews and knowledge".
EC-29	**Section 9.3** "…A direct effect occurs through the direct interaction of an activity with an environmental discipline. The Project-environment interactions currently anticipated, based upon preliminary analysis, to result in direct effects to the Economic discipline have been identified in Table 9-1…."	**Section 18** "…The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains..."	Section 9.3 of the study plan refers to a preliminary analysis that was completed by the Proponent to determine the direct effects of the Project on the environment, health, social or health conditions. This analysis was not included in the study plan, and so, it is unclear how these preliminary conclusions, illustrated in Table 9-1, were drawn. As required in Section 18 of the Guidelines, the effects assessment should illustrate an understanding of effect pathways, and potential linkages to other effects. The study plan does not provide an analysis on how those direct effect pathways were determined.	Update the study plan to include a description of the preliminary analysis conducted that informed Table 9-1.
EC-30		**Section 16.2** "With respect to Social Determinants of Health, the Impact Statement must: … • Consider adverse and positive effects on health (i.e., overall well-being) based on the social and economic valued components, and their respective indicators, as outlined in Sections 17 and 18. Specific priority	The study plan provides no information regarding mitigation measures for potential high school drop-out youth. Compared to high school graduates, high school drop-out Canadians are less likely to find a job (a good quality job) and more likely to live in poverty, which may negatively affect the community in the long-term. Training	Include in the Impact Statement mitigation measures against rates of potential high school drop-out youth.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
		indicators must be determined or validated by community members but may include, for example: … o Level-3 health determinants related to structural and equity factors (e.g., potential indicators related to income, high school drop-out rates associated with seeking project-related employment) that may affect Level 2 determinants of health."	opportunities and access to good quality jobs may mitigate the impact of high school drop-out.	
EC-31	**Section 9.4** "…As a result, it is proposed input-output multipliers developed by the Northern Policy Institute be used to consider economic effects at an unorganized district level or provincial-level consistent with the economic RSA (Moazzami 2019a). If this approach is utilized, provincial multipliers will be used to scale the regional multipliers when multipliers are not available through the Northern Policy Institute. Alternatively, Statistics Canada's National Input-Output model will be used to conduct a provincial level assessment of economic effects. The best practices method will be determined depending on the planned procurement of goods and service by the Proponent..."	**Section 18.6** "…Where a generic multiplier may not accurately reflect the specific situation of the Project being assessed, evidence should be provided of specific economic activity that will result from the Project going ahead..."	The study plan does not provide sufficient evidence on the specific economic activity that will be assessed using the multipliers developed by the Northern Policy Institute. In addition, the study plan does not refer to the specific multipliers that are intended to be used in the assessment. The study plan seems to indicate that there is uncertainty whether or not this approach will be utilized, but no alternative methodologies are indicated.	Update the study plan to indicate the specific multipliers that will be used from the Northern Policy Institute, and indicate how each multiplier will be used to meet the requirements under Section 18 of the Guidelines. Update the study plan to clarify potential alternative methodologies under consideration.
EC-32	**Section 9.4** "…Input-output modelling is linear with a simplified macro-economic structure which removes key variables such as price-level, interest rates and unemployment rates (Statistics Canada 2009). Due to the reliance on existing economic relationships, price volatility can corrupt the linear relationships contained within these models making them less reliable, particularly over time (Statistics Canada 2009)…."	**Section 13.1** "…The description of the effects can be either qualitative or quantitative. Effects must be described using criteria to quantify or qualify adverse effects, taking into account any important contextual factors. With respect to quantitative models and predictions, the Impact Statement must detail the model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained..." **Section 18.1** "The Impact Statement must: • describe the effects of the Project on the local and regional labour markets;... • describe longer-term labour market local and regional labour market effects as a result of the project;…" **Section 18.2** "The Impact Statement must:… • describe the effects of the Project on availability of goods and services and consumer prices, in particular for o food; fuel; and o electricity."	It is unclear how changes to consumer process and labour market would be assessed to meet the requirements of Section 18 of the Guidelines. The study plan should propose appropriate economic analysis methodologies to measure the potential changes of the Project as described in Section 18 of the Guidelines.	Update the study plan to include specific examples of the economic analysis methodologies that are anticipated to be used to meet the requirements of Section 18 of the Guidelines, including the specific indicators that would be assessed to measure and express potential impacts to the baseline economic condition due to the Project.

New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
EC-33	**Section 11, Table 11-1** "…the IS / EA Report will describe changes to direct, indirect and induced employment, which affects the regional labour market. This will include jobs by phase of the Project and will include expected rates of pay. A GBA+ analysis will be undertaken on these opportunities..."	**Section 3.3** "…the Impact Statement must include Gender Based Analysis Plus GBA+ in its discussion of workforce requirements to describe any potential differential effects for diverse subgroups in the community. This must include a discussion of how hiring policies and programs, access to employment and training opportunities, investment in training, workplace policies and programs take into consideration vulnerable or underrepresented groups, including Indigenous people or other community relevant subgroups (e.g., women, youth, elders)." **Section 18.1**	Further detail is required regarding the consideration of vulnerable demographics/intersectional identity factors, number of local/regional workers and childcare requirements to meet the requirements of Section 3.3 of the Guidelines. While Table 11.1 of the study plan mentions barriers, an explicit bullet should be provided, within the labour market cells, to highlight the interconnectedness of labour market participation and availability of child care, particularly given the demographics of, and rapid growth within, the Indigenous population.	Update the study plan to include an approach for baseline data collection that describes in detail the extent to which vulnerable demographics/intersectional identity factors (i.e.; older workers age 45-64, youth, people with less than high school, women, persons with disability, recent immigrants, etc.) would be impacted by job opportunities, loss/displacement during the construction and closure phase of the project. This information would help inform potential cumulative socioeconomic impacts. Update the study plan to include an estimate of the number of local / regional workers (from diverse sub-groups) and their skill levels based on the National Occupational Classification. Include in the Impact Statement an assessment of child-care requirements in relation to any employment opportunities or shifts in the labour market as a result of the Project.
EC-34	**Section 11, Table 11-3** "…These principles will inform both primary and secondary data collection to support the Economic Assessment. Further, the Proponent will document baseline data consistent with these principles. The exception is data will not be disaggregated by gender as Statistics Canada does not disaggregate based on gender. Data disaggregated based on sex will be included..."	**Section 13.1** "The Impact Statement must describe in detail the project's potential adverse and positive effects in relation to each phase of the designated project (construction, operation, maintenance, suspension, decommissioning, and abandonment). The environmental, health, social or economic effects should be described in terms of the context, magnitude, geographic extent, ecological context timing, duration and frequency, and whether effects are reversible or irreversible… As applicable, the effects assessment must be sufficiently disaggregated and analysed to understand differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives including consideration of disproportionate effects to surrounding communities…"	Section 11 of the economic study plan indicates that "*data will not be disaggregated by gender as Statistics Canada does not disaggregate based on gender*". Where possible, primary data should be disaggregated to support impact and effects analysis of differences among diverse subgroups, to meet the requirements in Section 13.1 of the Guidelines. A rationale to explain the extent or limitations with the data disaggregation should be provided.	See comment GC-06. Include in the Impact Statement the detailed rationale that explains the extent and limitations with data disaggregation in the effects assessment. It is recommended that secondary data collection sources be analyzed in order to address gaps in data collections. If Statistics Canada does not disaggregate data based on gender, then peer-reviewed, published "academic research" should be consulted as a source for community labour and employment information.
EC-35	**Editorial - Footnote 8, Section 9.2** "In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project."		The statement in the footnote 8 in Section 9.2 "*In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs."* is inaccurate, as the Regional Assessment in the Ring of Fire area has not yet begun.	Replace the text in footnote 8 with "*In February 2020, the Minister of Environment and Climate Change determined that a regional assessment will be conducted in an area centred on the Ring of Fire mineral deposits in northern Ontario. Relevant information available in relation to the Regional Assessment in the Ring of Fire area would be considered in the impact assessment of the Project."*
EC-36	**Table 11-3: Study Plan Federal and Provincial Concordance – Requirement Deviations**		Proposed amendments and/or deviations from the Guidelines will not be reviewed or approved during the study plans review process. The Agency will provide guidance on the process to propose amendments and/or deviations to the Guidelines to the project team.	

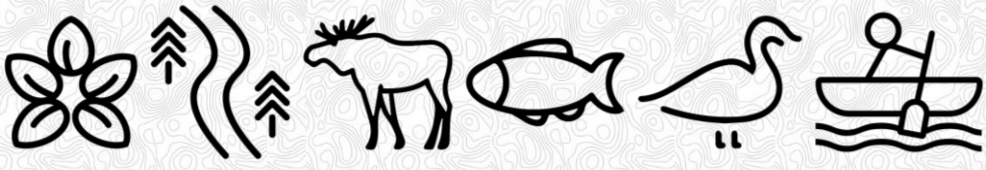
New comments from the Federal Review Team on the Marten Falls Community Access Road Project Economic Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for Proponent**
EC-37	**Section 7.3** "…For each of the valued components that will be assessed in the Impact Statement, the proponent must create a study plan and a work plan to be validated by the Agency. Upon receipt of a study plan, the Agency may request that the proponent present and discuss the study plan at technical meetings, which will be scheduled during the impact statement phase…"	In order to meet the requirements of Section 7.3 of the Guidelines, a work plan for each valued component must be submitted to the Agency for validation.	Since the economic study plan does not outline when baseline data will be collected for each Indigenous group (i.e., scheduling, sequencing), the submission of a work plan that provides this information is required.	Provide a work plan that outlines how the economic study plan will be executed in the field, including when baseline data will be collected. The work plan should include scheduling and sequencing of engagement activities relative to proposed baseline work, engagement on the study plan, spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge.

MARTEN FALLS FIRST NATION
ALL SEASON COMMUNITY ACCESS ROAD

FINAL

Social Study Plan

May 2021



Draft

Distribution List

# Hard Copies	PDF Required	Association / Company Name
	✓	Marten Falls First Nation
	✓	AECOM Canada Ltd.

Revision History

Rev #	Date	Revision Description
Draft	May 2020	Submitted “Socio-Community Assessment Study Plan” to the Agency.
Final	May 2021	Revised to address federal and provincial agency comments.

Statement of Qualifications and Limitations: AECOM

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13
© 2009-2015 AECOM Canada Ltd. All Rights Reserved.

Draft

Disclaimer: Dillon Consulting Limited

This report was prepared by Dillon Consulting Limited ("Dillon") for the sole benefit of our Client. The material in it reflects Dillon's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Draft

Authors

Report Prepared By:

<Originally Signed By>

Jessica Metuzals, MES
Environmental Planner
Dillon Consulting Ltd.

Report Reviewed By:

<Originally Signed By>

Don McKinnon, MES, RPP
Partner
Dillon Consulting Ltd.

<Originally Signed By>

Brady Romanson, MES, MCIP, RPP
Senior Social Scientist
AECOM

Draft

Table of Contents

page

1. Introduction 9
1.1 Federal and Provincial Terminology 9
1.2 Project Study Plans 10

2. Purpose and Objectives 13
2.1 Approach to Handling Confidential Information 15
2.1.1 Indigenous Knowledge 15
2.1.2 Socio-Economic Primary Data 16
2.1.3 Health Information 16

3. Study Plan Technical Discussions 17

4. IS / EA Report Consultation and Engagement Process 18
4.1 Interested Persons and Government Agencies 18
4.2 Indigenous Communities 18
4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement 20
4.4 Consultation on Social Concerns and Impacts 21

5. Consideration of Indigenous Knowledge in the IS / EA Report 22

6. Assessment Boundaries 25
6.1 Temporal Boundaries: Project Phases 25
6.2 Spatial Boundaries: Study Areas 26
6.2.1 General Information 26
6.2.2 Social Study Areas 28
6.2.3 Study Areas and Effects Assessment 30

7. Baseline Study Design 32
7.1 Desktop Assessment 32
7.2 Baseline Data Collection 32
7.2.1 Secondary Data Collection 33
7.2.2 Primary Data Collection 34
7.3 Study Methods 37

Draft

8. Data Management and Analysis 39

9. Effects Assessment 40

9.1 Project-Environment Interactions 40
9.2 Valued Components and Indicators 41
9.3 Potential Effects 46
9.4 Methods for Predicting Future Conditions 48
9.5 Mitigation and Enhancement Measures 49
9.5.1 TISG Section 20 Requirements 49
9.6 Residual Effects 50
9.7 Consideration of Sustainability Principles 51
9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment 53
9.9 Follow-up Programs 53

10. Assumptions 54

11. Concordance with Federal and Provincial Guidance 55

12. References 61

List of Figures

Figure 6-1: Project Schedule 25
Figure 6-2: Social Local and Regional Study Areas 31

List of Tables

Table 1-1: Equivalent Federal and Provincial Terms 9
Table 1-2: Project Study Plans and Valued Components 10
Table 3-1: Summary of Study Plan Technical Discussions 17
Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations 19
Table 6-1: Social Study Areas 28
Table 9-1: Project – Environment Interactions 40
Table 9-2: Social Valued Components and Indicators 43

Draft

Table 9-3: Potential Discipline Interactions 47
Table 9-4: Social Magnitude Definition 51
Table 11-1: Study Plan Federal Concordance – Conformance with Requirements 56
Table 11-2: Study Plan Provincial Draft ToR Concordance – Conformance with Requirements 60

Appendices

Appendix A. Preliminary List of Data Sources
Appendix B. Agency Comments on the Draft Study Plan
Appendix C. Table Example: Employment by Age and Sex in the Marten Falls First Nation Community

Acronyms

Agency, the ... Impact Assessment Agency of Canada
CAR ..... Community Access Road
EA ..... Environmental Assessment
GBA+ ..... Gender-based Analysis Plus
IA ..... Impact Assessment
IAA ..... *Impact Assessment Act*
IS ..... Impact Statement
km ..... kilometre
LSA ..... Local Study Area
MECP ..... Ontario Ministry of the Environment, Conservation and Parks
MFFN ..... Marten Falls First Nation
PDA ..... Project Development Area
RSA ..... Regional Study Area
SAR ..... Species at Risk
TISG ..... Tailored Impact Statement Guidelines
ToR ..... Terms of Reference
VC ..... Valued Component

Draft

1. Introduction

The Proponent of the Community Access Road (CAR or the Project) is Marten Falls First Nation (MFFN), a remote First Nation community in northern Ontario located at the junction of the Albany and Ogoki rivers, approximately 430 kilometres (km) from Thunder Bay, Ontario. The MFFN community is proposing an all-season Community Access Road that will connect the MFFN community to Ontario's provincial highway network (Highway 643) to the south via the existing Painter Lake Road. MFFN, as the Proponent of the Project, has formed a MFFN CAR Project Team that includes MFFN CAR Community Member Advisors and MFFN CAR Project Consultants who act with input, guidance and direction from the MFFN Chief and Council.

This document outlines the Study Plan for the Social Environment to support a co-ordinated Impact Assessment (IA) required for Project review by the Impact Assessment Agency of Canada (the Agency) under the federal *Impact Assessment Act* (IAA) and Environmental Assessment (EA) required for Project review by the Ontario Ministry of the Environment, Conservation and Parks (MECP) under the Ontario *Environmental Assessment Act*.

1.1 Federal and Provincial Terminology

The study plans have been prepared using federal terminology, however, the respective provincial terminology has been provided in **Table 1-1** for reference. The terms can be used interchangeably.

Table 1-1: Equivalent Federal and Provincial Terms

Provincial Term	Federal Term
Criteria	Valued Component
Impact Management Measure	Mitigation Measure
Net Effects	Residual Effects
Record of Consultation	Record of Engagement

Draft

1.2 Project Study Plans

This Study Plan is one of a group of study plans created for the Project. **Table 1-2** includes the study plans for each environmental[1] discipline currently planned for the Project and the valued components (VCs) covered by the study plans where applicable.

Table 1-2: Project Study Plans and Valued Components

Environmental Discipline	Study Plan Name	Valued Component(s)
Aboriginal and Treaty Rights and Interests	■ Aboriginal and Treaty Rights and Interests Study Plan	■ Indigenous Current Use of Lands and Resources for Traditional Purposes ■ Cultural Continuity (ability to practice and transmit cultural traditions)
Atmospheric Environment	■ Atmospheric Environment and Greenhouse Gases Study Plan	■ Air Quality ■ Greenhouse Gas Emissions
Climate Change	■ Climate Adaptation and Resiliency Study Plan	■ Climate Change
Acoustic and Vibration Environment	■ Acoustic and Vibration Environment Study Plan	■ Noise ■ Vibration
Physiography, Geology, Terrain and Soils	■ Physiography, Terrain and Soils Study Plan	■ Physiography, Terrain and Soils
Surface Water	■ Surface Water Study Plan	■ Surface Water
Groundwater and Geochemistry	■ Groundwater and Geochemistry Study Plan	■ Groundwater
Vegetation	■ Vegetation Study Plan	■ Wetland and Riparian Ecosystems ■ Upland Ecosystems ■ Designated Areas (Areas of Natural and Scientific Interest, Environmentally Significant Areas, Significant Woodlands, Critical Landform / Vegetation Associations) ■ Traditional Use Plants and SAR Plant Populations (including species with special conservation status or rarity in the province)
	■ Peatlands Study Plan	■ Peatland Ecosystems (bogs and fens)
Wildlife	■ Wildlife Study Plan	■ Bats (including SAR-bats such as: Little Brown Myotis [*Myotis lucifugus*], Northern Myotis [*Myotis septentrionalis*] and Tricolored Bat [*Perimyotis subflavus*])

1. *The use of the term environment in this document is inclusive of the components of the environment that are included in the Ontario Environmental Assessment Act definition, which includes a general description of the social, cultural, built and natural environments.*

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Fur Bearers (proxy VC[2] American Marten [*Martes americana*], Beaver [*Castor canadensis*] and Wolverine [*Gulo gulo*]) ■ Amphibians and Reptiles ■ Pollinating Insects
	■ Ungulates (Moose and Caribou) Study Plan	■ Moose (*Alces alces*) ■ Caribou, boreal population (*Rangifer tarandus*)
	■ Bird Study Plan	■ Forest Birds (proxy VC of Red-eyed Vireo [*Vireo olivaceus*] for deciduous forest, Ovenbird [*Seirus aurocapilla*] for mixedwood forest, Dark-eyed Junco [*Junco hyemalis*] for coniferous forest and disturbed forest ■ Raptors (proxy VC of Osprey [*Pandion haliaetus*] for diurnal raptors and Boreal Owl [*Aegolius funereus*] for nocturnal raptors ■ Shorebirds (proxy VC of Wilson's Snipe [*Gallingo delicata*]) ■ Waterfowl (proxy VC of Mallard [*Anas platyrhynchos*]) ■ Bog / Fen Birds and Other Wetland Birds (proxy VC of Palm Warbler [*Setophaga palmarum*] for bogs, Common Yellowthroat [*Geothlypis trichas*] for fens; and Northern Waterthrush [*Parkesia noveboracensis*] for swamps. ■ SAR birds: Canada Warbler (*Cardellina canadensis*), Chimney Swift (*Chaetura pelagica*), Common Nighthawk (*Chordeiles minor*), Eastern Whip-poor-will (*Antrostomus vociferous*), Eastern Wood-Pewee (*Contopus virens*), Evening Grosbeak (*Coccothraustes vespertinus*), Olive-sided Flycatcher (*Contopus cooperi*), Bald Eagle (*Haliaeetus leucocephalus)*, Peregrine Falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus)*, Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Black Tern (*Childonias niger*), Rusty Blackbird (*Euphagus carolinus*), Yellow Rail (*Coturnicops noveboracensis*)
Fish and Fish Habitat	■ Fish and Fish Habitat Study Plan	■ Lake Sturgeon (*Acipenser fulvescens*) ■ Walleye (*Sander vitreus*) ■ Brook Trout (*Salvelinus fontinalis*) ■ Northern Pike (*Esox lucius*) ■ Lake Whitefish (*Coregonus clupeaformis*) ■ Chain Pickerel (*Esox niger*) ■ Yellow Perch (*Perca flavescens*) ■ Cisco (*Coregonus artedii*)

[2] *A proxy VC is used when looking at the effects of one species that represents many others.*

Draft

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Burbot (*Lota lota*) ■ Longnose Sucker (*Catostomus catostomus*) ■ White Sucker (*Catostomus commersonii*) ■ Forage / Prey Species (including species such as Lake Chub [*Couesius plumbeus*]) ■ Lower Trophic Organisms (e.g., benthic invertebrates)
Social	■ Social Study Plan	■ Housing and Accommodation ■ Community Service and Infrastructure ■ Transportation ■ Community Well-being ■ Populations and Demographics
Economy	■ Economic Study Plan	■ Regional Economy ■ Labour Force and Employment ■ Government Finances
Land and Resource Use	■ Land and Resource Use Study Plan	■ Land Use Compatibility ■ Parks and Protected Areas ■ Extractive Industry ■ Forestry Industry ■ Energy and Linear Infrastructure ■ Recreation and Tourism
Human Health and Community Safety	■ Human Health and Community Safety Study Plan	■ Public Safety ■ Public Health ■ Diet ■ Environmental Factors Influencing Health
Visual Aesthetics	■ Visual Aesthetics Study Plan	■ Visual Contrast / Character ■ Visibility ■ Visual Sensitivity
Archaeological and Cultural Heritage	■ Cultural Heritage Study Plan	■ Archaeological Sites and Resources ■ Built Heritage Resources and Cultural Heritage Landscapes

It should be noted that while there is not a consultation study plan, the Project has developed the *Consultation and Engagement Plan to Support the Environmental Assessment / Impact Statement* (AECOM 2020) (referred to as the Impact Statement [IS] / EA Consultation Plan).

Draft

2. Purpose and Objectives

The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative, direct and indirect) of the Project and alternatives on the environment, determine measures needed to avoid or minimize adverse Project effects and enhance beneficial Project effects where feasible, and to undertake consultation and engagement throughout. The purpose of this Study Plan is to explain:

- A baseline[3] study methodology that will result in a comprehensive description of the existing environment potentially impacted by the Project;
- How efficient and transparent data management and analysis will be undertaken;
- Effects assessment scoping inputs specific to the Social Environment that will allow for potential effects of the Project on the existing environment to be appropriately assessed in the IS / EA Report; and
- How the Study Plan aligns with federal and provincial requirements and guidance, including the Agency's Tailored Impact Statement Guidelines (TISG), dated February 24, 2020 (the Agency 2020c), for this Project and applicable provincial agency comments on the Draft Terms of Reference (ToR)[4].

As required by the IAA and referenced in TISG Section 7.3, work plans will also be developed for disciplines as required. It is anticipated the work plans will include further details on how to action the study plans; for example they would contain a schedule for the key work tasks. The Social Assessment will consider how the Social environment and community features may be affected by the Project. This includes changes to population and demographics, housing, community services (e.g., education, child care), infrastructure (waste, water, wastewater, telecommunications and power), transportation, and community well-being.

Draft

3. *Baseline refers to the current conditions of the environment potentially impacted by the Project. Baseline conditions serve as a reference against which changes due the Project are measured.*
4. *If necessary, the Study Plan will be updated to reflect the approved ToR if approval is obtained.*

Items related to the Social environment but excluded from this Study Plan and covered under separate study plans include:

- Human Health and Community Safety Study Plan: e.g., for considerations related to: traffic safety, health care facilities and services, emergency services, supply and cost of goods and services, food security, illegal / disruptive activities, and women's safety; and,
- Economic Study Plan: e.g., for considerations related to: supply and cost of goods and services, cost of living, income inequity, non-commercial/trade economy, and employment.

The above items may be referenced and considered in the assessment of effects to relevant components of the socio-community such as community well-being.

In conducting the Social Assessment, information from the following other disciplines[5] will be considered:

- **Air Quality –** Potential changes to air quality will be considered as part of community well-being. Changes to air quality could result in nuisance effects to people who spend time near the Project location. This could occur during both the construction and operation periods.
- **Noise –** Potential changes to noise will be considered as part of community well-being. Changes to noise levels could be an annoyance to those who spend time near the Project location. This could occur during both the construction and operation periods.
- **Economic –** Potential changes to the economy will be considered throughout the Social assessment. Changes to the economy may affect the provision of community services and infrastructure; housing; education opportunities; population and demographics and community well-being.
- **Human Health and Community Safety –** Potential changes to health, including public safety, will be considered as part of community well-being. Changes to health may affect components of community well-being such as Social issues and overall well-being.
- **Aboriginal and Treaty Rights and Interest** – Potential changes to the use of land and resources for traditional use and cultural features and practices may influence the Social environment. These potential changes are considered within the assessment of community well-being.

Draft

5. *It is expected each discipline will produce their own technical report supporting the assessment of key factors within that area.*

Other relevant disciplines may also be considered depending on the nature of the information received including for example the Land and Resource Use Assessment. Further, relevant information to the Social Assessment may also be collected through the general engagement and consultation activities and from the Indigenous Knowledge collection program.

For the purposes of establishing appropriate context, the Study Plan begins with background and relevant information on:

- Study Plan related discussions with the Agency, the MECP and applicable agencies to date (**Section 3**);
- The approach to Project consultation and engagement (**Section 4**);
- How Indigenous Knowledge will be collected and used in the IA / EA (**Section 5**); and
- The spatial and temporal boundaries that will be used for the IA / EA (**Section 6**).

2.1 Approach to Handling Confidential Information

2.1.1 Indigenous Knowledge

Permission from the Indigenous community will be sought before including Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. Sensitive and / or confidential information will be specifically collected through the Indigenous Knowledge Program to inform the IS / EA Report, and its use and publication will be governed by Indigenous community-specific Indigenous Knowledge Sharing Agreements. Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared).

Draft

2.1.2 Socio-Economic Primary Data

Collected primary Social data that is considered to be confidential will not be documented in the IS / EA Report. This confidential information may include identity factors such as demographic data provided by individuals from whom the data are obtained. The content and findings obtained that are not considered as confidential will be included in baseline documentation irrespective of source (Indigenous or non-Indigenous knowledge holder). Information obtained through other primary data programs (such as Indigenous Knowledge) will adhere to the confidentiality provisions of the respective data sharing agreements that have been established.

Social primary data will be presented in a generic manner and referenced appropriately. It is anticipated that confidential primary data will relate to individuals rather than groups. Confidentiality will be granted upon request to those individuals and information related to the individual, including information which may support Gender-Based Analysis Plus (GBA+), will be redacted from the Social Assessment report.

2.1.3 Health Information

If applicable, a process for handling confidential health information will be developed. This process will conform to Ownership, Control, Access, Possession (First Nations Information Governance Centre 2020) requirements and will also aim to preserve the confidentiality of individual persons providing the information.

Draft

3. Study Plan Technical Discussions

To facilitate the development of satisfactory study plans and eventually a satisfactory IS / EA Report, MFFN previously submitted draft study plans in an effort to hold technical discussions with the Agency, the MECP and applicable agencies. A summary of technical discussions and correspondence held to date on this Study Plan has been provided in **Table 3-1**.

Table 3-1: Summary of Study Plan Technical Discussions

Attendees / Responsible Party	Correspondence	Discussion Point	Solution
■ **The Agency**	■ Preliminary comments received following submission and review of draft Study Plan.	■ **05-August-2020:** Comments and clarification questions received, including editorial comments, additional information requirements regarding study plan, and clarification requests related to study areas, data collection, assessment, criteria and indicators, and concordance with federal and provincial requirements.	■ Additional details and clarification provided within this Study Plan, and responses to these comments are in **Appendix B.**
■ **MECP**	■ Comments received following submission and review of draft Study Plan.	■ **20-August-2020:** Comments and clarification requests received, including editorial comments and additional information requirements.	■ Additional details and clarification provided within this Study Plan, and responses to these comments are in **Appendix B.**
■ **The Agency** ■ **MECP** ■ **Ministry of Energy, Northern Development and Mines** ■ **MFFN CAR Project Team**	■ Technical discussion of comments received following agency review of draft Study Plan.	■ **07-October-2020:** Discussion on the role of the general consultation and engagement program to confirm the interests of Indigenous communities and other persons in economic impacts and subsequent target information gathering sessions.	■ Additional details and clarification on the consultation and engagement program are provided in **Section 4** of the Study Plan.
		■ **07-October-2020:** Regarding data verification, the Agency indicated that it is not necessary to validate raw data with Chiefs and Councils, rather, community leadership can review / validate data that is to be documented in the IS / EA Report and supporting reports to help to ensure accurate representation.	■ This approach to data verification will be followed. See **Section 8**.

Draft

4. IS / EA Report Consultation and Engagement Process

4.1 Interested Persons and Government Agencies

The Proponent will provide Project notices and advise of opportunities for consultation and engagement with interested persons[6] which includes, at a minimum, members of the public outlined in the *Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020) (referred to as the Public Participation Plan). This will include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date. Government agencies and interested persons will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. The Project's approach to handling confidential and sensitive information is outlined in **Section 2.1**.

4.2 Indigenous Communities

The Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in **Table 4-1**, which is inclusive of all Indigenous communities identified in the *Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020a) (referred to as the Indigenous Engagement and Partnership Plan).

Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the IS / EA Report so that the Proponent can consider and incorporate, where appropriate Indigenous Knowledge and Indigenous land and resource use information into the Project as it pertains to the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. A variety of activities will be offered so that Indigenous communities are

6. *Interested persons, as defined in the IS / EA Consultation Plan, are individuals and groups (e.g., associations, non-governmental organizations, industry and academia) who could have an interest in the Project, including but not limited to communities in the region, those with commercial interests (e.g., forestry, trappers, outfitters, other mineral tenure holders in the area) and recreational users or those with recreational interest (e.g., campers, hunters and environmental groups).*

Draft

informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. The study plans have recognized Indigenous community input received on the Project to date. Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process.

Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations

Tribal Council Affiliation	Indigenous Community or Organization
Matawa First Nations Management *(Nishnawbe Aski Nation)*	■ **Marten Falls First Nation** (Proponent and potentially affected Indigenous community) ■ Aroland First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Ginoogaming First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Webequie First Nation
Matawa First Nations Management and the Union of Ontario Indians / Nishnawbe Aski Nation	■ Long Lake #58 First Nation**
Mushkegowuk Council *(Nishnawbe Aski Nation)*	■ Attawapiskat First Nation ■ Fort Albany First Nation ■ Kashechewan First Nation
Shibogama First Nations Council *(Nishnawbe Aski Nation)*	■ Kasabonika Lake First Nation ■ Kingfisher Lake First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Wunnumin Lake First Nation
Independent First Nations Alliance *(Nishnawbe Aski Nation)*	■ Kitchenuhmaykoosib Inninuwug First Nation
Independent First Nations *(Nishnawbe Aski Nation)*	■ Mishkeegogamang First Nation ■ Weenusk First Nation
Nokiiwin Tribal Council	■ Animbiigoo Zaagi'igan Anishinaabek First Nation*
Métis Nation of Ontario	■ Métis Nation of Ontario; Region 2*
Independent Métis Nation	Red Sky Independent Métis Nation*

*Notes: * Indigenous communities or organizations identified by the MECP who should be consulted on the basis that they may be interested in the Community Access Road.*
*** The MECP indicated in a letter to MFFN that Long Lake #58 First Nation was moved from interest-based to rights-based.*

Draft

4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement

To fulfill requirements of the IAA, the Consultation and Engagement Program will consider a diverse range of perspectives from interested persons and interested Indigenous communities and their members identified in the Agency's Indigenous Engagement and Partnership Plan and the Public Participation Plan. This will include at a minimum providing ongoing opportunities for engagement to:

- **Neighbouring Indigenous communities, including relevant subpopulations:**
  - Women;
  - Youth; and
  - Elders.
- **Non-Indigenous communities including:**
  - Women;
  - Youth; and
  - Activity-based subgroups (e.g., recreationalists, snowmobilers, tourism establishment operators).

The Proponent will also consult and engage with other subpopulations identified by communities during consultation and engagement. The information from these activities and any additional identity groups identified by communities through consultation and engagement will be considered by applicable environmental disciplines for the purposes of data collection and considering disproportionate effects.

During consultation and engagement, these aforementioned groups will be consulted and engaged with on targeted input**.** Specialized knowledge will be gathered through disciplines such as Social, Economic, Land and Resource Use and Aboriginal and Treaty Rights and Interests. The social data collection program is expected to include targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in socio-economic secondary data. These diverse populations include the aforementioned identity groups, which are also referenced in the IS / EA Consultation Plan, and those identified by communities during consultation and engagement. The importance of soliciting inputs and perspectives from diverse subgroups has also been factored into the Indigenous Knowledge Program and associated materials (see **Section 5**).

When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan.

Draft

Specific to Gender Based Analysis Plus (GBA+) objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement.

4.4 Consultation on Social Concerns and Impacts

As part of the IS / EA Consultation Plan and Indigenous Knowledge Program, Indigenous communities identified in **Table 4-1** will be contacted to determine their level of interest in the Project and their concerns related to the potential Social impacts. For the Indigenous communities that express specific Social concerns, targeted engagement for the purposes of Social data collection will be implemented through the Social primary data collection program consistent with the likelihood of effect anticipated to the community as determined by the MFFN CAR Project Team.

In addition, interested persons identified through the general engagement program and inclusive of those listed in the Public Participation Plan will also be engaged on potential Social concerns and for data collection purposes. **Section 7.2** provides additional details on the targeted Social data collection approach.

Draft

5. Consideration of Indigenous Knowledge in the IS / EA Report

The following provides a general description of how Indigenous Knowledge will be considered in the IA / EA process. The extent to which Indigenous Knowledge is considered by each specific VC will vary depending on the nature of the VC, the potential for Project effects on the VC and whether Indigenous knowledge that relates to a VC is provided / obtained. As such, not all aspects of the general approach described below may apply to all VCs / study plans.

There are two concurrent and complementary avenues for Indigenous communities and groups to be engaged with and provide input on the Project: the Indigenous Knowledge Program and the Consultation and Engagement Program. Both programs serve to support the collection of Indigenous perspectives, values, and input on the Project, including Aboriginal and Treaty Rights and how they may be impacted by the Project, to be integrated throughout the IA / EA process. However, the Indigenous Knowledge Program specifically aims to solicit and incorporate information that is considered sensitive and may have confidentiality requirements, including Indigenous Knowledge and information on Indigenous land and resource use. Indigenous Knowledge Sharing Agreements will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information.

All Indigenous communities and groups identified by the MECP and the Agency through the Indigenous Engagement and Partnership Plan have the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the Project, and / or complete Project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program includes opportunities for Indigenous communities and groups to meet with the Proponent to discuss the program, ask questions, and share concerns and interests. In support of this, the Proponent has created an Indigenous Knowledge Program Guidance Document (the Guidance Document) that provides:

- An overview of the Indigenous Knowledge Program and information on how Indigenous Knowledge and Indigenous land and resource use and cultural values and practices may can be collected and / or shared;

Draft

- Information on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values and practices may be used in the planning and design processes; and
- A suite of guidance materials that were developed based on the information requirements of both the federal and provincial assessment processes, including: question guides to support the collection of information on historical and current community context; Indigenous Knowledge that may be relevant to the various technical disciplines; information on Indigenous land and resource use, cultural values and practices and associated spatial data; and perspective on potential Project-related effects and associated mitigation and / or enhancement measures.

The Guidance Document will also support participating Indigenous communities in providing Project-specific information in a manner that facilitates meaningful incorporation into the IS / EA Report.

The IS / EA Consultation Plan outlines the process for obtaining information and feedback about the Project from Indigenous communities (i.e., the Consultation and Engagement Program). All Indigenous communities identified by the MECP and the Agency have the opportunity to participate in the Consultation and Engagement Program through community-specific meetings, Public Information Centres, web conferences, and other formats. All Indigenous communities identified by the MECP and the Agency will be provided information related to the Project and invited to participate at various points throughout the IA / EA process.

There are also opportunities for technical teams to engage with Indigenous communities to solicit perspectives and information relevant to the Project, including information related to collection of existing information and the development of the IS / EA Report. The Proponent also invites feedback and inputs throughout the Project via the Project website and ongoing communications with the Proponent.

The Indigenous Knowledge and Consultation and Engagement programs are designed to be complementary and provide multiple opportunities for communities to offer feedback and information, including perspectives on Aboriginal and Treaty Rights and interests and how these may be impacted by the proposed Project. Relevant information collected through both the Indigenous Knowledge and Consultation and Engagement programs, including potential effect pathways on Aboriginal and Treaty Rights and interests, will be shared with each of the relevant disciplines throughout the IA / EA to: guide and inform VCs; support characterization of the existing environment; identify the potential effects of the Project on VCs; help identify mitigation measures and potential monitoring programs; and ultimately guide Project planning. The nature of how the Indigenous Knowledge becomes integrated into the IS / EA Report will be dictated by the specific information provided by each Indigenous community and the parameters set out in

Draft

the Indigenous Knowledge Sharing Agreements. A description of how Indigenous Knowledge was considered in the IA / EA and in each of the technical discipline areas will be included in the IS / EA Report.

It is also important to note that information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs, given the interrelated nature of Indigenous peoples and other environmental disciplines.

The Proponent will strive to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values will become part of the IS / EA Report, and how potential effects to Aboriginal and Treaty Rights and interests will be assessed. It is expected that measures to support this may include but are not limited to: engaging Indigenous communities to solicit information on Indigenous Knowledge and Indigenous land and resource use and cultural values to inform baseline conditions, providing Indigenous communities with draft sections of the IS / EA Report to illustrate how Indigenous Knowledge and information on Indigenous land and resource use and cultural values has been integrated and to confirm it has been presented appropriately, and completing collaborative working sessions with Indigenous communities for the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights will be assessed is provided in the Aboriginal and Treaty Rights and Interests Study Plan.

Draft

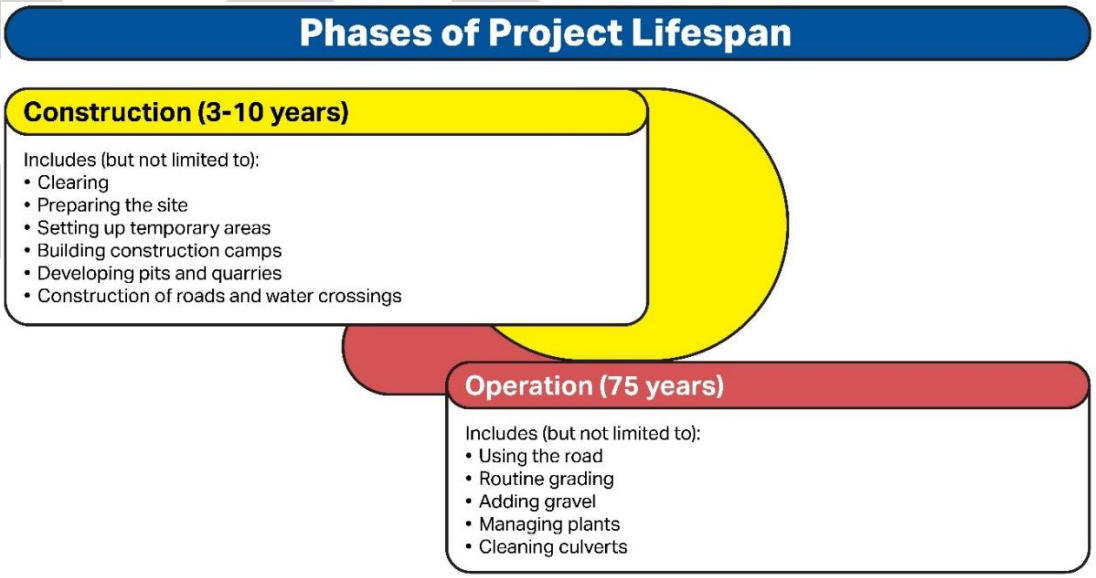
6. Assessment Boundaries

6.1 Temporal Boundaries: Project Phases

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the Project will be considered in the IS / EA Report. The Project is planned to occur in two phases, which are briefly described below and shown in **Figure 6-1**.

- **Construction Phase:**
  The time from start of construction, including site preparation activities, to the start of operations and maintenance of the CAR. Decommissioning of construction works is included in the construction phase. The construction phase is anticipated to take approximately 3 to 10 years to complete.
- **Operations and Maintenance Phase:**
  The operations and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The operations and maintenance phase of the Project is considered to be 75 years based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.

Figure 6-1: Project Schedule



Draft

There are currently no plans to decommission the CAR as there is no expected / known end date for its need. Therefore, future suspension, decommissioning and eventual abandonment of the CAR will not be considered in the IS / EA Report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long operations and maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations (Sustainability Principle #2[7]). The final temporal boundaries to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation process.

6.2 Spatial Boundaries: Study Areas

6.2.1 General Information

Study areas identify the geographic extents within which potential effects of the Project are likely to occur and will be considered in the IS / EA Report. The existing conditions and potential effects are documented for three study areas selected for the Project:

- **Project Development Area (PDA):** area of direct disturbance;
- **Local Study Area (LSA):** the area where most of the direct effects of the Project are likely to occur; and
- **Regional Study Area (RSA):** the area where indirect effects of the Project are likely to occur.

The PDA encompasses the 100-metre-wide CAR right-of-way (ROW), temporary construction access roads, work areas, worker camps, and pits, quarries and associated access roads. The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4. The preliminary study area generally allows for the documentation of existing conditions and prediction of potential environmental effects for the Project. A 5 km wide study area also allows for route refinements during development of Project design (e.g., adjustment of the alignment to avoid sensitive features).

7. *Sustainability Principles #2 is one of four sustainability principles included in Section 25 of the Project's TISG as further elaborated on Section 9.7.*

Draft

The specific location of Project components, including the roadway, quarries, pits and temporary infrastructure, are not yet known and will be included in the IS / EA Report. While most of the Project components are expected to be located within the preliminary 5 km wide study area, benefits (e.g., reduced environmental disturbance, avoidance of sensitive features, technical considerations, concerns received through consultation) for locating Project components on lands outside of the 5 km wide study area may become known during the IA / EA process. If the need to locate Project components outside the 5 km wide study area is determined to be required or of benefit to the Project, the study area would be adjusted.

The study area for each environmental discipline may vary from the above-described general study area based on the potential for the Project to directly or indirectly affect each environmental discipline; therefore, discipline-specific LSAs and RSAs have been defined for the Project. In defining the final LSAs and RSAs, each environmental discipline will consider:

- Location and other characteristics of the environmental discipline relative to the Project;
- The anticipated extent of the potential Project effects;
- Federal, provincial, regional, and local government administrative boundaries;
- Indigenous groups listed in **Table 4-1**;
- Community knowledge and Indigenous Knowledge;
- Current or traditional land and resource use by Indigenous communities;
- Exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices; and
- Physical, ecological, technical, social, health, economic and cultural considerations.

The study areas included in this document are preliminary, covering the extent to which readily available information suggests the Project may have noticeable effects on the environment. The size, nature and location of past, present and reasonably foreseeable projects will be taken into consideration in the development of the cumulative effects assessment study area(s). The appropriate study area(s) to assess cumulative effects are dependent on the VCs predicted to have direct residual adverse effects as a result of the Project, and therefore, cannot be defined until the IS / EA Report has sufficiently advanced.

As further detailed in **Section 4**, the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs.

Draft

6.2.2 Social Study Areas

The proposed LSA and RSA boundaries for the Social Environment are detailed in **Table 6-1** and shown on **Figure 6-2**.

Table 6-1: Social Study Areas

Study Area	Geographic Extent	Rationale
Local Study Area	■ The communities of: – MFFN; – Aroland First Nation; and – Municipality of Greenstone	■ Potential direct effects: – as a result of changing access to the MFFN community due to the Project; and/or – due to Project effects on the environment that could result in Social impacts to a community ■ Also note that the Proponent remains open to receiving further information from communities demonstrating socio-economic interests that may be affected by the Project which could result in additional communities be included in the LSA.
Regional Study Area	■ The unorganized regional districts of : – Cochrane, including the following Indigenous communities: • Constance Lake First Nation • Fort Albany First Nation – Kenora, including the following Indigenous communities: • Attawapiskat First Nation • Eabametoong First Nation • Kasabonika First Nation • Kashechewan First Nation • Kitchenuhmaykoosib Inninuwug • Kingfisher Lake Fist Nation • MFFN • Mishkeegogamang First Nation • Neskantaga First Nation • Nibinamik First Nation • Wapekeka First Nation • Wawakapewin First Nation • Webequie First Nation • Weenusk First Nation • Wunnumin Lake First Nation – Thunder Bay, including the following Indigenous communities: • Animbiigoo Zaagi'igan Anishinaabek First Nation • Aroland First Nation	■ The regional area where Project socio-community effects may also be experienced but to a lesser extent than in the LSA and largely limited to indirect effects. If socio-community residual effects in the RSA are identified, the potential for cumulative socio-community effects from other planned future projects will be assessed.

Draft

Study Area	Geographic Extent	Rationale
	• Ginoogaming First Nation • Long Lake #58 First Nation • Red Sky Independent Métis Nation • Métis Nation of Ontario, Region 2	

Notes: The Social LSA will consider the use of the existing Painter Lake Road and Anaconda Road as it relates to traffic.
The Social RSA is inclusive of all Indigenous communities identified in Table 4-1. While statistics are likely to be provided for the region, specific information on communities is likely to be provided at a high-level.

As currently defined, the Social study areas are defined to capture the potential Social effects of the Project on the surrounding environment. The study areas are also reflective of potential changes to natural environment, health, and economic conditions that could directly or indirectly impact Social considerations.

The Social LSA and RSA were defined based on secondary source information, including existing mapping and reports profiling relevant communities, to understand the extent to which community-level Social interest was apparent in the PDA. More specifically, this included assessing the use of the PDA and / or a connection to the Project that has the potential to alter the Social environment of a community. The Social Assessment will consider the potential for Social impacts on all communities identified in **Table 6-1**. Communities in the Social LSA are those who are anticipated to experience noticeable changes due to the Project. Comparatively, communities in the Social RSA, which is regionally defined, are likely to be impacted by the Project in a less noticeable and more variable manner due largely to their limited use and connection to the PDA and future transportation infrastructure.

Indigenous communities and interested persons will be consulted on their interest, concern and perceptions regarding the potential for Social impacts to their community. Further, the Proponent remains open to receiving information from communities on their activities within the PDA and how interlinkages between the Project and those communities may result in Social effects. The Social LSA and RSA will be informed by feedback received from Indigenous communities and interested persons identified in **Sections 4.1** and **4.2**.

To be included in the Social LSA, there needs to be either an articulated community concern or perception of Social impact on the community as a result of changing access to the MFFN community due to the Project; and / or due to Project effects on the environment that could result in Social impacts to a community. If there is rationale to alter study areas, the extents of the applicable study areas will be revised accordingly (i.e., if additional information is provided that warrants a community's inclusion in the Social LSA, the Social LSA will be adjusted). Alternatively, if requested, a community may be removed from the study area should the Project effects not be relevant to the community.

All communities identified in **Table 6-1** will be profiled in in the Social Assessment. Detailed socio-community profiles will be developed for communities listed in the Social LSA. Primary data collection will be undertaken to develop profiles for these communities. The Social RSA will be profiled in less detail

Draft

based on secondary data sources with key interactions and thematic information provided. Statistics collected on the Social RSA will focus on larger regional areas such as unorganized regional districts.

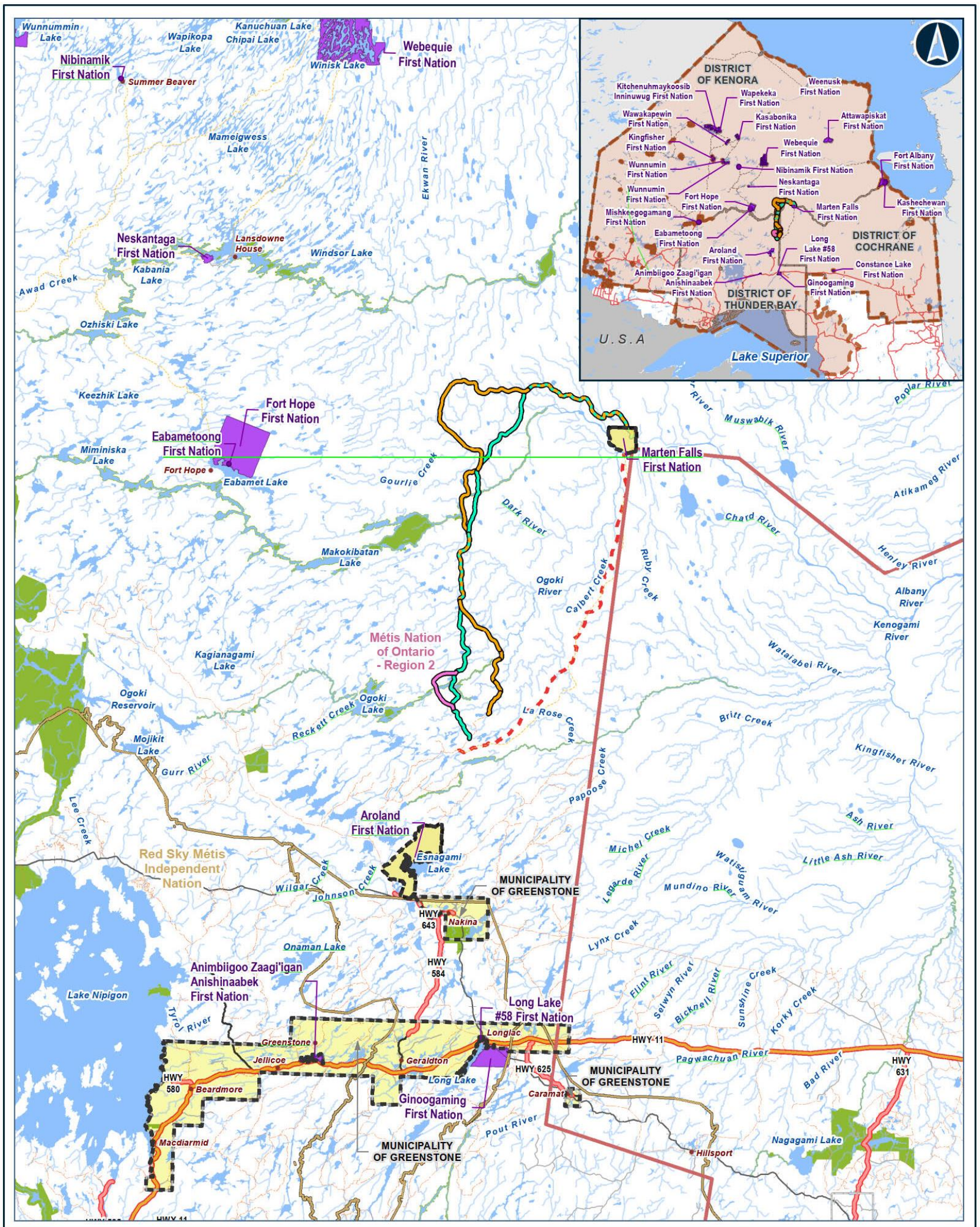
6.2.3 Study Areas and Effects Assessment

Considering the above description of study areas, a pathway analysis of potential Social impact will be completed for all Indigenous and Non-Indigenous communities identified in **Table 6-1**. Communities with identified effect pathways will be assessed in detail in the IS / EA Report. For communities that are not expected to experience Social impacts, a rationale will be provided. Communities located in the LSA will be assessed in greater detail than communities in the RSA. **Section 9.0** of this report provides a description to the effects assessment approach to be followed.

Members from other communities who are involved in non-traditional land use activities within the Project area will be assessed and considered in the Land and Resource Use Assessment.

Draft

Figure 6-2: Social Local and Regional Study Areas



7. Baseline Study Design

7.1 Desktop Assessment

A desktop review of existing information sources will be completed to identify information gaps that will need to be addressed through further study. A preliminary list of applicable information sources has been included in **Appendix A** and reflects federal and provincial guidance received to date. This Study Plan focuses on the additional studies that are anticipated to be required to gather information beyond what is currently available through existing information sources, including those as described in Section 7.2 'Sources of baseline information' in the Agency's TISG for this Project.

7.2 Baseline Data Collection

Data collected for the Social Assessment will be used to inform the IS / EA Report. Overall, data collection will be completed in support of the following objectives:

- Provide an understanding of the current state of each VC (**Section 9.2**) including relevant trends (for example, describing how the study area is already changing);
- Describe Social conditions using disaggregated data and gender statistics, where publicly available or volunteered by knowledge holders;
  - A sample table of publicly available disaggregated data are included in **Appendix C.**
  - Identity factors that cannot be disaggregated through secondary source data will be considered qualitatively. Where available, these identity factors will be referenced and considered in existing conditions reporting and analysis.
- Define access and control of resources in alignment with intersectional GBA+ principles for each indicator, as data allows;
  - Conduct intersectional gender analysis considering historic trends regarding resources, opportunity, control and access;
- Identify capacity of institutions and socio-community structures;
- Identify Social activities that contribute to community cohesion and well-being;
- Describe local and regional socio-community goals, as applicable; and,
- Provide relevant historical background on Social / community issues for the applicable study area.

Draft

These objectives will be reflected in the data collection processes and documentation of data in the IS / EA Report. The purpose of data collection will be to inform the assessment of the effects of the Project on the socio-community and to inform the development of mitigation measures to minimize adverse effects and / or enhance Project benefits.

The following sections detail secondary and primary Social data collection methods.

7.2.1 Secondary Data Collection

The Proponent will collect secondary source data on relevant socio-community features, issues and activities within the Project area. The information will be collected for the purposes of assessing the effects of the Project on the socio-community. The secondary data will be collected from (including example sources):

- Statistics Canada;
  - Population, housing and other relevant data
  - Aboriginal Population Profile, 2006, 2011, 2016 Census.
- Municipal, provincial and Indigenous government websites
  - Indigenous community profiles such as Marten Falls First Nation: Community Profile (Matawa 2014).
  - Municipal websites such as the Municipality of Greenstone's Community Profile (Municipality of Greenstone 2017).
- Municipal plans and reports;
  - Various municipal plans such as the Municipality of Greenstone's Asset Management Plan (2019).
- Provincial plans and reports;
  - Provincial reports such as Growth Plan for Northern Ontario (Ministry of Northern Development, Mines and Forestry 2011).
- Local service providers;
  - Local service provider reports such as Nishnawbe Aski Police Service – Annual Report 2018 / 2019 (Nishnawbe Aski Police Service 2019).
- Regional reports;
  - Regional Reports such as Northern Projections – Human Capital Series (Moazzami 2019) available for Cochrane District, Kenora District and Thunder Bay District.

Draft

- Industry reports;
  - Industry reports such as Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012).
- Academic research;
  - Academic research such as the Northern Policy Institute's Northern Projections – Human Capital Series (Moazzami 2019); and,
- Previous relevant EAs.
  - Previous EAs such as Greenstone Gold's Hardrock Project Environmental Assessment (2017).

Other secondary data sources publicly and readily available will also be considered and utilized as applicable. This will include sources identified in Appendix 1 of the TISG. In addition, any secondary data sources provided through primary data collection activities will be utilized if applicable.

Social data collection will be undertaken following the parameters outlined in **Section 4.4** to define the current state of the socio-community as applicable to each VC. Data collected from secondary sources will be disaggregated when available and analyzed to cover a diverse range of subgroups applicable to the Project area. Attention will be paid to norms; roles and relations; power structures; and needs, constraints and opportunities. The purpose of the disaggregation will be to understand disproportionate effects that may result from the Project.

7.2.2 Primary Data Collection

Primary data collection will include field work to collect qualitative data on the Social environment with communities in the LSA. The MFFN CAR Project Team may undertake community visits for the purpose of data collection. Depending on COVID-19 restrictions, data collection at the community-level may also be conducted through alternative methods (i.e., online or telephone) or by Community Consultation Co-ordinators. If field visits do occur, the visits are expected to include interviews, focus groups and other discussions with key community members to provide information on the Social and economic environment. The field visits will include:

- Data collection methods including interviews, focus groups and surveys designed with respect to cultural norms and the socio-economic situation in a community;
- Focused data collection on gaps identified in the secondary sources related to VCs and indicators such as quality factors for services and infrastructure;

Draft

- Community Consultation Co-ordinators integrated into the data collection process to improve capacity;
- Engagement with knowledge holders including community government officials such as Chief, Council and band office staff;
- Engagement with relevant identity groups for the community including women, youth and elders, if culturally appropriate;
- Engagement with Community Consultation Co-ordinators to verify if the approach is applicable to the community and receive feedback prior to commencing activities; and,
- Cultural norms and participant confidentiality respected in all activities.

The specific scope of the primary data collection program will be informed by the final Social study areas. However, it is anticipated that primary data collection will focus on the communities in the Social LSA which are most likely to be affected by the Project, including MFFN and Aroland First Nation (**Section 6.2**). Based on the nature of the socio-community, primary data will also be collected in the Municipality of Greenstone (Geraldton) that serves as the regional service centre. These communities are likely to experience the most Project-related change due to the location of the Project and its resulting access.

The primary data collection will be informed by the same objectives as the overall data collection. However, the primary data collection program will have the added focuses of filling gaps identified in secondary data and informing further secondary data collection based on issue-specific items raised through primary data collection. This includes the collection of Indigenous and local knowledge of the Social environment, disaggregated qualitative data by identity factors when volunteered and other information relevant to understanding the current state of the Social environment in the Project area.

The Social primary data collection program will focus on gathering information on specific subjects and geographies where gaps in secondary data exists. It is expected that primary data collection will be focused on LSA communities. It is important to note that this targeted Social data collection activity differs from the engagement activities outlined in the IS / EA Consultation Plan and Aboriginal and Treaty Rights and Interests Study Plan. The Social primary data collection will involve asking questions to fill discipline-specific information gaps. Interviews will be tailored to the specific knowledge holder. Example interview or focus group questions include:

- Is out-migration an issue in the community? Why do community members leave the community? How would a year-round access road impact your decision to stay in the community?

Draft

- What services are provided in community? What is the quality of these services? Where do you go for other services?
- What is the condition of housing in your community? If it needs to be improved, what are the barriers to improvement?
- What education facilities are in the community? Where else do students go for schooling?
- What community and Social issues exist in your community? Can you elaborate on those issues?

There will be also be opportunities throughout the interviews for participants to raise topics they deem to be relevant and appropriate.

When conducting this targeted primary data collection, reporting and consultation requirements identified by the community will be followed. The MFFN CAR Project Team will also work with Community Consultation Co-ordinators in those communities where they have been established to assist in primary data collection activities. The Community Consultation Co-ordinators are to be established primarily to assist in general engagement activities in those communities with the highest potential for impact and / or Project interest. Community Consultation Co-ordinators will be responsible for assisting in the co-ordination of engagement activities at the community-level and will be integral in gathering input from Indigenous communities. Individuals for this role will be determined through the posting of a notice in the community for the role and speaking to community leadership for their recommendations.

To attract Indigenous community participants to the Social primary data collection program, the MFFN Project Team will work with Community Consultation Co-ordinators to advertise data collection activities, encourage participation, identify barriers to participation and identify key socio-community knowledge holders. Community Consultation Co-ordinators will also play a key role in the identification of community-specific identity factors to be considered in the Social Assessment.

GBA+ will be integrated into Social primary data collection activities. Drawing on this analytical framework, the Social primary data collection program will seek to understand the diverse views and perspectives of a range of socio-community knowledge holders. Primary data collection will be inclusive of diverse genders, ages, cultures and other community-specific identity factors that emerge through engagement activities and the Indigenous Knowledge program.

Information obtained through consultation and engagement and the Indigenous Knowledge program will be used to support the Social baseline conditions and effects assessment, including any disproportionate effects on identified sub-populations. Relevant information from engagement activities and the Indigenous

Draft

Knowledge program may also include data collection techniques for the target group, information to support baseline data collection, an expression of interest in providing additional knowledge, and identifying other sources of information (i.e., people, groups or key documents).

The Social primary data collection program will select key socio-community knowledge holder to participate in the program. These participants may include government officials (including community officials), women's groups, youth groups, political officials (municipal and Indigenous communities), services providers and other relevant community knowledge holders consistent with gaps in secondary literature. The selection of participants will be informed by factors such as the availability of information, community level of interest, anticipated magnitude of effect and willingness to participate in activities. In addition, the selection of participants will be based on existing stakeholder consultation lists, previous engagement information, secondary data sources that identify key contacts, and information obtained from Community Consultation Co-ordinators. Information obtained through the general engagement activities and the Indigenous Knowledge program may be used to identify participants.

7.3 Study Methods

The study methods that will be employed to characterize the Social baseline conditions include data collection, data analysis and qualitative descriptions and profiling. Multiple sources of data, including primary, secondary, engagement and Indigenous Knowledge, will be utilized for the purposes of Social data collection. Data collection methods are detailed in **Section 7.2**. The data collection process can be conceptualized as a matrix. For each indicator listed in **Section 9.2**, data will be collected for different groups of interests (e.g., communities, subgroups within the community). The data collected will be tracked and assessed using this approach, and, when required, primary data collection will target information gaps identified in the matrix. Data analysis will involve classifying, comparing and interpreting the data collected in line with this matrix approach. The MFFN CAR Project Team will also conduct an intersectional gender analysis to examine the differences in the status of different subgroups and their differential access to resources, opportunities and services.

Based on this analysis, the MFFN CAR Project Team will produce qualitative descriptions and Social profiles, including community and regional profiles derived from the Social data, as described above. These descriptions and profiles will provide the Social baseline information to characterize the Social VCs and inform the effects assessment. In addition, to support GBA+ objectives, the qualitative descriptions and profiles will describe Social conditions using disaggregated data and gender statistics, when available. Regional and

community profiles provide a comprehensive and holistic background to consider and assess changes in a dynamic environment. These study methods are standard practices for Social impact assessments.

The scope of the Social baseline study will be tailored to the Project context and consider Indigenous community inputs and priorities. The scope of this study will be inclusive of the temporal and spatial boundaries identified in **Section 6.1** and **Section 6.2**. The Project phases and the Social LSA and RSA will inform data collection and data analysis.

The primary Social data collection is anticipated to be conducted during the Spring and Summer of 2021, however this timing is subject to change and dependent on the larger Project schedule including engagement and consultation activities. Public gathering restrictions related to COVID-19 may also influence timing. Other social baseline study methods will occur throughout the EA / IS process.

Draft

8. Data Management and Analysis

Data management including quality assurance / quality control (QA / QC) will be employed to minimize potential for data entry and analysis errors, prepare data sets for analysis and limit sensitive data distribution in accordance to established agreements.

It is expected that there will be a multitude of data issues and limitations based on the Project area. This may include:

- The suppression of data by Statistics Canada due to low population numbers, particularly when disaggregating data related to income and other sensitive factors;
- The willingness of individuals volunteering to self-identify during the primary data collection program to support disaggregated data reporting; and,
- Limitations in community-specific research and planning documentation to support all elements of data collection including community-specific studies and specialized plans.

The above list is not comprehensive. It is anticipated that additional data issues and limitations may be encountered. Data issues and limitations will be tracked for the duration of the Project and, when possible, addressed with supplementary sources of information. These issues may limit the information available to be reported by the Proponent as part of the IS / EA Report, particularly related to disaggregated data to support GBA+. None of these issues are likely to limit the ability of the Proponent to assess Social effects but may result in more frequent assumptions related to the applicability of data across communities.

The Social data collection program will involve a data verification component. There will be opportunities for community members that participate in Social data collection activities to review, comment and discuss changes to the information presented in the Social baseline study. In addition, meeting minutes will be shared with participants following primary data collection activities. When appropriate, Community Consultation Co-ordinators will also support and inform the data verification process. The data verification process will be clearly documented.

Draft

9. Effects Assessment

The following sections provide discipline-specific input and considerations as they pertain to the methodology for effects assessment. The Project is in the early stage of the IS / EA Report preparation and it is expected that the effects assessment methodology will be refined iteratively based on regulatory agency guidance, professional judgment and input received through the Project consultation and engagement process.

9.1 Project-Environment Interactions

The Project activities that may result in changes to the environment are described within the identified temporal and spatial boundaries. This includes identification of both direct and indirect changes by comparing the existing setting to the conditions anticipated to occur as a result of the Project. For each environmental discipline, the likely Project-environment interactions will be identified based on professional judgment, activities listed in TISG Section 3.2 as well as projects of similar magnitude and / or location.

A preliminary analysis of Project-environment interactions for the Social Environment is provided in **Table 9-1** and will be confirmed during the IA / EA process to identify the Project-environment interactions that are likely to have a potential effect, and to identify measures to avoid or minimize potential negative effects and enhance benefits.

Table 9-1: Project – Environment Interactions

Project Phases	Project Activities	Social
Construction Phase	*Mobilization of Equipment and Supplies*	X
	Temporary Construction Staging Areas[1]	X
	Temporary Access Roads and Trails[1]	X
	Temporary Construction Camps[1]	X
	ROW Clearing and Grubbing	X
	Brush and Timber Disposal	X
	Pits and Quarries[1]	X
	Drilling / Blasting / Aggregate Production	X
	Road Construction (stripping, subgrade excavation, embankment fill placement, grading, ditching)	X
	Bridge and Culvert Installation (approach embankments, foundations, substructures, superstructures, traffic protection, erosion controls)	X
	Construction Site Restoration	X

Draft

Project Phases	Project Activities	Social
Construction Phase: Decommissioning	*Pits and Quarries*	**X**
	Temporary Camps, Roads / Trails and Staging Areas	**X**
Operations Phase	*Road Usage*	**X**
	Maintenance[2]	**X**

Notes: 1. Includes construction and use of
2. Includes General Maintenance (e.g., grading, erosion control, quarrying, borrow pits), Seasonal Maintenance (e.g., snow clearing, bridge and culvert maintenance), and Special Maintenance (e.g., slope failures, road settlement / break-up.).

9.2 Valued Components and Indicators

VCs are the environmental, health, social, economic or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and are of concern or value to the public, Indigenous peoples, federal authorities and interested parties (the Agency 2020b). Indicators represent the resource, feature, or issue related to the VC that, if changed, may demonstrate an effect on the environment. The indicators and rationale for selection and measurement of potential effects, to be used to assess and evaluate the alternative routes and assess the overall effects of the Project in the IS / EA Report are provided in **Table 9-2**. The table includes both quantitative and qualitative indicators. The final list of VCs and indicators to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement activities with Indigenous communities and interested persons.

The VCs of the Social discipline have been determined through consideration of the following factors listed in the TISG[8]:

- VC presence in the study area;
- The extent to which the VC is linked to the interests or exercise of Aboriginal and Treaty Rights of Indigenous peoples, and whether an Indigenous group has requested the VC;
- The extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the VC;

8. *The TISG also states that information from ongoing and completed regional assessments in the proposed area of the Project should be used to inform VCs for the Project. In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/ EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project.*

- The extent to which the VC may be under cumulative stress from other past, existing or future undertakings in combination with other human activities and natural processes;
- The extent to which the VC is linked to federal, provincial, territorial or municipal government priorities (e.g., legislation, programs, policies);
- The possibility that adverse or positive effects on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and
- Whether the potential effects of the Project on the VC can be measured and / or monitored or would be better ascertained through the analysis of a proxy VC.

Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Social discipline.

As the Social environment has an abundance of interlinkages that overlap, certain aspects of the socio-community are considered in other study plans and have their baseline information documented in other relevant reports. The Human Health and Community Safety Assessment is expected to include information on public safety. The Land and Resource Use Assessment includes information on recreation and navigation. Elements of the cultural environment are covered in the Aboriginal and Treaty Rights and Interests Assessment. Findings and data included in these disciplines are considered under relevant components of the Social Assessment.

Draft

Table 9-2: Social Valued Components and Indicators

Valued Component	Indicator	Sub-Indicator[1]	Rationale for Selection	Sources of Information
Population and Demographics	■ Demographic change	■ Change in population ■ Change in sub-group population ■ Change in demographics	■ The Project has the potential to result in net migration to Marten Falls and perhaps other communities due to improved road access to the Project area.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Statistics Canada; – Aboriginal Population Profile, 2006, 2011, 2016 Census Results; ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Profile: Demographics (2017); ■ Municipal plans and reports; and, ■ Provincial plans and reports; – Growth Plan for Northern Ontario (Ministry of Northern Development, Mines and Forestry 2011).
Housing and Accommodation	■ Housing demand	■ Demand for permanent housing ■ Demand for temporary housing	■ The migration associated with the Project may affect the demand for housing in the study area. This may include both permanent housing demand and temporary housing demand for non-camp based accommodation to support construction work forces and / or suppliers.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Statistics Canada; – Aboriginal Population Profile, 2006, 2011, 2016 Census Results; ■ Municipal, provincial and Indigenous government websites; – Marten Falls Community Profile (2014); ■ Municipal plans and reports; ■ Provincial plans and reports; ■ Academic literature; and, ■ Relevant previous EA reports; – Hardrock Project Environmental Assessment (Greenstone Gold 2017).
Housing and Accommodation	■ Housing supply	■ Change in provision of housing stock ■ Change in quality of housing stock ■ Change in access to housing materials	■ Increased community access or changes in demographics may alter the ability or necessity to construct accommodation. This may include both permanent and temporary accommodation.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Statistics Canada; – Aboriginal Population Profile, 2006, 2011, 2016 Census Results; ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Profile: Housing Characteristics (2018); ■ Municipal plans and reports; ■ Provincial plans and reports; ■ Academic literature; and, ■ Relevant previous EA reports; – Hardrock Project Environmental Assessment (Greenstone Gold 2017).
Community Services[2] and Infrastructure, including: ■ **Education** ■ **Childcare** ■ **Water** ■ **Waste** ■ **Energy** ■ **Communications**	■ Service and infrastructure demand	■ Change in demand for community services ■ Change in demand for community infrastructure	■ Changes to demographics throughout the Project lifecycle and additional people within the study area during construction may affect the demand for community services and infrastructure.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Services (and); ■ Municipal plans and reports; – Municipality of Greenstone Asset Management Plan (2016); ■ Provincial plans and reports; – Building Better Lives: Ontario's Long-term Infrastructure Plan 2017 (Ministry of Infrastructure 2017); ■ Local service providers; ■ Industry reports; – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012); ■ Academic literature; – Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities (Centre for the North 2014); ■ Previous EA reports; and, – Hardrock Project Environmental Assessment (Greenstone Gold 2017); ■ Economic IA Report.

Valued Component	Indicator	Sub-Indicator[1]	Rationale for Selection	Sources of Information
Community Services[2] and Infrastructure, including: ■ **Education** ■ **Childcare** ■ **Water** ■ **Waste** ■ **Energy** ■ **Communications**	■ Service and infrastructure supply	■ Change in provision of community services and infrastructure ■ Change in capacity of community services and infrastructure	■ Changes to demographics and access may alter the provision or necessity of community services and infrastructure.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Municipal, provincial and Indigenous government websites; – Marten Falls Community Profile (Matawa 2014); ■ Municipal plans and reports; – Municipality of Greenstone Asset Management Plan (Municipality of Greenstone 2016); ■ Provincial plans and reports; – Building Better Lives: Ontario's Long-term Infrastructure Plan 2017 (Ministry of Infrastructure 2017); ■ Local service providers; – Marten Falls First Nation: Agency Profile (211 Ontario North 2020); ■ Industry reports; – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012); ■ Academic literature; and, – Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities (Centre for the North 2014); ■ Previous EAs. – Hardrock Project Environmental Assessment (Greenstone Gold 2017).
Transportation	■ Road Transportation	■ Changes to auto traffic / traffic volumes on existing road connections ■ Changes to truck traffic / traffic volumes on existing road connections	■ The Project may alter the use of existing roads related to traffic volumes within the Project area including the roads connecting such as Painter Lake Road and Anaconda Road to the proposed Marten Falls access road.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Statistics Canada; ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Profile: Transportation and Shipping (n.d.); ■ Municipal plans and reports; – Municipality of Greenstone Asset Management Plan (2016); ■ Provincial plans and reports; – Ministry of Transportation Traffic Volumes (Ministry of Transportation 2016); ■ Local service providers; ■ Regional economic development reports; ■ Industry reports; and, – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012); ■ Previous EAs. – Hardrock Project Environmental Assessment (Greenstone Gold 2017).
Transportation	■ Air Transportation	■ Change in demand for air travel ■ Changes in air traffic volume	■ The Project may change the demand for air transit services due to the new access created.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Statistics Canada; ■ Municipal, provincial and Indigenous government websites; – Municipality of Greenstone Community Profile: Transportation and Shipping (n.d.) ■ Municipal plans and reports; ■ Provincial plans and reports; ■ Local service providers; – North Star Air's Flex Flight Route Map (2020); ■ Regional economic development reports; – Mining Readiness Strategy: An Integrated Regional Economic Development Plan (Advantage Northwest 2013). ■ Industry reports; and, – Mining in Northwestern Ontario – Opportunities and Challenges (Ambassador's Northwest 2012); ■ Previous EAs. – Hardrock Project Environmental Assessment (Greenstone Gold 2017)

Valued Component	Indicator	Sub-Indicator[1]	Rationale for Selection	Sources of Information
Community Well-being[3]	■ Nuisance effects	■ Changes in air quality ■ Changes in noise levels	■ Changes to air quality and noise within the Project area may be a nuisance to existing receptors and sensitive receptors which could affect the use and enjoyment of lands.	■ Air Quality and Noise IS / EA Reports
Community Well-being[3]	■ Community	■ Changes in community well-being ■ Changes to Social cohesion ■ Changes to family relationships and dynamics ■ Changes to community participation ■ Changes to community support networks ■ Changes to material, Social or mental well-being	■ Community is defined as the presence of Social issues, community cohesion, family relationships, community participation, and community support networks. These components of the socio-community may be altered by the Project including its construction and the access provided during operation.	■ Subject to secondary data gap analysis, primary data may be collected, including for example through interviews and focus groups; ■ Indigenous Knowledge collected through the Indigenous Knowledge Program; ■ Statistics Canada; – Aboriginal Population Profile, 2006, 2011, 2016 Census Results; ■ NGO and Interest groups; – First Nation Perspectives on Health and Wellness (2020); ■ Municipal, provincial and Indigenous government websites; – Marten Falls First Nation: Agency Profile (211 Ontario North 2020); ■ Municipal plans and reports; ■ Provincial plans and reports; ■ Academic literature; ■ Local service providers; – Matawa Annual Report 2018-2019 (Matawa 2019); ■ Economic IS / EA Report; and, ■ Human Health and Community Safety IS / EA Report.

Note:
1. *Indicators consider changes during construction and operation to these factors, unless otherwise noted.*
2. *Additional community services are apparent within the Social LSA. These services are captured in the Human Health and Community Safety Assessment, including Police, Fire, Emergency, Health and other health-related services.*
3. *For the purposes of the Social Assessment, community well-being is defined as the socio-economic well-being of individual communities. It is comprised of four key components, including education, labour force activity, income and housing. This definition is derived from the Community Well-Being Index, which is a systematic way to measure community well-being for communities in Canada (Government of Canada 2019). The MFFN CAR Project Team will also consider community-specific definitions of well-being that are provided by communities.*
4. *For the purposes of the Social Assessment, Social cohesion consists of three key measurable components: Social inclusion, Social mobility and Social capital (OECD 2014).*

9.3 Potential Effects

A direct effect occurs through the direct interaction of an activity with an environmental discipline. The Project-environment interactions currently anticipated, based upon preliminary analysis, to result in direct effects to the Social Environment have been identified in **Table 9-1**. The potential direct effects resulting from the Project-environment interactions will be confirmed during the IA / EA process and will be based on input received through the Indigenous Knowledge Program and Consultation and Engagement Program, regulatory agency guidance, and professional judgement.

An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in noise could indirectly affect community wellbeing). **Table 9-3** provides a preliminary identification of how the Social Environment may be affected by changes to other environmental disciplines.

Draft

Table 9-3: Potential Discipline Interactions

Discipline and Associated Valued Components	Aboriginal and Treaty Rights and Interests	Atmospheric Environment	Acoustic and Vibration Environment	Physiography, Geology, Terrain and Soils	Surface Water	Groundwater and Geochemistry	Vegetation	Wildlife	Fish and Fish Habitat	Social	Economy	Land and Resource Use	Human Health and Community Safety	Visual Aesthetics	Archaeological and Cultural Heritage
Social Environment VCs ■ **Housing and Accommodation** ■ **Community Services and Infrastructure** ■ **Transportation** ■ **Community Well-Being** ■ **Population and Demographics**	X	-	-	-	-	-	-	-	-		X	X	X	X	-

Notes: X = Potential pathway for indirect effect as a result of the Project.
- = No pathway for indirect effect is anticipated as a result of the Project.

Draft

9.4 Methods for Predicting Future Conditions

The Social Assessment will assess Project effects using similar methodologies and frameworks as the other disciplines. The assessment will include:

- Determine potential residual effects on the VCs and indicators;
- Consideration of existing conditions data and impact assessments for criteria and indictors from other relevant disciplines as referenced in **Section 1**. These include biophysical, Economy, Land and Resource Use, Human Health and Community Safety and Aboriginal and Treaty Rights and Interests assessments;
- Relevance of the Project to existing plans and aspirational community goals;
- Consideration of disproportionate effects to diverse subgroups based on Project relevant identifying factors including gender and age;
- Define impact management measures with respect to diverse subgroups, where applicable and feasible (see below); and,
- Consideration of future expenditure related to new socio-community facilities, services and / or infrastructure due to Project effects.

The Social Assessment is informed by academic literature, best practices in Social impact assessment and previous similar EAs. The methodology to complete the Social Assessment will include gathering local knowledge and utilising inputs from consultation activities to analyze the concerns of interested and affected communities related to the criteria and indicators as per **Section 9.2**. Community members in the Social LSA and RSA will be engaged with regarding the assessment of Social effects, the analysis of alternatives, and the preparation of mitigation and monitoring plans. Data used in the Social Assessment will be disaggregated (where possible) and analyzed to understand differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives related to the Social VCs and indicators.

Considerations related to Painter Lake Road and Anaconda Road will be addressed qualitatively based on the understanding that Aroland First Nation will be conducting their own study on improvements to these roads.

Draft

9.5 Mitigation and Enhancement Measures

Once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects beyond those that are already inherent to the design. These measures will consist of industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, Indigenous and community recommendations and recommendations from industry and environmental professionals based on expertise, scientific publications, experience and judgement.

It is important that mitigation and enhancement measures are achievable, measurable and verifiable and monitored for compliance and effectiveness during all temporal phases as part of the Project follow-up monitoring plan. Required environmental monitoring will verify the potential environmental effects predicted in the IS / EA Report, evaluate the effectiveness of mitigation and enhancement measures, and identify the process the Proponent will follow if mitigation and enhancement measures are not effective.

9.5.1 TISG Section 20 Requirements

The following provides a response to the fulfillment of TISG Section 20 requirements.

Item #	TISG Section 20 Requirement	Response
1	Describe mitigation measures that are specific to each environmental, health, Social or economic effect identified. Mitigation measures are to be written as specific commitments that clearly describe when and how the proponent intends to implement them, what decision-making criteria will be used, and the outcome these mitigation measures are designed to address;	The Social Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment.
2	Describe mitigation measures that are specific to identified effects to Indigenous peoples;	The Social Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment, including measures that may be specific to Indigenous people.
3	Describe mitigation measures proposed by Indigenous peoples and the consideration of those in the Project;	The Social Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment, including measures that may be specific to Indigenous people including measures that may have been suggested by Indigenous people.

Draft

Item #	TISG Section 20 Requirement	Response
4	Propose differentiated mitigation measures for all potential adverse effects identified, if applicable, so that adverse effects do not fall disproportionately on vulnerable populations, certain Indigenous groups, or certain communities, and they are not disadvantaged in sharing any development benefits and opportunities resulting from the Project. These mitigation measures should be developed in collaboration with those who are vulnerable and / or disadvantaged;	The development of applicable mitigation measures will take into account identified potential impacts on vulnerable populations and developed with the input of interested persons from those vulnerable populations.
5	Propose mitigation measures to reduce all potential adverse effects to health conditions of all potentially impacted communities and Indigenous groups and present opportunities for enhancing positive effects;	Mitigation measures will be developed to address potential adverse effects on all potentially Socially impacted communities. As well, opportunities to enhance positive effects will be recommended where applicable.
6	Describe education, training, hiring practices that encourage employment of local people, including the use of the Northern Ontario Network of Indigenous Training Organizations (e.g., the Indigenous Skills and Employment Training network);	Where applicable, recommendations will be made regarding the development and implementation of training and hiring practices to promote the hiring of local people.
7	Describe how disproportionate effects that were identified in the GBA+ results were used to inform mitigation and enhancement measures.	The Social Assessment will describe any identified disproportionate effects to sub-populations.

9.6 Residual Effects

Residual effects are the effects remaining after the application of mitigation measures. The IS / EA Report will describe in detail the potential adverse and positive residual effects in relation to each temporal phase of the Project (e.g., construction, operation). Residual effects will be described using criteria to quantify or qualify adverse and positive effects, taking into account any important contextual factors. The residual effects will therefore be described in terms of the direction, magnitude, geographic extent, duration, frequency, likelihood, and whether effects are reversible or irreversible[9]. Ecological and socio-economic context may also be relevant when describing a residual effect. Context relates to the existing setting, its level of disturbance and resilience to adverse effects. Context can also relate to timing as it applies to assessing the worst-case scenario (e.g., effect during migratory or calving season for wildlife). Where appropriate, information regarding residual effects will be disaggregated by sex, gender, age and other community relevant identifying factors to identify disproportionate residual effects for diverse subgroups.

9. *TISG Section 13.1 identifies additional effects characteristics for certain disciplines (e.g., wetlands, birds, terrestrial wildlife, species at risk). These additional effects characteristics are described in the respective discipline-specific study plans.*

For magnitude, Social-specific definitions are required and are proposed below in **Table 9-4**.

Table 9-4: Social Magnitude Definition

Magnitude Level	Definition	Rationale
Negligible	An effect that may or may not be discernible but is within the historical variability as defined by baseline conditions. The effect is within the capacity of the socio-community system to respond and / or will not alter the current socio-community structures.	Negligible effects are small and may not be noticeable. These effects do not represent a change in day-to-day life at a community-level.
Low	An effect that is small but discernable and within historical variability as defined by baseline conditions. The effect is within the capacity of the socio-community system to respond and / or will not alter the current socio-community structures.	Low effects are noticeable to community members. These effects do not represent a change in day-to-day life at a community-level.
Medium	An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. The effect is within the capacity of the socio-community system to respond and / or will not alter the current socio-community structures.	Medium effects are noticeable to community members. These effects may or may not represent a change to day-to-day life but can be adjusted to within the current socio-community system.
High	An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. The effect is beyond the capacity of the socio-community system to respond and / or will alter the current socio-community structures.	High effects are noticeable to community members. These effects represent a change to day-to-day life. In the case of adverse effects, these changes cannot be responded to within the current socio-community system resulting in systemic change.

9.7 Consideration of Sustainability Principles

The following provides a generic description of how sustainability principles will be considered in the effects assessment. The extent to which sustainability principles apply to a specific VC will vary depending on the nature of the VC and the potential for Project effects on the VC.

The effects assessment approach for the Project has included the consideration of the sustainability principles outlined in the Project TISG and the Agency's guidance on sustainability. The sustainability principles that have been considered include:

1. Consider the interconnectedness and interdependence of human-ecological systems;
2. Consider the well-being of present and future generations;

3. Consider positive effects and reduce adverse effects of the Project; and
4. Apply the precautionary principle by considering uncertainty and risk of irreversible harm.

The interconnectedness and interdependence of human-ecological systems will be considered through the assessment of potential indirect effects of each alternative. An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in vegetation could indirectly affect wildlife). A preliminary assessment of indirect effects has been included in **Section 9.3**.

The well-being of present and future generations will be considered in the effects assessment through the application of the long-term operations phase temporal boundary of 75 years (**Section 6.1**) and through the effects characteristics description of duration and reversibility for each residual effect predicted.

The consideration of positive effects and reducing adverse effects of the Project is fundamental to the effects assessment methodology through the identification of mitigation measures to reduce potential adverse effects and the identification of the preferred alternative through the evaluation of advantages (e.g., positive effects) and disadvantages (e.g., adverse effects).

The effects assessment will apply the precautionary principle by clearly describing and documenting all uncertainties and assumptions underpinning the analysis and identifying information sources. The effects assessment will consider risk of irreversible harm through the effects characteristics description of reversibility for each residual effect predicted and will describe any uncertainty associated with the assessment of residual effects.

The scope of the sustainability assessment will be defined by issues of importance identified by Indigenous communities and interested persons through consultation and engagement activities, while also ensuring to be inclusive of the diversity of views expressed. The selection of VCs that will be the focus of the sustainability assessment will be aligned with the issues of importance identified by Indigenous communities and interested persons, as well as residual effects identified through the effects assessment process. The sustainability assessment will describe how the planning and design of the Project, in all phases including follow-up monitoring, considered the sustainability principles.

Draft

9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment

The Proponent recognizes that communities and sub-populations within those communities may be impacted differently by the Project with respect to VCs and indicators. As such, the Project aims to collect baseline information for the purpose of assessing differential effects and establishing relevant mitigation measures, as further elaborated on in **Section 4.3**. GBA+ will not be limited to community feedback, when offered or discussed in secondary texts, additional sub-population information as is applicable to the relevant assessment will be incorporated.

As noted in **Sections 7.2** and **7.3**, GBA+ will be integrated throughout the Social Assessment. This analysis will be derived from our matrix-based approach for baseline collection which will be foundational to understanding and assessing differential effects to sub-populations. As with all of the Social Assessment analysis, our approach to GBA+ will be largely qualitative drawing on professional knowledge, best practices and relevant literature.

9.9 Follow-up Programs

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. Section 26 of the TISGs do not specifically outline required Social related monitoring activities that are to be included, other than the tracking of social issues that would be the responsibility of overall Project engagement and consultation activities. The identification of Social follow-up programs for the Project are not described in this Study Plan as the information needed to determine the need for and form of impact monitoring is dependent on the outcome of the effects assessment and on the results of consultation and engagement with Indigenous communities, agencies and interested persons.

Based on the results of the Social Assessment work, follow-up program recommendations will be made subject to their applicability and necessity. These programs may be targeted to specific communities and / or specific adverse effects and / or potential positive effects of the Project.

Draft

10. Assumptions

The MFFN CAR Project Team is not aware at this time of key assumptions that will be recognized in the Social Assessment. These will be determined during the development of the IS / EA Report. Key assumptions made and used in the assessment of Social impacts will be documented in the IS / EA Report.

Draft

11. Concordance with Federal and Provincial Guidance

This section provides the best information currently available on how federal and provincial requirements identified for the Project to date will be addressed. **Table 11-1** outlines how the Social Assessment will conform with the TISG. Presented in **Table 11-2** are the comments received on the draft Provincial Terms of Reference that relate to the Social Assessment.

The final concordance with federal and provincial requirements will be included in the IS / EA Report, and will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

At this time, the Proponent has not identified any TISG requirements applicable to the Social Environment that it requests a deviation from.

Draft

Table 11-1: Study Plan Federal Concordance – Conformance with Requirements

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
1	Section 10 of the TISG	■ Baseline information is required on existing Social conditions and must include Social well-being and Social activities for all potentially impacted local communities, including municipalities, and Indigenous groups.	■ Baseline Social information will be collected for the Social Study Areas in accordance with the methods outlined in Section 7.2.	■ Section 7.3 ■ Section 6.2
2	Section 10 of the TISG	■ The scope and content of the Social baseline conditions should be tailored to the specific project context, take into account community and Indigenous input and priorities, and should include indicators and information that are useful and meaningful for the effects analysis. The information provided must: – describe any relevant indicators and how Indigenous knowledge and engagement contributed to defining them; – be sufficient to provide a comprehensive understanding of the current state of each VC, including relevant trends; – describe how community and Indigenous knowledge was used in establishing Social baseline conditions, including input from diverse subgroups; – describe baseline Social conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; and – conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services.	■ This will be achieved during data collection consultation and reflected in baseline conditions reporting, as outlined in Section 7.3, and through the possible refinement and application of VCs and indicators as outlined in Section 9.2.	■ Section 4.0 ■ Section 9.2
3	Section 10 of the TISG	■ In preparing a baseline, the proponent must identify the Social area of influence of the Project and prepare a community profile. To understand the community context, the information provided must describe: – influences on community well-being, including youth mental health, current expectations within the community for the Project to bring Social and economic development opportunities and implications of the Project not being realized; – access, ownership and use of resources (e.g., land tenure, forestry, minerals, aggregate, food, water, Social infrastructure, current road systems and seasonal roads), including ownership of land surrounding water crossings; – access to and control over resources from a gender perspective (e.g., information, knowledge and services); capacity (currently available or planned) of institutions to deliver public services and infrastructure; – relevant historical community background; – applicable history with previous developers, including historical and recent proponents of mineral and other natural resource exploration and development projects and aspirations for future Social and economic development; and, – any issues or concerns related to the cost of living, particularly with respect to food prices, energy prices, and housing/rental costs.	■ The Social baseline data collection will be used to create a community profile that will focus on population and demographic conditions, community well-being, Social cohesion, housing and accommodation, community services and community infrastructure, and transportation. This will be informed by the separate but co-ordinated Assessments for Human Health and Community Safety, Land and Resource Use and Economy. The mental health, employment, economic development, land use, food access, land ownership and cost of living conditions will be documented in those other Assessments and the information will be used to inform the community profile and the Social Assessment.	■ Section 4.0 ■ Section 7.0 ■ Economic Study Plan ■ Human Health and Community Safety Study Plan ■ Land and Resource Use Study Plan
4	Section 10 of the TISG	■ Information related to interested parties, those likely to be impacted directly and indirectly by the Project should be provided in association with a consideration of those in the community who are considered particularly vulnerable to changes brought about by the Project. Baseline information must be sufficiently disaggregated and analyzed to understand the differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities; and the impact of these differences in their lives, including consideration of disproportionate effects to surrounding communities.	■ Baseline information will be collected for the Social Study Areas in accordance with the methods outlined in Section 7.2.	■ Section 6.2 ■ Section 7.2
5	Section 10 of the TISG	■ The Impact Statement must provide information on the following Social conditions: – Social Services: • public services available (e.g., childcare, eldercare, communication services, Social and cultural support). – Education: • education programs including elementary and secondary programs available in the community and the need to access programs outside the community; • apprenticeships and training initiatives (e.g., Kiikenomaga Kikenjigewen Employment & Training Services, Mushkegowuk Council Employment & Training Services, Northern Ontario Internship Program, etc.) • Traditional education components that could potentially be impacted by the Project.	■ Social Services, Education, Housing, and Community Cohesion will be covered in the Social Assessment. Recreation and Navigation will be addressed in the Land and Resource Use Assessment. Public Safety will be addressed in the Human Health and Community Safety Assessment. Culture will be addressed in the Archaeological and Cultural Heritage Assessment. These assessments will be used to inform the community well-being VC in the Social Assessment.	■ Section 2.0 ■ Section 9.2

10. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
		– Housing: • baseline information regarding housing occupancy rates and general housing conditions and how it compares to other Indigenous groups in the area/regional/provincial/territorial averages; • the general patterns of human occupancy including information on year round vs seasonal residents, quality and quantity of housing stock and crowding within the project study areas; and • overview of the local housing market, including a description of housing conditions and needs, and the general condition of the housing stock. – Recreation: • describe the current use of land and water bodies in the study area for outdoor recreational and teaching purposes, including youth recreation, recreational hunting, fishing, trapping, and gathering. – Navigation: • existing navigable waterways and navigation use including type, volume, seasonality, manoeuvrability, and physical characteristics (e.g., width, depth, etc.), bank/bottom features, biological components, flow/tides, etc.; • describe past, current, and anticipated future use of all waterways and waterbodies, including recreational uses by Indigenous groups and the public (including special events, fishing, cottagers, etc.); • describe the use of water-ways with Indigenous cultural importance (e.g., Albany River, Ogoki River and Attawapiskat Rivers); and • potential of obstructions, restrictions, or expansions of access to navigable waterways (e.g., portage routes and access roads). – Community Cohesion: • basic demographic characteristics of the community; • relevant community background and historical experience with similar infrastructure and/or resource development projects; • describe the proportion of community members who live in the community year-round; and • describe Social cohesion or Social capital, including factors such as community/neighbourhood involvement, Social networks/support, and Social wellbeing, including inter-community relationships. – Public Safety: • crime rates, substance use and how they compare to other Indigenous groups in the area/regional/provincial/territorial averages; • information on Indigenous women's safety and rates of gender-based violence • community gender-based violence rapid assessment; and • existing police, fire services, and other public safety services. – Culture: • structures, sites and things of historical, archaeological, paleontological, cultural, spiritual or architectural significance.		
6	Section 10 of the TISG	■ Baseline data can often be found in secondary information sources, such as census data, government publications and academic literature. Where secondary sources are unable to provide the required information, primary sources such as surveys, key informant interviews, focus groups or other primary research methods should be used. The collection, analysis and reporting of data must adhere to relevant ethical and cultural protocols	■ Baseline data will be collected from primary and secondary sources with respect to Social data. The listed sources will be utilized for secondary data and primary data will consider key informant interviews, focus groups and targeted surveys. Primary data will focus on qualitative information.	■ Section 2.1 ■ Section 7.2
7	Section 11 of the TISG	■ The Impact Statement must provide information on Infrastructure: – access to infrastructure and services (transportation, electricity, telecommunications infrastructure and broadband, etc.); – details on the existing road network (all weather and winter roads) and traffic patterns, including any projections of future traffic patterns; – information on the nearest railways and airports; and – an overview of other infrastructure (e.g., power plants, transmission lines, pipelines, dams, water mains, sewage lines) relevant to the Project.	■ Although referenced in the Economic section of the TISG, this information will be included in the Social Assessment. Data will be collected on these infrastructure categories including information on the supply of and demand for the services.	■ Section 7.2.1 ■ Section 7.2.2 ■ Section 9.2
8	Section 11 of the TISG	■ *Document information on housing prices, conditions and needs.* (Note: that requirements in italics have been paraphrased from the TISGs)	■ Although referenced in the Economic section of the TISG, this information will be included in the Social Assessment as part of the housing baseline data.	■ Section 7.3 ■ Section 9.2

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
9	Section 11 of the TISG	■ *Document information on service gaps.*	■ Although referenced in the Economic section of the TISG, this information will be included in the Social Assessment.	■ Section 7.3
10	Section 12.3 of the TISG	■ The baseline conditions requirements set out in the sections above for health, Social and economic conditions, include Indigenous peoples and GBA+ specific to Indigenous peoples.	■ Baseline socio-community conditions will consider Indigenous peoples and their Social interests.	■ Section 7.3
11	Section 17 of the TISG	■ Within the context of the predicted changes to the biophysical environment, health and economic conditions resulting from the project, the proponent must assess the effects of the project on Social conditions. Interconnections between Social valued components and other valued components and interactions between effects must be described. The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain (health, Social and/or economic) is predicted, there is an understanding of what other effects or consequences may be felt across the other domains.	■ This approach to effects assessment will be followed. As noted in Section 9.2, other disciplines will be considered including as input into Social effects and their interplay with Social effects to take a holistic approach.	■ Section 2.0 ■ Section 9.2
12	Section 17 of the TISG	■ Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided.	■ This is included in the Study Plan in Section 9.2.	■ Section 9.2
13	Section 17 of the TISG	■ The proponent must analyze the community and Indigenous knowledge across diverse subgroups where possible to identify differential effects highlighted by these groups including through the application of GBA+.	■ This approach to analysis will be followed as indicated in Section 4.3, Section 7.3 and 9.8.	■ Section 4.3 ■ Section 7.3 ■ Section 9.8
14	Section 17 of the TISG	■ The analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders).	■ This approach will be followed in the Social Assessment.	■ Section 9.8
15	Section 17 of the TISG	■ The analysis should describe the goals of local or regional land use plans or local or regional development plans and the extent to which the Project is aligned with such plans to avoid or enhance Social effects. For the valued components listed below, the effects assessment should explore and discuss opportunities by which benefits to local communities can be enhanced.	■ The Land and Resource Use Assessment will cover this content. The interconnection of the socio-economy with land use will be described.	■ Land and Resource Use Study Plan
16	Section 17.1 of the TISG	■ The Impact Statement must: – describe the predicted effects to services and infrastructure in the study area, including but not limited to the positive and adverse effects to: • quality of road infrastructure; • Ogoki post airport; • traffic safety; • educational facilities and childcare; • health care facilities; • recreational and Social services facilities; • emergency services (e.g., police, ambulance, health care, fire-fighting); • availability and use of fuel to generate power; • housing (ownership, cost, affordability, crowding); • communication services in the community (including telecommunications infrastructure); – transportation within and between communities, and in what forms (e.g., hitchhiking, shared rides, work buses); – supply of goods and services, including food; – costs of goods and services, including food; – existing businesses; – community amenities (e.g., recreational spaces/services, green spaces); and – community governance.	■ All components listed will be covered in the Study Plan except for: – Supply and cost of goods and services and existing businesses will be assessed in the Economic Assessment. – Emergency services, health care services and traffic safety will be included in the Human Health and Community Safety Assessment.	■ Section 7.3 ■ Section 9.2 ■ Economic Study Plan ■ Human Health and Community Safety Study Plan
17	Section 17.1 of the TISG	■ Describe any need for government and/or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects.	■ This will be considered in the Social Assessment.	■ Section 7.3 ■ Section 9.2 ■ Economic Study Plan

Draft

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
18	Section 17.2 of the TISG	■ *Land and resource use and recreation – all items listed*	■ This Section will be covered in the Land and Resource Use Assessment	■ Land and Resource Use Study Plan
19	Section 17.3 of the TISG	■ *Navigation – all items listed*	■ Navigation items are covered in the Land and Resource Use Assessment	■ Land and Resource Use Study Plan
20	Section 17.4 of the TISG	■ Community Cohesion - The Impact Statement must assess potential changes to local demographic conditions, including changes to population size and changes in the relative population of men and women, and younger and older people. The Impact Statement must: – describe in-and out-migration effects, including changes in Social and cultural make-up of affected communities and changes in populations; and – identify whether Social divisions might be intensified as a result of the Project and evaluate effects to Social cohesion, both between the project community and other surrounding First Nations.	■ This will be considered in the Social Assessment.	■ Section 9.2
21	Section 17.5 of the TISG	■ The Impact Statement must: assess potential adverse and positive effects of changes to Social conditions including, but not limited to: – food security; – illegal or potentially disruptive activities, including: • violent crime, including sexual and physical violence (with particular consideration of effects to specific subgroups in the community such as young people, women and girls); • gender-based violence; • human trafficking; • vandalism; • poaching; • drug and alcohol distribution; • trafficking of illegal goods and counterfeit goods; • other crimes; – cost of living; – income inequity; – changes at the community level that affect Social conditions as a result of increased population, worker camps, economic activity, cost of living, among other factors; – non-commercial/trade economy; – examine barriers and constraints that prevent individuals or groups from benefitting and how they are magnified across different subgroups; – employment, including type of jobs (fulltime vs part time, temporary vs permanent, skilled vs unskilled; distribution of jobs to youth vs adult, women vs others); – education and access to training opportunities; – housing availability and affordability, crowding; and – safety of travel to and from connected communities, including by public, commercial, and private transport, and ride sharing. – assess potential adverse effects on women's safety, including Indigenous women; – evaluate potential Social effects associated with changes in disposable income, including potential cost-of-living effects, adverse and positive lifestyle changes, feelings of empowerment, distribution of benefits among affected people; – describe the potential opportunities expected to become available for youth, and how youth will gain access to these opportunities, considering the conditions described (e.g., youth living in urban centres who are attending secondary school, youth who have left the community to seek training or work); and – consider the potential for stresses on community, family and household cohesion, alcohol and substance use, or illegal or other potentially disruptive activities.	■ Many of these items are covered under the Human Health and Community Safety Assessment and the Economic Assessment. The Social Assessment will cover community cohesion, housing, community infrastructure, transportation and community well-being and interconnections with health, safety and the economy will be identified.	■ Section 9.2 ■ Economic Study Plan ■ Human Health and Community Safety Study Plan
22	Section 17.6 of the TISG	■ *Culture – all items listed*	■ These items will be covered in the Archaeological and Cultural Heritage Assessment.	■ N/A

Table 11-2: Study Plan Provincial Draft ToR Concordance – Conformance with Requirements

ID#	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Study Plan Reference
1	■ Draft ToR Comment from Fort Albany First Nation (ID #57)	■ We encourage that the assessment process include special efforts to consider impacts on specific groups (e.g., people of certain sex or age) at every stage where it may be relevant, with the help of those with appropriate expertise.	■ A GBA+ framework will be utilized for the federal Impact Assessment that is also to be completed for the Project to consider gender and other identity factors.	■ Section 4.3 ■ Section 7.3 ■ Section 9.8
2	■ Draft ToR Comment from Fort Albany First Nation (ID #58)	■ Given that we must understand wellbeing in a collective and interconnected way, the magnitude of any potential harm should be judged by its likely impacts on those most sensitive to it (e.g., pregnant women, breastfeeding infants, animals during breeding or nesting seasons, and so on).	■ A GBA+ framework will be utilized for the federal Impact Assessment that is also to be completed for the Project to consider gender and other identity factors.	■ Section 4.3 ■ Section 7.3 ■ Section 9.8
3	■ Draft ToR Comment from Aroland First Nation (ID #210)	■ "7.1.2 Environmental Features" Table 7-1 "Environmental Disciplines to be Considered during the Environmental Assessment" does not include gender-based analysis plus (GBA+) AFN submits that Table 7-1 should include gender-based analysis plus (GBA+)	■ A GBA+ framework will be utilized for the federal Impact Assessment that is also to be completed for the Project to consider gender and other identity factors.	■ Section 4.3 ■ Section 7.3 ■ Section 9.8
4	■ Draft ToR Comment from Webequie First Nation (ID #617)	■ 7.1.4.12 Socio-Economic and Built Environment (Page 39) "Will consider six components: Social, economy, land and resource use, recreation and tourism, human health and visual esthetics" Please include these components: – gender relations, – human safety (in addition to health)	■ Community safety has been added to the heading title for Human health and will be considered under this discipline. Gender and other identity factors have and will continue to be considered as part of the federal Impact Assessment.	■ Section 4.3 ■ Section 7.3 ■ Section 9.8 ■ Human Health and Community Safety Study Plan

Draft

12. References

211 Ontario North, 2020:

Marten Falls First Nation: Agency Profile.: https://211north.ca/record/65300596/agency/

Advantage Northwest, 2013:

Mining Readiness Strategy: An Integrated Regional Economic Development Plan. http://www.noma.on.ca/upload/documents/mining-readiness-strategy.pdf

AECOM Canada Ltd., 2020:

Marten Falls First Nation Proposed Terms of Reference Marten Falls Community Access Road – Environmental Assessment, Appendix B: Consultation & Engagement Plan to Support the Environmental Assessment / Impact Statement.

Ambassador's Northwest, 2012:

Mining in Northwestern Ontario – Opportunities and Challenges. http://www.thunderbayventures.com/upload/documents/mining-in-northwestern-ontario.pdf

Centre for the North, 2014:

Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities. http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf.

First Nations Health Authority, 2020:

First Nation Perspectives on Health and Wellness. https://www.fnha.ca/wellness/wellness-and-the-first-nations-health-authority/first-nations-perspective-on-wellness

First Nations Information Governance Centre, 2020:

Our Data. Our Stories. Our Future. https://fnigc.ca/splash/

Government of Canada, 2019:

About the Community Well-Being Index. https://www.sac-isc.gc.ca/eng/1421245446858/1557321415997

Greenstone Gold, 2017:

Hardrock Project Environmental Assessment. https://www.greenstonegoldmines.com/environment-documents

Draft

Impact Assessment Agency of Canada, 2019:
Impact Assessment Act. https://laws-lois.justice.gc.ca/eng/acts/I-2.75/

Impact Assessment Agency of Canada, 2020:
Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133934E.pdf

Impact Assessment Agency of Canada, 2020a:
Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133936E.pdf

Impact Assessment Agency of Canada, 2020b:
Glossary of Terms for the impact assessment of designated projects under the IAA. https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/glossary-of-terms.html

Impact Assessment Agency of Canada, 2020c:
Tailored Impact Statement Guidelines for the Marten Falls Community Access Road Project. https://iaac-aeic.gc.ca/050/documents/p80184/133937E.pdf

Matawa, 2014:
Marten Falls First Nation: Community Profile: http://community.matawa.on.ca/wp-content/uploads/2014/02/CULPOR_Marten-Falls_Profile.pdf.

Ministry of Northern Development, Mines and Forestry, 2011:
Growth Plan for Northern Ontario. https://www.ontario.ca/document/growth-plan-northern-ontario

Ministry of Transportation, 2016:
Traffic Volumes – Provincial Highway Networks. https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx

Moazzami, B., 2019:
Northern Projections – Human Capital Series. https://www.northernpolicy.ca/article/publications-search-245.asp?Category=38765

Municipality of Greenstone, 2016:
Asset Management Plan. https://greenstone.civicweb.net/filepro/documents/38241?preview=39514

Draft

Municipality of Greenstone, 2017:
Community Profile: Demographics. http://www.greenstone.ca/content/demographics-0

Municipality of Greenstone, 2018:
Community Profile: Housing Characteristics. http://www.greenstone.ca/content/quality-life

Municipality of Greenstone, n.d.:
Community Profile: Transportation and Shipping. http://www.greenstone.ca/content/transportation-and-shipping

Municipality of Greenstone, n.d.:
Community Services. http://www.greenstone.ca/content/community-services

North Star Air, 2020:
Flex Flight Route Map. http://www.northstarair.ca/article/flex-flights-route-map-1171.asp

Ontario Government, 1990a:
Environmental Assessment Act. https://www.ontario.ca/laws/statute/90e18

Organization for Economic Co-operative Development:
OECD Social Cohesion Policy Reviews.
http://www.oecd.org/dev/inclusivesocietiesanddevelopment/OECD_Social_Cohesion_Policy_Note.pdf

Draft

Appendix A

Preliminary List of Data Sources

Draft

211 Ontario North, 2020:

Marten Falls First Nation: Agency Profile.: https://211north.ca/record/65300596/agency/

Advantage Northwest, 2013:

Mining Readiness Strategy: An Integrated Regional Economic Development Plan. http://www.noma.on.ca/upload/documents/mining-readiness-strategy.pdf

Ambassador's Northwest, 2012:

Mining in Northwestern Ontario – Opportunities and Challenges. http://www.thunderbayventures.com/upload/documents/mining-in-northwestern-ontario.pdf

Centre for the North, 2014:

Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities. http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf.

First Nations Health Authority, 2020:

First Nation Perspectives on Health and Wellness. https://www.fnha.ca/wellness/wellness-and-the-first-nations-health-authority/first-nations-perspective-on-wellness

Greenstone Gold, 2017:

Hardrock Project Environmental Assessment. https://www.greenstonegoldmines.com/environment-documents

Matawa, 2014:

Marten Falls First Nation: Community Profile: http://community.matawa.on.ca/wp-content/uploads/2014/02/CULPOR_Marten-Falls_Profile.pdf.

Ministry of Northern Development, Mines and Forestry, 2011:

Growth Plan for Northern Ontario. https://www.ontario.ca/document/growth-plan-northern-ontario

Ministry of Transportation, 2016:

Traffic Volumes – Provincial Highway Networks. https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx

Moazzami, B., 2019:

Northern Projections – Human Capital Series. https://www.northernpolicy.ca/article/publications-search-245.asp?Category=38765

Draft

Municipality of Greenstone, 2016:
Asset Management Plan. https://greenstone.civicweb.net/filepro/documents/38241?preview=39514

Municipality of Greenstone, 2017:
Community Profile: Demographics. http://www.greenstone.ca/content/demographics-0

Municipality of Greenstone, 2018:
Community Profile: Housing Characteristics. http://www.greenstone.ca/content/quality-life

Municipality of Greenstone, n.d.:
Community Profile: Transportation and Shipping. http://www.greenstone.ca/content/transportation-and-shipping

Municipality of Greenstone, n.d.:
Community Services. http://www.greenstone.ca/content/community-services

North Star Air, 2020:
Flex Flight Route Map. http://www.northstarair.ca/article/flex-flights-route-map-1171.asp

Draft

Appendix B

Agency Comments on the Draft Study Plan

Draft

Draft Study Plan Comments – Federal

Dra

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
General Comment	■ General Comment	■ N/A	■ In addition to the required actions detailed below, other required actions to be addressed in the update to this study plan are detailed in a separate table titled "2020-07-02 – IAAC to MFFN - General Comments on MFCAR Draft Study Plans". The Agency has provided these other required actions to highlight common sections of the Tailored Impact Statement Guidelines (the Guidelines) where requirements were not met in the draft study plans submitted to the Agency. These additional actions must be addressed in the updated study plans.		■ We have reviewed the relevant comments and incorporated where appropriate. Please refer to the General Comments Table Response submitted separately to the Agency for specific responses.	■ Various Sections
1	■ Section 3	■ Section 6.2 of the Guidelines	■ Input from Engagement - Section 3 of the study plan states "In addition to engagement data, it is expected that Indigenous Knowledge will be integrated throughout the Socio-community Assessment, where applicable. This may include information on social cohesion, education, community challenges, and other information tied to socio-community criteria (Section 4.2) but will not include confidential data." ■ Section 6.2 of the Guidelines states that the proponent is required to describe the type of confidential information provided by each Indigenous group that does not compromise any stipulations in the confidentiality agreements and the description shall state how that information impacted the project design, baseline data, effects assessment or mitigation measures. the proponent is required to provide evidence to the Agency in the form of a letter from the Indigenous group that provided confidential information confirming that: – the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; – the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed. ■ It is unclear how the approach proposed in the study plan will meet the requirements of Section 6.2 of the Guidelines.	■ Update the study plan to reflect how the expectations highlighted from Section 6.2 of the Guidelines will be met.	■ Indigenous communities will be engaged with as part of the overall consultation and engagement program for the Project, which is summarized in Section 4 of the updated Study Plan. Section 5 of the Study Plan also describes the Indigenous Knowledge Program, another avenue for Indigenous communities to provide input on the Project. Indigenous Knowledge related to the Social VCs and indicators will be considered in the Social Assessment.	■ Section 4 ■ Section 5
2	■ Section 4.1	■ Section 6 of the Guidelines	■ Section 4.1 of the study plan states that "data collection will focus on the communities most likely to be affected by the Project including Marten Falls and Aroland First Nations". This section does not mention how the other Indigenous groups listed in the Indigenous Engagement and Partnership Plan (IEPP) have been, or will be engaged to gather baseline data and to inform the assessment of potential social impacts to indicators for the preparation of the Impact Statement. As per Section 6 of the Guidelines, the proponent is required to engage with, at a minimum, the Indigenous groups listed in the IEPP. The proponent must also provide Indigenous groups with an opportunity to comment on the list of valued components and indicators.	■ Update the study plan to include the list of all Indigenous groups that will be engaged, at a minimum the Indigenous groups listed in the IEPP, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan. Clarify whether the Indigenous groups in the IEPP have been provided an opportunity to comment on the list of criteria and indicators in the study plan and whether the group has a direct community-level socio-community interest in the Project footprint, prior to being screened out of the socio-community Local Study Area.	■ A list of all Indigenous communities identified in the Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment that are to be engaged with has been provided in the updated Study Plans (Table 4-1). ■ Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Social discipline. The VCs / Indicators (or assessment criteria as presented in the ToR) are to be considered as draft. The final list of VCs and indicators to be used in the Social Assessment will be based on regulatory agency guidance, professional	■ Table 4-1 ■ Section 4

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
					judgement and future input received through the Project consultation and engagement activities with Indigenous communities and interested persons. ■ Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the assessment so that the Proponent can consider and incorporate, where appropriate, Indigenous Knowledge and Social discipline related information into the Project as it pertains to the existing environment, VCs and indicators, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. ■ A summary of the consultation plan has been provided in the Study Plan (Section 4.); further details can be found in the IS / EA Consultation Plan (AECOM 2020) included as Appendix B of the Proposed ToR for the Project.	
3	■ Section 4.1	■ Section 5 of the Guidelines	■ List of Public Groups - Section 4.1 of the study plan highlights the Municipality of Greenstone to be included in the primary data collection. No other member of the public or public community is identified for the primary or secondary data collection in the study plan. As per Section 5 of the Guidelines, the proponent is required to engage with, at a minimum, the members of the public listed in the Public Participation Plan (PPP).	■ Update the study plan to include the list of the members of the public and public groups that will be engaged, at a minimum the public participants listed in the PPP, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan.	■ Considering the Social VCs as presented in Table 9.2, and the study areas presented in Section 6.2, the Municipality of Greenstone is the primary public body that will be engaged with for data collection purposes to support the Social assessments. There are no other public groups (non-indigenous communities) in the LSA expected to experience social impacts from the Project. Other public interests such as land users will be engaged with to support the Land and Resource Use assessment. The study plan for that discipline should be referred to for a list of public interests that will be engaged with.	■ Section 6 ■ Table 6-1
4	■ Section 4	■ N/A	■ Collection of Baseline Data - More detail is required on the methodology of baseline information collection for the Agency and federal experts to understand the work that the proponent is planning to undertake.	■ Provide detail on what baseline information will be sourced from primary information sources, and what will be sourced from secondary information sources so that it is clear where information is being sourced for the criteria and indicators listed in the study plan.Regarding primary information collection, the study plan requires additional detail on how the collection methodology would meet the expectations of the Guidelines, including:- Describe how Gender-Based Analysis Plus (GBA+) has been applied to the consideration of engagement activities.	■ Sources of baseline information can be found in Appendix A of the Study Plan. Section 7.2.1 and Section 7.2.2 describe which information will be collected from secondary and primary sources, respectively. ■ The primary data collection methodology can be found in Section 7.2.2 of the	■ Section 4.3 ■ Section 7.2.1 ■ Section 7.2.2 ■ Appendix A

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
				Identify any specific methods targeted to specific subgroups.- Specify participants in engagement activities (reflecting the Indigenous groups listed in the Indigenous Engagement and Partnership Plan and members of the public listed in the Public Participation Plan) including rationale for how the selection of participants meets the objectives of the study and demonstrates accessibility considerations (e.g., language requirements) and GBA+.- Define who is considered a community consultation co-ordinator, and how these community consultation co-ordinators will be identified prior to being approached for engagement.- Describe the approach the proponent intends to take to encourage or attract participation, including how opportunities to participate will be planned and advertised.- Describe how Indigenous knowledge will be used to inform types of engagement activities and participant selection, including the identification of community consultation co-ordinators.- If sample surveys, interview questions, or other data collection tools exist, identify them in an appendix to the study plan, and provide clear links to how they relate to the social criteria. Identify past public or Indigenous engagement activities that have taken place and are being used to inform this study plan. For secondary information collection, provide specific information sources to be used, and for which criteria and indicators they apply. The study plan should provide a clear outline of which criteria and indicator data will come from existing secondary sources and what those sources are. Provide detail on how the proponent has considered GBA+ requirements in the identification of secondary information sources.	updated Study Plan. Sections 4.3 and 7.2.2 of the study plan also describe how GBA+ will be incorporated into the Project, including the primary social data collection.	
5	■ Sections 3 and 4.1	■ Section 6.2 of the Guidelines	■ Sections 3 and 4.1 of the study plan identify Indigenous knowledge as a potential source of information for baseline data, where provided by an Indigenous group. It is unclear how Indigenous groups will be provided opportunities to provide Indigenous knowledge and validate the collected baseline data. (According to Section 6.2 of the Guidelines, permission from Indigenous groups should be sought before including any confidential information, such as Indigenous knowledge, in the Impact Statement.)	■ Describe in the study plan how Indigenous groups will have opportunities to provide Indigenous knowledge and validate the baseline data collected. The description should include the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the groups, to demonstrate that guidance outlined in Section 6.2 of the Guidelines has been incorporated into this study plan.	■ Section 5 of the Study Plan describes how Indigenous Knowledge will be collected and considered in the IS / EA for the Project. Section 2.1 has additional information on the Project's approach to handling confidential information.	■ Section 5 ■ Section 2.1
6	■ Section 4 and 4.3	■ Sections 5.2, 6.3 and 10 of the Guidelines	■ Gender Based Analysis Plus - Section 4.0 of the study plan identified the following objectives: – "Describe social conditions using disaggregated data and gender statistics, where publically available or volunteered by knowledge holders:- Identity factors that cannot be disaggregated through secondary source data will be considered qualitatively. Where available, these identity factors will be referenced and considered in existing conditions reporting and analysis." Section 4.3 of the study plan states "it is expected that there will be a multitude of data issues and limitations based on the Project area."…"These issues may limit the information available to be reported by the proponent as part of the Impact Assessment, particularly related to disaggregated data to support a GBA+ analysis." The study plan does not provide any further information on how the GBA+	■ Update the study plan to demonstrate how GBA+ has been integrated into all aspects of data collection methodology and the assessment of effects and impacts. This should include a description of how the proponent will engage diverse populations to collect information necessary to support the GBA+ analysis and how the information will be tracked, considered and reported in the Impact Statement.	■ The Social Study Plan will integrate a GBA+ framework into the Social data collection and assessment program.	■ Section 4.3

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
			analytical framework will be applied to data collection methodology and analysis. Refer to Agency guidance for more information on the GBA+ approach: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html Section 5.2 of the Guidelines state that the Impact Statement must include, at a minimum, a description of efforts made by the proponent to engage diverse populations, including groups identified by gender, age or other community relevant factors (e.g., recreational hunters) to support the collection of information needed to complete the GBA+; The proponent should seek to solicit information necessary to support the GBA+, and if unsuccessful, efforts made should be described in the Impact Statement. Section 6.3 of the Guidelines state that the Impact Statement must include, at a minimum, a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+; Section 10 of the Guidelines states that baseline information must be sufficiently disaggregated and analyzed to understand the differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities; and the impact of these differences in their lives, including consideration of disproportionate effects to surrounding communities.			
7	■ Section 5.1.2	■ Sections 5, 6, and 7.4 of the Guidelines	■ Study Areas - Section 5.1.2 of the study plan states that:“The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in socio-economic effects. To be included in the social LSA, a community must demonstrate direct community-level socio-economic interest in the PSA; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that affect the socio-community”. “Based on the information provided, the proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas”. Sections 5 and 6 of the Guidelines provide direction on the Agency’s expectations for meaningful engagement with members of the public and public groups (at a minimum those listed in the PPP), as well as Indigenous groups (at a minimum those listed in the IEPP) during the impact assessment process. The Agency expects the proponent to engage equitably with the members of the public and public groups listed in the PPP and all Indigenous groups listed in the IEPP to gather baseline data and to assess the Project’s effects. Additionally, Section 7.4 of the Guidelines explains that the spatial and temporal boundaries determined and established for the impact	■ Revise the study plan to describe a methodology and engagement approach that will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines. Provide further detail on the criteria and the rationale that is used to define the PSA, LSA and Regional Study Area (RSA) for each valued component, and describe how Indigenous groups and the public have been, or will be, provided an opportunity to inform the spatial and temporal boundaries.	■ Section 6 of the Study Plan describes the rationale for the temporal and spatial boundaries for the Project. ■ Section 6.2 of the Study Plan identifies how the PDA (formerly PSA), LSA and RSA have been defined for the Project, including for the Social Environment. Section 6.2.1 of the Study Plan identifies that the study areas can be further refined based on input from neighbouring Indigenous communities and interested persons.	■ Section 6

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
			assessment will vary depending on the valued component and are considered separately for each valued component, including valued components related to the environmental, health, social and economic conditions of Indigenous peoples, or other potential effects and impacts. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups. It is unclear how the approach proposed in the study plan will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines.			
8	■ Section 5.1.2	■ Section 1.1 of the Guidelines	■ Study Areas - Section 5.1.2 of the study plan states "The socio-community study areas are defined to capture the potential effects of the Project on the surrounding environment. For each criteria, a local study area (LSA) and regional study area (RSA) are defined to reflect the extent to which the Project has the potential to affect the environment. The extent of the potential effects includes both direct and indirect effects." ■ Section 1.1 of the Guidelines states that "the factors [to be considered in an impact assessment] are listed in subsection 22(1) of IAA and prescribe that the impact assessment of a designated project must take into account: a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by the carrying out of the designated project, including:…" ■ The assessment of effects on the social conditions should not only consider the extent to which the Project has the potential to affect the environment but include potential changes to health, social or economic conditions. The socio-community study area should be defined to capture the social area of influence of the Project, including effects not directly linked to adverse effects to the environment.	■ Update the study plan to define study areas that capture the Project's social effects due to potential changes to environment, health, social and economic conditions.	■ The LSA and RSA for the Social Environment and the accompanying rationale can be found in Table 6-1 of the Study Plan.	■ Table 6-1
9	■ Section 5.2	■ Concordance Table in Section 7 of the Guidelines, Section 17 of the Guidelines	■ Indicators - More detail is required in the description of indicators listed in Table 3 to understand the work that the proponent is planning to undertake. The criteria provided do not align with the specifics from the Guidelines outlined in the concordance table in Section 7 of the study plan. The criteria should refer to the wording used in the Guidelines to provide clarity to the reviewer. Section 17 of the Guidelines state that "Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided". Criteria should be included as laid out in the concordance table, but with additional details on the indicators that will be used to describe each criterion. Indicators must provide data (either quantitative or qualitative) that can be measured and used to identify changes due to the Project. The two examples below are a representative sample of indicators from the study plan that require more detail, not a complete list of the indicators that	■ Update Table 3 of the study plan to include detailed criteria and detailed and measurable indicators, and the rationale for the indicators selected to demonstrate how the requirements in Section 17 of the Guidelines would be met.	■ A list of Valued Components and Indicators can be found in Table 9-2. This table also includes the rationale for selection and potential sources of information for each indicator.	■ Table 9-2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
			require more detail:- Example 1 – In Table 3 of the study plan, the use of the indicator “Demographic change” for the criterion of “Population and Demographics” does not provide adequate detail on what will be evaluated or measured (for change) by the proponent in relation to the criterion of “Population and Demographics”.- Example 2 - In Table 3 of the study plan, the “Community Well-being” criterion specifies “Community” as an indicator. This does not provide detail on what indicators will be used to describe the conditions of a community or how the indicator will be used to measure the potential changes within a community.			
10	■ Section 5.2	■ Sections 10 and 17 of the Guidelines	■ Criteria and Indicators - Section 5.2 of the study plan states “As the socio-economy has an abundance of interlinkages that overlap, certain aspects of the socio-community are considered in other study plans, and have their baseline information documented in other relevant reports. The Human Health and Community Safety Assessment is expected to include information on public safety. The Land and Resource Use Assessment includes information on recreation and navigation. Elements of the cultural environment are covered in the Cultural Heritage Assessment, Archaeology Assessment and Indigenous Knowledge Assessment. Findings and data included in these sections are considered under relevant components of the Socio-community Assessment. Other sections, such as the Economic Assessment and those mentioned, will also contain information that supports the Socio-community Assessment, as noted in Section 1.0.” ■ Section 17 of the Guidelines states that the assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided. ■ The study plan provides inadequate detail on the data described in other study plans (such as the Human Health and Community Safety Assessment) that will be collected and analyzed to meet the social baseline data collection and social effects assessment requirements described in Sections 10 and 17 of the Guidelines, respectively.	■ Update the study plan to provide further detail on the specific social criteria and indicators that will be collected and assessed through other study plans. At a minimum, provide a cross reference as to where the specific social criteria and indicators can be found in the other plans.	■ Table 9-2 outlines for each VC / Indicator the information that will be considered that is to be collected by other disciplines. For example, for the Community Well Being VC, the results of the Economic Assessment and Human Health and Community Safety Assessment will be considered.	■ Table 9-2

Draft Study Plan Comments – Provincial

Dra

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
1	■ General Comment	■ MECP, Environmental Assessment Branch	■ As with other work plans, there is a lack of detail about how this environmental component will be used in the alternatives assessments and effects assessments, and whether these two assessment methodologies will differ in any way. ■ For instance, will the criteria and indicators for socio-community be scored to compare each alternative method? Will the effects assessment for all alternative methods be done to the same level of detail as the preferred methods?	■ Please ensure the ToR and draft EA clearly describe the methodologies for the alternatives assessments and effects assessments for the route alternatives and supporting infrastructure, and how each environmental component is used in the methodologies.	■ The draft EA will clearly describe the methodologies for the alternatives assessments and effects assessment for the route alternatives and supporting infrastructure. Furthermore, as committed to in the Proposed ToR Section 9.1.1, MFFN will prepare a technical work plan on the effects assessment methods at the onset of the IA / EA, including an opportunity for technical review by applicable agencies.	■ N/A
2	■ Page 1, s. 1	■ MECP, Environmental Assessment Branch	■ [Similar comment as for other draft work plans] Key objectives of conducting an EA include the elements mentioned in the work plan and also describing the existing environment, describing potential effects (positive and negative) of the project and alternatives, and consult about the project.	■ Suggest the following revisions to add additional key objectives of the EA process: – "In relation to this Plan, the key objectives of conducting an IA/EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative) of the project and alternatives on the environment, on the socio-community environment and determine measures needed to avoid or minimize adverse Project effects, enhance beneficial Project effects where feasible, and undertake consultation."	■ The purpose and objectives have been updated to reflect the suggested addition.	■ Section 2
3	■ Page 8, s. 5.1.1	■ MECP, Environmental Assessment Branch	■ [Same comment as for other draft work plans] It is stated that project phases include construction and operation. It would be helpful if this section clarifies that the construction phase includes decommissioning of temporary infrastructure, per page 14 of the draft ToR.	■ Please add to this section that the construction phase includes decommissioning of temporary infrastructure, using consistent language as the ToR.	■ The Study Plans have been updated to include this information.	■ Section 6.1
4	■ Page 9, s. 5.1.2	■ MECP, Environmental Assessment Branch	■ [Same comment as for human health draft work plan] Page 9 states: "The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in socio-economic effects. To be included in the social LSA, a community must demonstrate direct community-level socio-economic interest in the PSA; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that affect the socio-community. Community-level socio-economic effects can be defined as changes to the indicators (Section 4.2) that can reasonably be expected to potentially exceed a negligible magnitude (Section 5.2)." This excerpt implies that it is up to Indigenous communities to self-identify and demonstrate as being potentially impacted by the project from a socio-economic perspective in order to be	■ Please ensure the EA study design will capture potential direct and indirect effects to all relevant Indigenous communities. The proponent should also ensure that communities are aware of opportunities to provide input and raise concerns, including for the socio-community assessment.	■ Section 9.3 of the updated Study Plan speaks to the consideration of indirect effects. ■ Indigenous communities identified in Table 4-1 of the Study Plan will be made aware of opportunities to provide input and raise concerns. Section 4 describes the overall consultation and engagement approach for the program. More specific information about consultation and engagement can be found in the IS / EA Consultation Plan included as Appendix B of the Proposed ToR. ■ Section 6.2.2 describes the approach to the consideration of Indigenous communities in the Social assessment.	■ Section 9.3 ■ Section 4 ■ Section 6.2.2

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
			considered in the socio-economic assessment. The proponent is required to identify and consider all potential impacts, direct and indirect, from its project. The proponent should ensure it is capturing these potential effects to all relevant communities. The proponent should also ensure that communities are aware of opportunities to provide input and raise concerns, including for the socio-community assessment.			
5	■ Page 10, Table 2	■ MECP, Environmental Assessment Branch	■ The Social RSA is defined as "The regional area where project effects to the socio-community may result in cumulative effects through facilitating future development activities." This sounds like the RSA is only related to future development. However doesn't the RSA also include effects of the MFCAR that extend beyond the LSA, e.g., effects to the disciplines listed on page 3, effects to physical factors that may be a nuisance to community members as noted on page 8?	■ Please clarify definition of the RSA, in particular connecting the RSA boundaries and rationale to the MFCAR itself, not just cumulative effects with other future development.	■ An updated definition of the RSA for the Social Environment has been provided in the Study Plan.	■ Section 6.2.2
6	■ Page 10, s. 5.1.2	■ MECP, Environmental Assessment Branch	■ Similar to comment above, the following statement limits the RSA assessment to future developments rather than to impacts from the MFCAR that go beyond the LSA. "While many Indigenous communities are located within the regional study area these communities will be profiled individually, if Project interest is expressed, at a high-level using qualitative data given their relation to the Project is predominantly focused on cumulative effects from future developments." What about impacts from the road on any sensitive receptions besides those for MFFN, Aroland or Greenstone that could impact other communities' wellbeing?	■ Please clarify that the RSA includes consideration of socio-community impacts of the MFCAR that might extend beyond the LSA. If not, please provide rationale.	■ An updated definition of the RSA for the Social Environment has been provided in the Study Plan and clarified that the RSA includes consideration of socio-community impacts of the Project that might extend beyond the LSA.	■ Section 6.2.2 ■ Table 6-1
7	■ Page 14, s. 6.1	■ MECP, Environmental Assessment Branch	■ The first bullet in section 6.1 states that it is assumed the socio-community assessment will determine potential residual effects on the criteria and indicators. This should be more complete and state that the assessment is to establish the baseline socio-community environment, help assess and select alternatives, and identify potential environmental effects prior to impact management measures being applied.	■ Please revise bullet for completeness to incorporate the required elements of the EA process.	■ The Study Plan has been revised to include more information on the assessment process. However, as committed to in the Proposed ToR Section 9.1.1, MFFN will prepare a separate technical work plan on the effects assessment methods at the onset of the IA / EA, including an opportunity for technical review by applicable agencies.	■ Section 9
8	■ Page 14, s. 6.2	■ MECP, Environmental Assessment Branch	■ [Same comment as for other draft work plans] Residual effects are mentioned but not explained. For clarity, there should be a statement that residual effects (net effects using provincial language) are the effects left over after application of impact management measures, per Ontario's EA Code of Practice.	■ Please add to this paragraph that 'residual (net) effects are the effects remaining after the application of impact management measures.'	■ This has been added to the revised section 9.6 on residual effects.	■ Section 9.6

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
9	■ Page 15, s. 6.2 and Table 4	■ MECP, Environmental Assessment Branch	■ The definitions and rationale for the magnitude levels require further clarification. Page 15 states, "Determining and characterizing the magnitude of effects will be informed by the level of concern expressed through engagement with the potentially effected Indigenous community members." Table 4 states that Low, Medium and High magnitude levels are determined by whether they are noticeable to community members. While it is appropriate to consider community feedback on level of impact of potential effects, this should not be the only way to determine potential harm of an impact. Based on the criteria and indicators some effects may not be noticeable to community members but could still have a high degree of adverse effect. For example, changes in air quality could be known to be harmful or a nuisance based on existing standards and modelling, or there may be significant changes to auto or truck traffic, and it is the proponent's responsibility to identify and describe the effects using a variety of assessment methods (e.g., field work, modelling, literature reviews, consultation). Since the EA is done prior to construction of the project and the effects actually occurring, it could be difficult for communities to identify what effects are noticeable or whether they change day to day life. Therefore community consultation needs to be combined with the proponent's own professional assessment methods and analysis.	■ Please provide further rationale for relying on communities' expressed concern in determining magnitude effects, or revise to include other means to help determine magnitude. Please also consult the EA Code of Practice, for example section 3.2.5 about using best available data and evaluation methods.	■ Magnitude definitions, including rationale, are provided in Section 9.6 of the updated Study Plan.	■ Section 9.6
1	■ Page 2-3, Section 2.0; Page 14, Section 6.0	■ MECP, Senior Advisor, Peter Brown	■ It is unclear how indirect effects or effects on other disciplines will be considered in the assessment of impacts on socio-community. For example, it is identified on page 3 that information from the air quality, noise, economic, human health and community safety, and traditional land use/Indigenous knowledge disciplines will be considered in conducting the socio-community assessment, and that other disciplines may be considered including the land and resource use assessment.	■ It would be preferred to see a comprehensive list of disciplines or pathways that could impact socio-community (e.g., water quality, fish and fish habitat, wildlife and wildlife habitat, etc.) and will be considered, or say that all other disciplines will be considered with respect to impacts on socio-community. More detail on these methods are also requested, for example, are just the net or residual impacts on other disciplines carried forward for consideration of impacts on socio-community or all potential effects?	■ Preliminary information on the interaction of the Social discipline with other disciplines is included in Section 2 and 9.3 of the Study Plan.	■ Section 2 ■ Section 9.3 ■ Table 9-3
2	■ Page 4, Table 1, Section 3	■ MECP, Senior Advisor, Peter Brown	■ It is stated that the study plan has been informed by input… It is unclear what this input was or how it has informed the study plan. It is unclear if Table 1 is to be included in the final study plan and/or the EA/EIS.	■ Please clarify if Table 1 will be included in the final socio-community study plan or in the EA/EIS. Please clarify what input has been received and how it has the informed the study plan, and consider summarizing this in the study plan.	■ Table 1 in the draft Study Plan was an example table of how information received from interested persons and groups would be documented and considered in the IA / EA. Sections 4 and 5 of the updated Study Plan describe how Indigenous communities and interested persons will be engaged with throughout the Project, and how Indigenous Knowledge will be collected and considered.	■ Section 4 ■ Section 5

Draft

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
3	■ Page 6-7, Section 4.0 and pages 11-13, Table 3	■ MECP, Senior Advisor, Peter Brown	■ Relevant knowledge holders should include service providers, including those providing social services to the communities and/or regions. Secondary sources should include community plans and reports.	■ Please include service providers, as applicable, to the list of knowledge holders or key informants for purposes of primary data collection in Section 4.0. Please include community plans and reports as potential secondary information sources in Section 4.0 and Table 3.	■ Service providers and municipal plans and reports have been added as secondary data sources. (see Table 9-2)	■ Section 7.2.1 ■ Table 9-2
4	■ Page 8-9, Section 5.0	■ MECP, Senior Advisor, Peter Brown	■ It is unclear if/how socio-community study areas will consider impacts through or align with other disciplines. For example, it is identified that socio- community study areas consider "study areas for physical factors that may be a nuisance to community members", but it is not clear how impacts on other disciplines (e.g., traditional land use, wildlife, etc.) might influence the socio-community study areas.	■ Please clarify how the consideration of impacts on socio-community through other disciplines will influence the development of the socio-community study areas.	■ Section 6.2 describes how the study areas for the Social Environment have been developed. As noted in Section 6.2, the study areas in the study plans are preliminary and are subject to change based on consultation and engagement with Indigenous communities and interested persons.	■ Section 6.2
5	■ Page 10, Section 5.0	■ MECP, Senior Advisor, Peter Brown	■ It is not clear if "While many Indigenous communities are located within the regional study area these communities will be profiled individually, if Project interest is expressed, at a high-level using qualitative data given their relation to the Project is predominantly focused on cumulative effects from future developments" means that communities that express an interest in the project will be profiled (and assessed?) in greater detail than they would be otherwise. It is recommended that the level of detail be appropriate to the extent and severity of potential impacts, rather than interest expressed.	■ Please clarify the level of detail likely required, with rationale, to appropriately characterize and assess impacts on communities in the LSA and RSA.	■ Further information on the rationale for the LSA and RSA for the Social Environment can be found in Section 6.2.2, including additional information on the characterization and assessment of impacts on communities in the LSA and RSA.	■ Section 6.2.2

Draft

Appendix C

Table Example: Employment by Age and Sex in the Marten Falls First Nation Community

Draft

Appendix C: Table Example: Employment by Age and Sex in the XXXX First Nation Community

Note: This table is illustrative. The purpose of the table is to demonstrate how Statistics Canada data is likely to be disaggregated.

		Total - Age Groups	0 to 14 years	15 years and over	15 to 24 years	25 to 54 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 years and over
Total	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	160	0	160	60	75	30	20	20	10	15
	In the labour force	80	0	80	15	50	15	15	15	10	0
	Employed	65	0	65	10	45	15	10	15	10	10
	Unemployed	20	0	15	10	10	0	0	0	0	0
	Not in the labour force	85	0	80	40	25	15	10	0	0	10
	Participation rate (%)	50	0	50	25	66.7	50	75	75	100	0
	Employment rate (%)	40.6	0	40.6	16.7	60	50	50	75	100	66.7
	Unemployment rate (%)	25	0	18.8	66.7	20	0	0	0	0	0
Male	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	90	0	85	30	40	15	10	10	10	0
	In the labour force	40	0	45	10	30	10	10	10	10	0
	Employed	35	0	35	10	20	0	0	10	0	0
	Unemployed	15	0	10	0	10	0	0	0	0	0
	Not in the labour force	50	0	45	25	10	10	0	0	10	0
	Participation rate (%)	44.4	0	52.9	33.3	75	66.7	100	100	100	0
	Employment rate (%)	38.9	0	41.2	33.3	50	0	0	100	0	0
	Unemployment rate (%)	37.5	0	22.2	0	33.3	0	0	0	0	0
Female	**Total - Labour force status for the population aged 15 years and over in private households - 25% Sample data**	75	0	75	25	35	20	10	10	0	0
	In the labour force	40	0	40	10	20	10	10	0	0	10
	Employed	30	0	30	0	20	10	10	0	10	10
	Unemployed	10	0	0	0	0	0	0	0	0	0
	Not in the labour force	35	0	35	15	15	10	0	0	0	0
	Participation rate (%)	53.3	0	53.3	40	57.1	50	100	0	0	0
	Employment rate (%)	40	0	40	0	57.1	50	100	0	0	0
	Unemployment rate (%)	25	0	0	0	0	0	0	0	0	0

Draft

Comments from the Federal Review Team on Marten Falls Community Access Road Project Social Study Plan – November 8, 2021

It is essential that the Impact Statement for the Marten Falls Community Access Road Project (the Project) address all requirements outlined in the Tailored Impact Statement Guidelines (the Guidelines), and that the study plans outline a clear approach to achieving these requirements. The Impact Assessment Agency of Canada (the Agency) has highlighted sections of the Guidelines where requirements for the Impact Statement may not be met, based on content of the draft study plan submitted to the Agency. Note that this table does not provide an exhaustive list of the requirements described in the Guidelines. The Guidelines should be reviewed in their entirety, including the sections identified below.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
ID #	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
GC-01	**Section 5 - Public Participation and views (including 5.1, 5.2)**	Provide a clear description in the study plans of how public engagement opportunities have been and/or will be integrated into the impact statement phase. This must include detail on how the public will have opportunities to provide input to contribute to the development of the Impact Statement, as required in Section 5 of the Guidelines. Describe what engagement with the members of the public listed in the Public Participation Plan has been done in the development of the study plans, and/or any planned engagement with members of the public on the proposed study plans.	Section 4: describes how the Proponent will provide Project notices and opportunities with members of the public listed in the Public Participation Plan. This will also include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. - The study plans have recognized public and agency input received on the Project to date.	**Section 4.1** "A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input."	Section 4.1 of the study plan mentions that "*a variety of activities will be offered*", however, no details on the likely engagement activities are provided. As required by Section 5 of the Guidelines, the Impact Statement must provide a record of engagement that describes all efforts taken to seek the views of local communities and other stakeholders with respect to the Project, including on the study plans. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement, including prior to and during the planning phase, and in the preparation of the Impact Statement. Provide details on the timeline for public engagement relative to the project workplan, including engagement relative to the schedule for baseline work, and in consideration of the project team's timeline for the development of the Impact Statement. Demonstrate in the Impact Statement that comments provided by members of the public on social conditions are taken into consideration. Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions
GC-02	**Section 6 - Description of Engagement with Indigenous Groups (including 6.1, 6.2, 6.3)**	Provide a clear description in the study plans of how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will have opportunities to provide Indigenous knowledge, including the validation of how information they provided was applied. The study plan should include a description of the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the group, to demonstrate that the guidance outlined in Section 6.2 of the Guidelines has been incorporated into the study plans. Describe what engagement with all the Indigenous groups listed in the Indigenous Engagement and Partnership Plan has been done in the development of the study plans, and/or any planned engagement with Indigenous groups on the proposed study	- In Section 4.2 it is noted that the Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in the Indigenous Partnership and Engagement Plan. A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. - Section 2.1.1 outlines the approach to handling confidential information, by means of permission from Indigenous communities to include Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. - The study plans have recognized Indigenous community input received on the Project to date.	**Section 4.2** "…A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input…" "…Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process…"	Section 4.2 of the study plan states that "*a variety of activities will be offered*", however, no details on the planned engagement activities are provided. Section 4.2 of the study plan also states that "*Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process*", however, it is unclear on which components of the study plans the project team plans to engage. It is also unclear whether Indigenous groups will be provided with a meaningful opportunity to provide input on a preliminary approach/method for baseline data collection, as required in Section 6 of the Guidelines, or if engagement will take place after the baseline data collection is complete. Provide details on the timeline for Indigenous engagement on the social study plan, including engagement relative to the schedule for baseline work, and spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge, and in consideration of the project team's timeline for the development of the Impact Statement. Demonstrate in the Impact Statement that comments provided by Indigenous groups on social conditions were taken into consideration.

[1] Refer to complete sections of the Guidelines for more context.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
ID #	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		plans, particularly in relation to collection of Indigenous knowledge (i.e. develop the work plan in collaboration with those Indigenous groups that would need to provide knowledge).			Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions
GC-03	**Section 6.2 - Analysis and response to questions, comments, and issues raised**	Revise the study plans to include an approach to handling confidential information that demonstrates adherence to the guidance provided in Section 6.2 of the Guidelines.	- Section 2.1.1: Section has been updated to include information regarding both confidentiality and permission information on all collected Indigenous Knowledge, regardless of the source. - This section also includes how information regarding the Indigenous Knowledge Sharing Agreements will be established by the Proponent and Indigenous community participating in the Program.	**Section 2.1.1** "…Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared)…"	As required in Section 6 of the Guidelines, describe the confidential information provided by each Indigenous group. Present the content in sufficient detail to support understanding of the potential effects and impacts on rights, while also protecting confidential/sensitive specifics and respecting stipulations in the confidentiality agreements (e.g, use buffer areas instead of specific locations, etc.). Provide to the Agency, in the form of a letter from the Indigenous group that shared confidential information, a letter confirming that: • the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; • the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed.
GC-04	**Section 7.4 Spatial and temporal boundaries**	Describe the approach to be implemented to demonstrate how the definitions of the proposed study area boundaries: • encompass the anticipated boundaries of the Project's effects, including all potentially impacted local communities, municipalities and all Indigenous groups listed in the Indigenous Engagement and Partnership Plan; and • take into account community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; physical, ecological, technical, social, health, economic and cultural considerations; and the size, nature and location of past, present and foreseeable future projects and activities.	- Section 6.2: General information on study areas for the Project, including a detailed list of what was considered to develop the discipline-specific local and region study areas, is included in each study plan. Each study area has been proposed taking into consideration community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices, physical, ecological, technical, social, health, economic and cultural considerations available at this time. - The proposed discipline-specific study areas are preliminary. The proposed study areas will be consulted and engaged on early in the IA / EA process. In addition, the Indigenous Knowledge Program provides additional	**Section 6.2.1** **"**The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4". **7.2.2 Primary Data Collection** "The specific scope of the primary data collection program will be informed by the final Social study areas. However, it is anticipated that primary data collection will focus on the communities in the Social LSA which are most likely to be affected by the Project, including MFFN and Aroland First Nation (Section 6.2). Based on the nature of the socio-community, primary data will also be collected in the Municipality of Greenstone (Geraldton) that serves as the regional service centre. These communities are likely to experience the most Project-related change due to the	Section 7 of the Guidelines, states that "The size, nature and location of past, present and foreseeable future projects and activities are factors that should be included in the definition of spatial boundaries." It is unclear how a Local Study Area of 2.5 km from the centreline of the Project would be appropriate to assess direct effects on social conditions. At a minimum, all project components (including aggregates sources, access roads, etc.), the upgrades to the Anaconda and Painter Lake forestry access roads, the Northern Road Link Road Project, the Webequie Supply Road Project, as well as winter roads, and activities and communities connected through these roads, should be included in the Local Study Area. As required in Section 7.4.1 of the Guidelines, provide information regarding how the following were/will be taken into account in defining the spatial boundaries: community knowledge and Indigenous knowledge; current and traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights, including cultural and spiritual practices; physical, ecological, technical, social, health, economic and cultural considerations; and the size, nature and location of past, present and reasonably foreseeable future projects and activities.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
ID #	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
			opportunities for community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples to be shared in greater detail.	location of the Project and its resulting access." **Section 4.3** "…The social data collection program is expected to include targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in socio-economic secondary data. These diverse populations include the aforementioned identity groups, which are also referenced in the IS / EA Consultation Plan, and those identified by communities during consultation and engagement…" **Section 4.4** "…For the Indigenous communities that express specific Social concerns, targeted engagement for the purposes of Social data collection will be implemented through the Social primary data collection program consistent with the likelihood of effect anticipated to the community as determined by the MFFN CAR Project Team…" **Section 7.2.2** "…Focused data collection on gaps identified in the secondary sources related to VCs and indicators such as quality factors for services and infrastructure…" **Section 7.3** "… The primary Social data collection is anticipated to be conducted during the Spring and Summer of 2021, however this timing is subject to change and dependent on the larger Project schedule including engagement and consultation activities. …"	Ensure that the social conditions Regional Study Area encompasses the spatial boundary of cumulative effects. Provide the above information in a way that allows those who provided the knowledge to the proponent and the Agency to see their input reflected in the Impact Statement. It is not sufficient to state that "input from participants will be/was taken into account".
GC-05	**Section 7 - Baseline Methodologies (Including 7.1, 7.2, 7.3, 7.4)**	Provide clear descriptions in the study plans of the proposed study areas and the criteria used to define the study areas for each valued component. Provide clear descriptions of the timing of previously collected data (days/month/year) and future approximate (month/year or season/year) for every field work planned and the criteria used to tailor the temporal boundaries to the valued components under consideration. Describe how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will be, or have been, engaged to provide input on spatial and temporal boundaries. Explain how the Agency will be provided opportunities to validate spatial and temporal boundaries.	- Local Study Area (LSA) and Regional Study Area (RSA) for each valued component are described in Table 6-1, including rationale used to define the area. - Study plans have been designed considering historical information, where applicable and available. Study plans will be updated with appended Work Plans, to be submitted at a future date, which will detail upcoming planned field activities. - As detailed in both Section 4.2 and Section 6.2 the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs. - Government agencies and interested persons will have the opportunity to comment on component of the study plans throughout the IS / EA Report consultation and engagement process	**Sections 4.3, 4.4, 7.2.2 and 7.3**	It is unclear whether any secondary baseline studies have been conducted to identify potential gaps in the baseline information requirements described in Section 10 of the Guidelines. Primary data collection should be used where secondary sources are unable to provide the required information. Update the study plan to provide the current status of the secondary baseline data collection analysis and specify where gaps need to be addressed to meet the requirements in Section 10 of the Guidelines. To ensure that baseline data collection will meet the requirements of the Guidelines, the Agency advises the project team to share a work plan describing how the survey for social data collection will be conducted. If it is not possible to provide this information in the study plans or work plans, the Agency requires an opportunity to review the collected baseline data/baseline reports prior to the preparation of the Impact Statement documentation. Include in the Impact Statement a baseline community profile for <u>each</u> Indigenous group listed in the Indigenous Engagement and Partnership Plan and for each local community listed in the Public Participation Plan, to meet the requirements of Section 10 of the Guidelines. The baseline community profiles should be used to inform the effects assessment required by Section 17 of the Guidelines.
GC-06		Provide further details in the study plans on how GBA+ has been integrated into all aspects of data collection methodology, as	- Section 4.3 has been updated to include the consideration of Identity and Gender-Based Analysis Plus (GBA+) including both Indigenous communities	**Section 4.3**	The study plan does not sufficiently describe how GBA+ will be utilized throughout the consultation process to better inform the baseline data.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
ID #	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 13, 20, 21, and others, related to effects assessments of the Guidelines	and their relevant subpopulations and non-Indigenous communities and their subpopulations. During consultation and engagement activities these groups (and any others defined during consultation) will be engaged with on targeted input.		A GBA+ framework should be applied to analyze historic and current power relations, decision-making processes, and how gender intersects with health, social, and economic conditions. Include equity considerations as a tool to ensure inclusiveness in the engagement process. Describe how GBA+ has been or will be applied to the consideration of engagement activities. Identify specific methods targeted to specific subgroups. Provide detail on how GBA+ has been integrated into all aspects of data collection methodology, including for the definition of indicators, as per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 10, 13, 20, 21, and others, related to effects assessments of the Guidelines. It is not sufficient to mention that Gender-Based Analysis Plus will be applied to the assessment. Clear descriptions of how GBA+ was integrated (including to which variables, method, and how it influenced results' interpretation) are needed in the Impact Statement.
GC-07	**Section 13 - Effects Assessment (including 13.1, 13.2)**	Provide details to demonstrate how the Project's potential effects will be considered, as per the requirements in Sections 13 to 19 of the Guidelines. Ensure that the effects assessment considers the effects of each of the project components and physical activities, in all phases, and that it is based on a comparison to the proposed baseline work. Provide detail on how engagement with all Indigenous groups listed in the Indigenous Engagement and Partnership Plan and the public will inform the effects assessment and the selection of mitigation measures and follow-up program measures.	- Project environmental interaction are separated into Project phases, and Project activities for each environmental discipline in their VC-specific study plan listed as Table 9-1. - Information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs.	**Throughout the study plan, Section 9**	As required in Sections 7 and 13 of the Guidelines, ensure that the effects assessment considers the effects of each of the project components (including but not limited to all alternative routes brought forward in the Impact Statement, all aggregates sources, access roads, etc.) and physical activities, in all phases, and that the assessment is based on a comparison to the data and information gathered during the proposed baseline work. Clarify the level of information that will be shared with, and explained to, the Indigenous Knowledge Program leads and whether study plans will be made available to all Indigenous groups listed in the Indigenous Engagement and Partnership Plan.
GC-08	**Section 13.1**	Provide clear descriptions of the rationale behind the assumptions, including but not limited to the assumed average daily traffic and vehicles composition during the construction and operation phases that will be considered for the effects assessment and the cumulative effects assessment.	- Section 10: Current assumptions to be used in the effects assessment have been identified. Any additional assumptions will be identified and rationale will be provided in the IS / EA Report.	**Section 10** "…The MFFN CAR Project Team is not aware at this time of key assumptions that will be recognized in the Social Assessment. These will be determined during the development of the IS / EA Report. Key assumptions made and used in the assessment of Social impacts will be documented in the IS / EA Report…"	Before conducting the effects assessment analysis, the Agency advises the proponent to seek the Federal Review Team's confirmation of the assumptions that will be used in the analysis or, at a minimum, to discuss the type of assumptions that will be considered. As required by Section 13.1 of the Guidelines, ensure that the Impact Statement clearly outlines the assumptions used for the assessment of effects, including cumulative effects, on each valued component.
GC-09	**Section 19.2 - Impacts on the Exercise of**	Describe an approach for identifying the potentially impacted rights of Indigenous peoples of Canada that are recognized and	- All study plans reference how potential effects on Indigenous rights will be	**Section 5, and Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan**	Feedback will be provided in the Federal Review Team's comments package on the Aboriginal and Treaty Rights and Interests Study Plan.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
ID #	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
	Aboriginal and Treaty Rights	affirmed by section 35 of the *Constitution Act, 1982*, and for integrating the potential impacts on those rights into the collection of baseline information and the effects assessment.	assessed in the Aboriginal and Treaty Rights and Interests Study Plan. - Impacts on Rights considerations are explained in the rationale for defining a Local Study Area and Regional Study Area for Aboriginal and Treaty Rights and Interests VCs. Further information for this is listed in Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan.		
GC-10	**Section 20 - Mitigation and enhancement measures**	Provide detail on the approach to meeting the requirements of Section 20 of the Guidelines regarding the identification of mitigation and enhancement measures.	- Section 9: Approach to mitigation and enhancement measures, specifically noting that once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects.	**Section 9.5.1**	Ensure that the Impact Statement provides a description of the method or approach followed to meet the requirements of Section 20 of the Guidelines.
GC-11	**Section 25 – Description of the Project's contribution to sustainability**	Provide detail on the approach to meeting the requirements of Section 25 of the Guidelines regarding the description of the Project's contribution to sustainability.	Section 9: the sustainability assessment for the Project will be undertaken on the preferred alternative and will characterize the Project's contribution to sustainability incorporating the requirements set out in Section 25 of the Guidelines.	**Section 9.7**	Section 9.7 of the study plan is listing the requirements outlined in Section 25 of the Guidelines. Ensure that the Impact Statement provides a description of the method or approach followed to meet the requirements of Section 25 of the Guidelines.
GC-15	**Concordance with Federal Guidance**	Provide a separate concordance table containing all requirements of the Guidelines. This is required to show how all requirements of the Guidelines, including the interactions of effects and interconnectedness of valued components, would be addressed.	Please refer to Table 11-1, Table 11-3 and the General Comments Table Response.	**Table 11-1**	The Agency has identified inconsistencies between the cross-references presented and the information contained in the study plans. For example, ID# 30 in Table 11-1 of the Aboriginal and Treaty Rights and Interests (ATRI) study plan indicates that "*the assessment of potential changes to language will be led by the socio-community assessment – refer to the Social Study Plan for more information".* However, the social study plan does not mention language. Demonstrate in either the ATRI study plan or the social study plan the approach for assessing potential changes to language and update the concordance table accordingly. Provide a separate concordance table that describes the content of each study plan. This is needed to cross-check all plans against the Guidelines and demonstrate how all requirements of the Guidelines would be met.

Preliminary Comments from the Impact Assessment Agency of Canada on the Draft Socio-community Study Plan submitted on May 22, 2020:						
ID #	**Draft Study Plan**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan Reference**	**Agency Response**
SO-01	**Section 3**	**Section 6.2**	Required Action # 1: Update the study plan to reflect how the expectations highlighted from Section 6.2 of the Guidelines will be met.	Indigenous communities will be engaged with as part of the overall consultation and engagement program for the Project, which is summarized in Section 4 of the updated Study Plan. Section 5 of the Study Plan also describes the Indigenous Knowledge Program, another avenue for Indigenous communities to provide input on the Project. Indigenous Knowledge related to the Social VCs and indicators will be considered in the Social Assessment.	**Sections 4 and 5**	Required action # 1 was partially addressed. See comments GC-02, GC-04, and GC-05 above.
SO-02	**Section 4.1**	**Section 6**	Required Action # 2: Update the study plan to include the list of all Indigenous groups that will be engaged, at a minimum the Indigenous groups listed in the IEPP, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan. Required Action # 3: Clarify whether the Indigenous groups in the IEPP have been provided an opportunity to comment on the list of criteria and indicators in the study plan and whether the group has a direct community-level socio-community interest in the Project footprint, prior to being screened out of the socio-community Local Study Area.	- A list of all Indigenous communities identified in the Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment that are to be engaged with has been provided in the updated Study Plans (Table 4-1). - Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Social discipline. The VCs / Indicators (or assessment criteria as presented in the ToR) are to be considered as draft. The final list of VCs and indicators to be used in the Social Assessment will be based on regulatory agency guidance, professional judgement and future input received through the Project consultation and engagement activities with Indigenous communities and interested persons. - Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the assessment so that the Proponent can consider and incorporate, where appropriate, Indigenous Knowledge and Social discipline related information into the Project as it pertains to the existing environment, VCs and indicators, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. - A summary of the consultation plan has been provided in the Study Plan (Section 4.); further details can be found in the IS / EA Consultation Plan (AECOM 2020) included as Appendix B of the Proposed ToR for the Project.	**Section 4, Table 4-1**	Required action # 2 was adequately addressed. Required action # 3 was partially addressed. Provide a workplan that clearly outlines the approach to engage Indigenous groups listed in the Indigenous Engagement and Partnership Plan in determining the spatial and temporal boundaries specifically for the social conditions valued component. The Impact Statement should clearly outline all perspectives and input received on spatial and temporal boundaries, including Indigenous and community knowledge, and demonstrate how these were integrated into or contributed to decisions regarding the Project (e.g., project design). If the Proponent determined that some perspectives and input received during engagement activities did not warrant consideration or integration into the decisions regarding the Project, a detailed description of the input and rationale for exclusion must be provided in the Impact Statement. See also comments GC-02, GC-04, and GC-05 above.
SO-03	**Section 4.1**	**Section 5**	Required Action # 4: Update the study plan to include the list of the members of the public and public groups that will be engaged, at a minimum the public participants listed in the Public Participation Plan, as part of the baseline data collection and effects assessment analysis. The list should be consistent throughout the study plan.	Considering the Social VCs as presented in Table 9.2, and the study areas presented in Section 6.2, the Municipality of Greenstone is the primary public body that will be engaged with for data collection purposes to support the Social assessments. There are no other public groups (non-indigenous communities) in the LSA expected to experience social impacts from the Project. Other public interests such as land users will be engaged with to support the Land and Resource Use assessment. The study plan for that discipline should be referred to for a list of public interests that will be engaged with.	**Section 6, Table 6-1**	Required action # 4 was not adequately addressed. As per Section 5 of the Guidelines, the Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Participation Plan. Provide a work plan that clearly outlines the approach to engage, at a minimum, members of the public listed in the Public Participation Plan in confirming the spatial and temporal boundaries specifically for the social conditions valued component.

[2] Refer to complete sections of the Guidelines for more context

Preliminary Comments from the Impact Assessment Agency of Canada on the Draft Socio-community Study Plan submitted on May 22, 2020:						
ID #	**Draft Study Plan**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan Reference**	**Agency Response**
						See also comment GC-04, particularly with respect to the definition of the Local Study Area.
SO-04	**Section 4**	**Sections 5, 6, 7 and 13**	Required Action # 5: Provide detail on what baseline information will be sourced from primary information sources, and what will be sourced from secondary information sources so that it is clear where information is being sourced for the criteria and indicators listed in the study plan. Required Action # 6: Regarding primary information collection, the study plan requires additional detail on how the collection methodology would meet the expectations of the Guidelines, including: - Describe how Gender-Based Analysis Plus (GBA+) has been applied to the consideration of engagement activities. Identify any specific methods targeted to specific subgroups. - Specify participants in engagement activities (reflecting the Indigenous groups listed in the Indigenous Engagement and Partnership Plan and members of the public listed in the Public Participation Plan) including rationale for how the selection of participants meets the objectives of the study and demonstrates accessibility considerations (e.g. language requirements) and GBA+. - Define who is considered a community consultation coordinator, and how these community consultation coordinators will be identified prior to being approached for engagement. - Describe the approach the proponent intends to take to encourage or attract participation, including how opportunities to participate will be planned and advertised. • Describe how Indigenous knowledge will be used to inform types of engagement activities and participant selection, including the identification of community consultation coordinators. - If sample surveys, interview questions, or other data collection tools exist, identify them in an appendix to the study plan, and provide clear links to how they relate to the social criteria. - Identify past public or Indigenous engagement activities that have taken place and are being used to inform this study plan. Required Action # 7: For secondary information collection, provide specific information sources to be used, and for which criteria and indicators they apply. The study plan should provide a clear outline of which criteria and indicator data will come from existing secondary sources and what those sources are. Provide detail on how the proponent has considered	Sources of baseline information can be found in Appendix A of the Study Plan. Section 7.2.1 and Section 7.2.2 describe which information will be collected from secondary and primary sources, respectively. The primary data collection methodology can be found in Section 7.2.2 of the updated Study Plan. Sections 4.3 and 7.2.2 of the study plan also describe how GBA+ will be incorporated into the Project, including the primary social data collection.	**Sections 4.3, 7.2.1, 7.2.2 and Appendix A**	Required action # 5 was addressed. Required action # 6 was partially addressed. See also comments GC-01, GC-02, GC-03 and GC-06 above. Required action # 7 was addressed.

Preliminary Comments from the Impact Assessment Agency of Canada on the Draft Socio-community Study Plan submitted on May 22, 2020:						
ID #	**Draft Study Plan**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan Reference**	**Agency Response**
			GBA+ requirements in the identification of secondary information sources.			
SO-05	**Sections 3 and 4.1**	**Section 6.2**	Required Action # 8: Describe in the study plan how Indigenous groups will have opportunities to provide Indigenous knowledge and validate the baseline data collected. The description should include the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the groups, to demonstrate that guidance outlined in Section 6.2 of the Guidelines has been incorporated into this study plan.	Section 5 of the Study Plan describes how Indigenous Knowledge will be collected and considered in the IS / EA for the Project. Section 2.1 has additional information on the Project's approach to handling confidential information.	**Sections 2.1 and 5**	Required action # 8 was partially addressed. See comments GC-02, GC-03, and GC-04.
SO-06	**Sections 4 and 4.3**	**Sections 13, 20, 21**	Required Action # 9: Update the study plan to demonstrate how GBA+ has been integrated into all aspects of data collection methodology and the assessment of effects and impacts. This should include a description of how the proponent will engage diverse populations to collect information necessary to support the GBA+ analysis and how the information will be tracked, considered and reported in the Impact Statement.	The Social Study Plan will integrate a GBA+ framework into the Social data collection and assessment program.	**Section 4.3**	Required Action # 9 was partially addressed. See comment GC-06.
SO-07	**Section 5.1.2**	**Sections 5, 6, 7.4**	Required Action # 10: Revise the study plan to describe a methodology and engagement approach that will meet the requirements of Sections 5, 6 and 7.4 of the Guidelines. Required Action # 11: Provide further detail on the criteria and the rationale that is used to define the PSA, LSA and Regional Study Area (RSA) for each valued component, and describe how Indigenous groups and the public have been, or will be, provided an opportunity to inform the spatial and temporal boundaries.	- Section 6 of the Study Plan describes the rationale for the temporal and spatial boundaries for the Project. - Section 6.2 of the Study Plan identifies how the PDA (formerly PSA), LSA and RSA have been defined for the Project, including for the Social Environment. Section 6.2.1 of the Study Plan identifies that the study areas can be further refined based on input from neighbouring Indigenous communities and interested persons.	**Section 6**	Required Actions # 10 and # 11 were partially addressed. See comments GC-01, GC-02 and GC-04. Provide a work plan that clearly outlines the approach to engage Indigenous groups listed in the Indigenous Engagement and Partnership Plan and members of the public listed in the Public Participation Plan in determining the spatial and temporal boundaries specifically for the social conditions valued component.
SO-08	**Section 5.1.2**	**Section 7**	Required Action # 12: Update the study plan to define study areas that capture the Project's social effects due to potential changes to environment, health, social and economic conditions.	The LSA and RSA for the Social Environment and the accompanying rationale can be found in Table 6-1 of the Study Plan.	**Table 6-1**	Required Action # 12 was partially addressed. Section 7.4 of the Guidelines states that the spatial boundaries should vary depending on the valued component and that the proponent should validate with the Agency the spatial boundaries for each valued component. The local study area proposed in the social study plan is very narrow and too geographically linked to the Project's footprint to represent the area of influence and fully capture the potential impacts of the Project on the social conditions valued component. See also GC-02, GC-04, SO-03 and SO-07.
SO-09	**Section 5.2**	**Sections 7, 10 and 17**	Required Action # 13: Update Table 3 of the study plan to include detailed criteria and detailed and measurable indicators, and the rationale for the indicators selected to demonstrate how the	A list of Valued Components and Indicators can be found in Table 9-2. This table also includes the rationale for selection and potential sources of information for each indicator.	**Table 9-2**	The indicators and sub-indicators presented in Table 9-2 do not adequately specify what would be collected and assessed to meet the requirements of Sections 10 and 17 of the Guidelines. Specifically, the sub-indicators identified in Table

Preliminary Comments from the Impact Assessment Agency of Canada on the Draft Socio-community Study Plan submitted on May 22, 2020:						
ID #	**Draft Study Plan**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan Reference**	**Agency Response**
			requirements in Section 17 of the Guidelines would be met.			9-2 lack appropriate detail required to provide useful and meaningful information for the effects assessment. For example, the indicator “Community” is associated with the following list of sub-indicators, however, no further information on the sub-indicators is provided: • Changes in community well-being • Changes to social cohesion • Changes to family relationships and dynamics • Changes to community participation • Changes to community support networks • Changes to material, Social or mental well-being Update the study plan to provide additional detail to the specific indicators that would be used to meet the requirements of Sections 10 and 17 of the Guidelines. This should include both quantitative and qualitative indicators that are specific, measurable, and accessible to source.
SO-10	**Section 5.2**	**Sections 7, 10 and 17**	Required Action # 14: Update the study plan to provide further detail on the specific social criteria and indicators that will be collected and assessed through other study plans. At a minimum, provide a cross reference as to where the specific social criteria and indicators can be found in the other plans.	Table 9-2 outlines for each VC / Indicator the information that will be considered that is to be collected by other disciplines. For example, for the Community Well Being VC, the results of the Economic Assessment and Human Health and Community Safety Assessment will be considered.	**Table 9-2**	Required action # 14 was partially addressed. See comment SO-09.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
SO-11	**2.1.3 Health Information** "If applicable, a process for handling confidential health information will be developed. This process will conform to Ownership, Control, Access, Possession [OCAP] (First Nations Information Governance Centre 2020) requirements and will also aim to preserve the confidentiality of individual persons providing the information"	**Section 6.1** "…In all cases, cultural and ethical protocols for the collection, analysis and reporting of information must be respected …" **Section 7.2** "…Ethical guidelines and relevant cultural protocols governing research, data collection and confidentiality must be adhered to…"	The social study plan does not indicate explicitly whether the guiding principles of OCAP will be followed to handle confidential and/or health information. OCAP ensures that information about a community is shared with the community and that the community has authority/control over and ownership of the information, however, each individual has a right to privacy and owns their personal information. When gathering personal and/or confidential information, a clear commitment should be made to have the individual health information anonymized (de-identified). It is not enough to state that "*the process…will aim to preserve the confidentiality of individual persons providing the information".* Depersonalization of personal health information is a commonly applied standard that must be upheld. It is recommended that the use of OCAP principles be confirmed with each participating Indigenous group, as community-specific protocols or alternative principles, such as CARE[4] (i.e., Collective benefit, Authority to control, Responsibility, and Ethics), may be preferred by the community.	Adhere to ethical guidelines and relevant cultural protocols governing research, data collection and confidentiality throughout the data collection process, as well as during research, analysis and reporting of information. Provide an opportunity to Indigenous groups to express their preferences regarding ethical guidelines and cultural protocols prior to collect the data. Ensure that the Impact Statement indicates the ethical guidelines and relevant cultural protocols governing research that were followed during the the data collection process, as well as during research, analysis and reporting of information.
SO-12	**4.2 Indigenous Communities** "The Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in Table 4-1, which is inclusive of all Indigenous communities identified in the Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment (the Agency 2020a) (referred to as the Indigenous Engagement and Partnership Plan)." "Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the IS / EA Report so that the Proponent can consider and incorporate, where appropriate Indigenous Knowledge and Indigenous land and resource use information into the Project as it pertains to the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. A variety of activities will be offered so that Indigenous communities are informed of	**Section 6.2** "…The Impact Statement must also document how the proponent responded to questions, comments and issues raised by Indigenous groups, and how unresolved matters have been addressed. Any proposed mitigation measures are to be clearly linked, to the extent possible, to valued components in the Impact Statement as well as to specific project components or activities. The analysis and responses are to include: - a comprehensive list of all issues, questions and comments raised during the engagement activities by each Indigenous group and the proponent's responses, including how matters have been addressed in the Impact Statement or will be addressed through the impact assessment (including but not limited to avoidance, mitigation or other measures to address potential effects or impacts on the exercise of rights of Indigenous peoples);..." …- if engagement with certain Indigenous groups is not possible, rationale must be provided, including, as applicable, an outline of efforts made;… - where and how Indigenous groups' knowledge, perspectives and input were integrated into or	The study plan does not describe how information will be shared with participants that may face barriers to participate rather than be 'disinterested' as required by Section 12 of the Guidelines. A description of efforts to engage with individuals or groups that may face barriers to participate should be provided. Certain populations may be less likely to express their views voluntarily, and steps should be taken to remove barriers to ensure their participation.	Describe in the study plan actions taken and to be taken to raise interest in the Project from Indigenous groups who may face barriers to participate in engagement activities. Clarify how information will continue to be shared with participants and Indigenous groups who may face barriers to participate in engagement activities. For the Indigenous groups that do not wish to participate, provide the rationale in an updated study plan and describe the barriers and the efforts made to overcome them, as per Sections 6.2 and 12 of the Guidelines. Include in the Impact Statement detailed descriptions of the Indigenous groups that are being engaged and of those that do not wish to participate.

[3] Refer to complete sections of the Guidelines for more context.

[4] CARE principles are available online at: https://www.gida-global.org/care

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
	the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. The study plans have recognized Indigenous community input received on the Project to date. Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process."	contributed to decisions regarding the Project (e.g., project design), including: o scoping, development and collection of baseline information; o plans for construction, operation, decommissioning, abandonment, and maintenance; and o follow-up and monitoring. □□where and how Indigenous groups' knowledge, perspectives and input were integrated in the characterization of the nature of environmental, health, social and economic effects and impacts expected from the Project for each Indigenous group; …" **Section 12** "…If an Indigenous group has chosen not to participate, the proponent should identify the community and provide evidence of efforts to engage… …Where Indigenous groups do not wish to participate, the proponent is encouraged to continue sharing information and analysis with the Indigenous groups of the potential effects of the Project, and to use available public sources of information to support the assessment…."		
SO-13	**4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement** "When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan. Specific to Gender-Based Analysis Plus (GBA Plus) objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement."	**Section 10** "…The information provided must:.. • describe how community and Indigenous knowledge was used in establishing social baseline conditions, including input from diverse subgroups; • describe baseline social conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; and • conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services…" **Section 17** "…The proponent must analyze the community and Indigenous knowledge across diverse subgroups where possible to identify differential effects highlighted by these groups including through the application of GBA+. In assessing effects to valued components listed [in Section 17], the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders)…"	The study plan outlines opportunities for engagement with neighbouring Indigenous groups and non-Indigenous groups; however, there is no clear indication that this data will be disaggregated as required by Sections 10 and 17 of the Guidelines. Summary statistics will not provide an intersectional gender analysis and will not achieve GBA+ objectives that are needed to ensure diverse and inclusive engagement has occurred, as required by Sections 7.1, 13, 20, and 21 of the Guidelines.	Update the study plan to demonstrate that engagement activities and surveys are designed to collect disaggregated data of diverse groups and subgroups to identify clearly the segments of the population that were/will be consulted and engaged during the preparation of the Impact Statement in order to meet the requirements of Sections 10 and 17 of the Guidelines. See also comment GC-06.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
SO-14	**Section 2.1.2 Socio-Primary Data** **"**Social primary data will be presented in a generic manner and referenced appropriately... Confidentiality will be granted upon request to those individuals and information related to the individual, including information which may support Gender-Based Analysis Plus (GBA+), will be redacted from the Social Assessment report." **7.2.2 Primary Data Collection** "The Social primary data collection will involve asking questions to fill discipline-specific information gaps. Interviews will be tailored to the specific knowledge holder"	**Section 10** "…The information provided must:… - describe baseline social conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; and - conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services..." "…Where secondary sources are unable to provide the required information, primary sources such as surveys, key informant interviews, focus groups or other primary research methods should be used…" **Section 17** "…The proponent must analyze the community and Indigenous knowledge across diverse subgroups where possible to identify differential effects highlighted by these groups including through the application of GBA+…"	The social study plan does not clearly describe how personal and confidential information will be anonymized and still included in the Impact Statement while not compromising privacy nor confidentiality.	Update the social study plan to include a description of the approach that will be used to ensure that, while protecting confidentiality, relevant GBA+ data will be included in the effects assessment and in the Impact Statement, to meet the requirements of Section 10 and 17 of the Guidelines. Update the social study plan to clarify what is meant by "*Social primary data will be presented in a <u>generic</u> manner and referenced appropriately*", particularly in regards to the presentation of social primary data.
SO-15	**7.2.2 Primary data collection** "…To attract Indigenous community participants to the Social primary data collection program, the MFFN Project Team will work with Community consultation Coordinators to advertise data collection activities, encourage participation, identify barriers to participation and identify key socio-community knowledge holders. Community Consultation Co-ordinators will also play a key role in the identification of community specific identity factors to be considered in the Social Assessment. GBA+ will be integrated into Social primary data collection activities. Drawing on this analytical framework, the Social primary data collection program will seek to understand the diverse views and perspectives of a range of socio-community knowledge holders. Primary data collection will be inclusive of diverse genders, ages, cultures and other community-specific identity factors that emerge through engagement activities and the Indigenous Knowledge program."	**Section 10** "…The information provided must:… - describe baseline social conditions using disaggregated data and gender-statistics for diverse subgroups within the community to support GBA+; and - conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services..." "…Where secondary sources are unable to provide the required information, primary sources such as surveys, key informant interviews, focus groups or other primary research methods should be used. The collection, analysis and reporting of data must adhere to relevant ethical and cultural protocols…"	The social study plan does not specify how identified sub-groups, that may be differentially impacted by the Project or may require targeted approaches, will be engaged. Data from diverse groups is essential to provide a picture of existing vulnerabilities and protective factors that may create unequal starting points for community members who may benefit from, or be impacted by, the Project. Information regarding the Community Consultation Coordinators' role is important to understand how the Proponent is approaching community members in ways that are equitable and culturally relevant (e.g., acknowledging the contribution of lived experience and local networks).	Update the social study plan to clarify how primary data collection will include a targeted approach for sub-groups that may be inequitably or differentially impacted by the Project. Provide a description of the proposed approach(es) to address barriers (e.g., accessibility, childcare or other accommodations) for community members to facilitate their participation in the process and to meet the requirements of Section 10 of the Guidelines. Update the social study plan to clarify whether the Community Consultation Coordinators will be selected based on knowledge of community-specific identity factors, or if training will be offered on how to consider diverse identities (e.g., based on gender, age, socio-economic status, etc.).
SO-16	**7.2.2 Primary data collection** "Data collection methods including interviews, focus groups and surveys designed with respect to cultural norms and the socio-economic situation in a community…"	**Section 7.2** "…The Impact Statement must provide <u>detailed</u> descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental, health, social and economic condition that is described, in order to corroborate the validity and accuracy of the baseline information collected…."	The social study plan does not provide enough details to understand whether the approach for sampling, survey and research protocols and methods proposed for the primary data collection will meet the requirements of Sections 7, 10, 13 and 17 of the Guidelines.	Update the social study plan to provide more detail regarding the data collection approach, including how it will achieve results that are representative, inclusive and culturally appropriate, in order to meet the requirements of Sections 7, 10, 13 and 17 of the Guidelines.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
		Section 10 "…The information provided must: • describe any relevant indicators and how Indigenous knowledge and engagement contributed to defining them;… • describe how community and Indigenous knowledge was used in establishing social baseline conditions, including input from diverse subgroups;.." **Section 13** **Section 17** "…Valued components that require assessment are listed below. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public…"	For example, the use of a survey is included as a data collection method but no details are provided about the methodology (e.g., sampling strategy, survey tool used, confidentiality, etc.), if this approach is utilised.	
SO-17	**8. Data Management and Analysis** "Data management including quality assurance / quality control (QA / QC) will be employed to minimize potential for data entry and analysis errors, prepare data sets for analysis and limit sensitive data distribution in accordance to established agreements. It is expected that there will be a multitude of data issues and limitations based on the Project area. This may include: - The suppression of data by Statistics Canada due to low population numbers, particularly when disaggregating data related to income and other sensitive factors; - The willingness of individuals volunteering to self-identify during the primary data collection program to support disaggregated data reporting; and, - Limitations in community-specific research and planning documentation to support all elements of data collection including community-specific studies and specialized plans. The above list is not comprehensive. It is anticipated that additional data issues and limitations may be encountered. Data issues and limitations will be tracked for the duration of the Project and, when possible, addressed with supplementary sources of information…"	**Section 2.5** "… The proponent must adhere to the principles of scientific integrity, honesty, objectivity, thoroughness and accuracy…" **Section 10** "…Baseline data can often be found in secondary information sources, such as census data, government publications and academic literature. Where secondary sources are unable to provide the required information, primary sources such as surveys, key informant interviews, focus groups or other primary research methods should be used. The collection, analysis and reporting of data must adhere to relevant ethical and cultural protocols..."	While the social study plan indicates that data issues will be tracked and when possible gaps will be supplemented by additional resources, there would be value in describing the various methods and sources of data that are anticipated to be used to ensure the quality of the information and analysis.	Describe in the Impact Statement how data gaps or limitations were addressed with primary data collection or with secondary source information, such as academic research and qualitative and quantitative data on gendered divisions of labour, family, and community responsibility.
SO-18	**2. Purpose and Objectives** "In conducting the Social Assessment, information from the following other disciplines will be considered: (…) Human Health and	**Section 9** "…use a social determinants of health approach to identify and describe the causal chain…"	The valued component "Public Safety" is a social factor. It is recommended that this factor be assessed as part of the social study plan to better align with the overall determinants of health approach in the human health assessment. Human Health valued components (VCs) should focus on the individual level (i.e., biological and behavioral factors), which immediately underlie health outcomes.	

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
	Community Safety – Potential changes to health, including public safety, will be considered as part of community well-being." **9.2 Valued Components and Indicators, Table 9-2: Social Valued Components and Indicators** "The Human Health and Community Safety Assessment is expected to include information on public safety."	**Section 16** "… it is important to include interactions within and across the higher-level health determinants (i.e., Level 2, pertaining to material circumstances/ resources and psychosocial factors, and Level 3, pertaining to structural factors and equity factors) in order to identify the pathways of health effects that are most likely to be affected by project-related changes to the determinant(s) of health…"	Including the valued component "Public Safety" in the Human Health Study Plan creates confusion, as the Human Health Assessment, which uses a determinants of health approach, is expected to include information on determinants relevant to public health found in the other assessments.	
SO-19	**9. Effects Assessment** **9.2 Valued Components and Indicators, Table 9-2: Social Valued Components and Indicators** "Valued Component: Community well-being Indicator: Community Sub-indicator: Changes to material, Social or mental well-being"	**Section 9** "…use a social determinants of health approach to identify and describe the causal chain…" **Section 16** "… it is important to include interactions within and across the higher-level health determinants (i.e., Level 2, pertaining to material circumstances/ resources and psychosocial factors, and Level 3, pertaining to structural factors and equity factors) in order to identify the pathways of health effects that are most likely to be affected by project-related changes to the determinant(s) of health…".	Community well-being may be understood as encompassing both material (resource-related) and social (psychologically-related) well-being. Changes to community well-being may be understood as how the community views changes to their economic, social and/or cultural conditions, whether favourably or unfavourably. Project-related changes to mental well-being arise from the Project's influences on what matters to the community in regards to the environmental, economic, social and cultural conditions that characterize community well-being. As such, mental well-being should be considered a separate valued component. It is recommended to update the study plan to include the following changes: - Remove "mental" from the valued component: "Community well-being"; Sub-indicator: "Changes to material~~,~~ or social ~~or mental~~ well-being"; - Add a new valued component and sub-indicator: Valued component: "Mental well-being"; Sub-indicator: "Changes to mental well-being (relative to project-related changes to material or social well-being)"	
SO-20	**9.2 Valued Components and Indicators; Table 9-2: Social Valued Components and Indicators** Valued component: social wellbeing Indicator: community Sub-indicator: • Changes in community well-being • Changes to Social cohesion • Changes to family relationships and dynamics • Changes to community participation • Changes to community support networks • Changes to material, Social or mental well-being Rationale for selection: Community is defined as the presence of Social issues, community cohesion, family relationships, community participation, and community support networks. These components of the socio-community may be altered by the Project including its construction and the access provided during operation.	**Sections 10 and 17**	Table 9.2 in the social study plan lists the proposed valued components and sub-indicators but does not provide sufficient detail to describe each variable, particularly with respect to how a "change" in the proposed sub-indicators would be identified and measured. The wording "change", by itself, does not capture what will be evaluated. For example, "*changes in community well-being*" in itself is not a measurable indicator, and is not specific or clear. In order to understand and evaluate social and community change, the notion of change and its associated impacts, either positive or negative, intended or unintended, need to be detailed. This clarification would help to understand the scope and magnitude of the sub-indicators "change" overall and also among the sub-groups of local and regional population through an intersectional analysis, and offer a systematic approach to the next steps of measurement and monitoring. Furthermore, the social study plan mentions child care as an example of a community service, however, it does not evaluate the potential influence of the Project on early learning / early-years experiences as a result of greater movement into, out of, and through the potentially impacted communities.	Update the social study plan to provide further information on the valued components and sub-indicators listed in Table 9-2 of the social study plan: • Describe each variable with enough detail to clarify what would be measured and how a change would be identified to provide a detailed description of the potential change and its associated impacts, either positive or negative, intended or unintended. • Provide further detail to help with understanding the scope and magnitude of the sub-indicators "change" overall and also among the sub-groups of local and regional population through an intersectional analysis, and offer a systematic approach to the next steps of measurement and monitoring. Update the social study plan to provide further information on community services, including childcare, indicating how the potential influence of the Project on early learning / early-years experiences as a result of greater movement into, out of, and through the potentially impacted communities will be assessed. See also comment SO-09.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
SO-21	**9.2 Valued Components and Indicators; Table 9-2: Social Valued Components and Indicators** **"**Changes in community well-being -Changes to Social cohesion -Changes to family relationships and dynamics -Changes to community participation -Changes to community support networks -Changes to material, Social" "Community is defined as the presence of Social issues, community cohesion, family relationships, community participation, and community support networks. These components of the socio-community may be altered by the Project including its construction and the access provided during operation."	**Section 10** "…Community Cohesion: ○ basic demographic characteristics of the community; ○ relevant community background and historical experience with similar infrastructure and/or resource development projects; ○ describe the proportion of community members who live in the community year-round; and ○ describe social cohesion or social capital, including factors such as community/ neighbourhood involvement, social networks/support, and social well-being, including inter-community relationships…" **Section 17.4**	The social study plan does not describe how changes to populations, including changes in social and cultural make-up, and changes to the valued component "social cohesion" with surrounding Indigenous groups would be evaluated for each of the Indigenous groups listed in the Indigenous Engagement and Partnership Plan, as required by Sections 10 and 17.4 of the Guidelines. Furthermore, the social study plan does not describe the approach proposed to evaluate current or new social divisions that might be intensified as a result of the Project, as required by Sections 10 and 17.4 of the Guidelines.	Update the social study plan with a description of how changes to populations, including changes in social and cultural make-up, and changes to the valued component "social cohesion" with surrounding Indigenous groups be evaluated for each of the Indigenous groups listed in the Indigenous Engagement and Partnership Plan, to meet the requirements of Sections 10 and 17.4 of the Guidelines. Update the social study plan with a description of the approach proposed to evaluate current or new social divisions that might be intensified as a result of the Project, to meet the requirements of Sections 10 and 17.4 of the Guidelines.
SO-22	**Section 9.2, Table 9-2: Social Valued Components and Indicators** **Valued component:** Housing and accommodation; Indicator: Housing demand Sub-Indicator: • Demand for permanent housing • Demand for temporary housing <u>Rationale for selection:</u> The migration associated with the Project may affect the demand for housing in the study area. This may include both permanent housing demand and temporary housing demand for non-camp based accommodation to support construction work forces and / or suppliers. **Valued component:** Housing and accommodation; Indicator: Housing supply Sub-Indicator: • Change in provision of housing stock • Change in quality of housing stock • Change in access to housing materials <u>Rationale for selection:</u> Increased community access or changes in demographics may alter the ability or necessity to construct accommodation. This may include both permanent and temporary accommodation. **Economic Study plan** **Table 11-1- Study Plan Federal Concordance – Conformance with Requirements; ID4** "Housing pricing, conditions and needs are to be included within the Social Assessment."	**Section 18.2** **"**The Impact Statement must: - describe the predicted positive and adverse effects to accommodation/lodging, including housing supply, housing costs, and rental rates, both during the construction and operation phases;…"	The social study plan does not provide sufficient information on the approach to socio-economic costs of the anticipated influx of people/ employees in the area that would be associated with the Project being carried out. The approach should include an analysis on where the new accommodations will be, for how long there would be an increased demand, long and short-term impacts on the local population and communities and on their ways of living. For example, there likely would be upward pressure on rental prices with the influx of new employees for the Project and potential newcomers to the area. This could lead to pressures on the availability of affordable housing units due to the change in demographic. Mitigating measures should aim to ensure housing demands and supplies are met during and after the Project to prevent unintended consequences and potentially contributing to displacement or migration of people temporarily or in the long-term. Information should be provided on the existence of social and affordable housing, such as units in housing cooperatives or subsidized units would be helpful to assess housing stock available for lower-income or vulnerable individuals and the quality of housing.	Update the social study plan to provide further detail on the predicted positive and adverse effects to accommodation/lodging, including housing supply, housing costs and rental rates during the construction and operation phases, as required by Section 18.2 of the Guidelines. Include information on where the new accommodations would be, for how long there would be an increased demand, long and short-term impacts on the local population and communities and on their ways of living. Update the social study plan with information on the existence of social and affordable housing, such as units in housing cooperatives or subsidized units to assess housing stock available for lower-income or vulnerable individuals. Information on the quality of housing would be helpful to determine the adequacy of the housing conditions before and after the Project.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
SO-23	**Section 9.2, Table 9-2: Social Valued Components and Indicators** **Valued component:** "Community Services[2] and Infrastructure, including: - Education - Childcare - Water - Waste - Energy - Communications"; **Table 11-1 Study Plan Federal Concordance – Conformance with Requirements; ID 16** "All components listed will be covered in the Study Plan except for: • Supply and cost of goods and services and existing businesses will be assessed in the Economic Assessment. • Emergency services, health care services and traffic safety will be included in the Human Health and Community Safety Assessment."	**Section 10** "…To understand the community context, the information provided must describe: … • capacity (currently available or planned) of institutions to deliver public services and infrastructure…" "…The Impact Statement must provide information on the following social conditions: • Social Services: ○ public services available (e.g., childcare, eldercare, communication services, social and cultural support). • Education: ○ education programs including elementary and secondary programs available in the community and the need to access programs outside the community; ○ apprenticeships and training initiatives (e.g., Kiikenomaga Kikenjigewen Employment & Training Services, Mushkegowuk Council Employment & Training Services, Northern Ontario Internship Program, etc.) ○ traditional education components that could potentially be impacted by the Project. • Housing:… ○ overview of the local housing market, including a description of housing conditions and needs, and the general condition of the housing stock…." **Section 17.1** **"**The Impact Statement must: • describe the predicted effects to services and infrastructure in the study area, including but not limited to the positive and adverse effects to: ○ quality of road infrastructure; ○ Ogoki post airport ○ educational facilities and childcare; ○ health care facilities; ○ recreational and social services facilities; ○ availability and use of fuel to generate power; ○ housing (ownership, cost, affordability, crowding); ○ communication services in the community (including telecommunications infrastructure); ○ transportation within and between communities, and in what forms (e.g., hitchhiking, shared rides, work buses); ○ community amenities (e.g., recreational spaces/services, green spaces); and ○ community governance."	Section 10 of the Guidelines requires an understanding of the baseline conditions of each social value component. The social study plan does not provide enough detail on how baseline data will be collected and how sub-indicators will be developed to assess potential impacts of the Project on social services, education, and local housing to meet the requirements of Section 10 of the Guidelines. Section 17.1 of the Guidelines requires information on effects to services and infrastructure, including positive and adverse effects to housing (ownership, cost, affordability, crowding). Section 9.2 of the social study plan only indicates that housing will be approached from a demand and supply perspective but does not provide any further detail on how information on effects to services and infrastructure, including to housing, will be gathered and assessed to meet the requirements of Section 17.1 of the Guidelines.	Update the social study plan to provide further detail on baseline data collection, including a description of data to be collected to assess current capacity of institutions to deliver public services and infrastructure, social services, education and housing, to meet the requirements of Section 10 of the Guidelines. Update the social study plan to provide further detail on how positive and adverse effects of the Project on services and infrastructure, as described in Section 17.1 of the Guidelines, will be assessed. Update the study plan to provide a list of data sources for secondary data for valued components such as public services, education and housing.

Comments from the Federal Review Team on the Marten Falls Community Access Road Project Social Study Plan submitted in June 2021				
ID #	**Study Plan Section**	**Guidelines Section[3]**	**Context**	**Required Action for the Proponent**
SO-24	**Editorial - Footnote 8, Section 9.2** "In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project."		The statement in the footnote 8 in Section 9.2 "*In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs."* is inaccurate, as the Regional Assessment in the Ring of Fire area has not yet begun.	Replace the text in footnote 8 with "*In February 2020, the Minister of Environment and Climate Change determined that a regional assessment will be conducted in an area centred on the Ring of Fire mineral deposits in northern Ontario. Relevant information available in relation to the Regional Assessment in the Ring of Fire area would be considered in the impact assessment of the Project."*
SO-25		**Section 7.3** "…For each of the valued components that will be assessed in the Impact Statement, the proponent must create a study plan and a work plan to be validated by the Agency. Upon receipt of a study plan, the Agency may request that the proponent present and discuss the study plan at technical meetings, which will be scheduled during the impact statement phase."	In order to meet the requirements of Section 7.3 of the Guidelines, a work plan or work plans for the valued components to be assessed in the Impact Statement must be submitted to the Agency for validation. Since this social study plan does not include content for a work plan, notably this plan does not outline when baseline data will be collected for each Indigenous group (i.e., scheduling, sequencing), the submission of a work plan is an outstanding requirement of the Guidelines.	Provide a work plan that outlines how the social study plan will be executed in the field, including when baseline data will be collected. The work plan should include scheduling and sequencing of engagement activities relative to proposed baseline work, engagement on the study plan, spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge. In addition, the work plan should outline when information will be collected for each relevant valued component, including environmental, social, health and economic interests.
SO-26	**Table 11-3: Study Plan Federal and Provincial Concordance – Requirement Deviations**		Proposed amendments and/or deviations from the Guidelines will not be reviewed or approved during the study plans review process. The Agency will provide guidance on the process to propose amendments and/or deviations to the Guidelines to the project team.	

MARTEN FALLS FIRST NATION
ALL SEASON COMMUNITY ACCESS ROAD

FINAL

Human Health and Community Safety Study Plan

May 2021

Draft

Distribution List

# Hard Copies	PDF Required	Association / Company Name
	✓	Marten Falls First Nation
	✓	AECOM Canada Ltd.

Revision History

Rev #	Date	Revision Description
Draft	May 2020	Submitted “Human Health and Community Safety Study Plan” to the Agency.
Final	May 2021	Revised to address federal and provincial agency comments.

Statement of Qualifications and Limitations: AECOM

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13
© 2009-2015 AECOM Canada Ltd. All Rights Reserved.

Draft

Disclaimer: Dillon Consulting Limited

This report was prepared by Dillon Consulting Limited ("Dillon") for the sole benefit of our Client. The material in it reflects Dillon's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Draft

Authors

Report Prepared By:

<Original Signed By>

Rob Willis, B.Sc., M.E.S., EP, QPRA, QPCA
Senior Toxicologist and Risk Assessor
Dillon Consulting Limited

Report Reviewed By:

<Original Signed By>

Don McKinnon, MES, RPP
Senior EA and Socio-economist Specialist
Dillon Consulting Ltd.

<Original Signed By>

Brady Romanson, MES, MCIP, RPP
Senior Social Scientist
AECOM

<Original Signed By>

Christine Cinnamon, B.Sc. (Env Bio), EP
Senior Project Manager, Planning and Permitting
AECOM

Draft

Table of Contents

page

1. Introduction 1
1.1 Federal and Provincial Terminology 1
1.2 Project Study Plans 2

2. Purpose and Objectives 5
2.1 Approach to Handling Confidential Information 7
2.1.1 Indigenous Knowledge 7
2.1.2 Health Information 7

3. Study Plan Technical Discussions 8

4. IS / EA Report Consultation and Engagement Process 11
4.1 Interested Persons and Government Agencies 11
4.2 Indigenous Communities 11
4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement 13
4.4 Consultation on Human Health and Safety 14

5. Consideration of Indigenous Knowledge in the IS / EA Report 15

6. Assessment Boundaries 18
6.1 Temporal Boundaries: Project Phases 18
6.2 Spatial Boundaries: Study Areas 19
6.2.1 General Information 19
6.2.2 Human Health and Community Safety Study Areas 21

7. Baseline Study Design 24
7.1 Desktop Assessment 24
7.1.1 Secondary Data Collection 24
7.1.2 Primary Data Collection 25
7.1.2.1 Social Determinants of Health 25
7.1.2.2 Tissue Sampling 27
7.2 Study Methods 27
7.2.1 Social Determinants of Health 28
7.2.2 Environmental Determinants of Health 29

Draft

8. Data Management and Analysis 35

9. Effects Assessment 36

9.1 Project-Environment Interactions 36
9.2 Valued Components and Indicators 37
9.3 Potential Effects 41
9.4 Methods for Predicting Future Conditions 43
9.5 Mitigation and Enhancement Measures 43
9.5.1 TISG Section 20 Requirements 44
9.6 Residual Effects 45
9.7 Consideration of Sustainability Principles 46
9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment 47
9.9 Follow-up Programs 48

10. Assumptions 49

11. Concordance with Federal and Provincial Guidance 50

12. References 63

List of Figures

Figure 6-1: Project Schedule 18
Figure 6-2: Human Health and Community Safety Local and Regional Study Areas 23

List of Tables

Table 1-1: Equivalent Federal and Provincial Terms 1
Table 1-2: Project Study Plans and Valued Components 2
Table 3-1: Summary of Study Plan Technical Discussions 8
Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations 12
Table 6-1: Human Health and Community Safety Study Areas 21
Table 9-1: Project – Environment Interactions 36
Table 9-2: Human Health and Community Safety Indicators 38
Table 9-3: Potential Discipline Interactions 42

Draft

Table 9-4: TISG Section 20 Requirements for Human Health and Community Safety 44
Table 9-5: Human Health and Community Safety Magnitude Definition 45
Table 11-1: Study Plan Federal Concordance – Conformance with Requirements 51
Table 11-2: Study Plan Provincial Draft ToR Concordance - Conformance with Requirements 55
Table 11-3: Study Plan Federal and Provincial Concordance - Requirement Deviations 62

Appendices

Appendix A. Preliminary List of Data Sources
Appendix B. Agency Comments on the Draft Study Plan

Acronyms and Abbreviations

Agency, the ... Impact Assessment Agency of Canada
CAR ..... Community Access Road
CEM ..... Conceptual Exposure Model
COPCs..... Chemicals of Potential Concern
EA..... Environmental Assessment
GBA+ ..... Gender Based Analysis Plus
HHRA..... Human Health Risk Assessment
IA ..... Impact Assessment
IAA..... *Impact Assessment Act*
IS ..... Impact Statement
km..... kilometre
LSA..... Local Study Area
MECP ..... Ontario Ministry of the Environment, Conservation and Parks
MFFN..... Marten Falls First Nation
OCAP..... Ownership, Control, Access, Possession
PDA ..... Project Development Area
RSA ..... Regional Study Area
SAR ..... Species at Risk
TISG ..... Tailored Impact Statement Guidelines
ToR..... Terms of Reference
VC..... Valued Component

Draft

1. Introduction

The Proponent of the Community Access Road (CAR or the Project) is Marten Falls First Nation (MFFN), a remote First Nation community in northern Ontario located at the junction of the Albany and Ogoki rivers, approximately 430 kilometres (km) from Thunder Bay, Ontario. The MFFN community is proposing an all-season Community Access Road that will connect the MFFN community to Ontario's provincial highway network (Highway 643) to the south via the existing Painter Lake Road. MFFN, as the Proponent of the Project, has formed a MFFN CAR Project Team that includes MFFN CAR Community Member Advisors and MFFN CAR Project Consultants who act with input, guidance and direction from the MFFN Chief and Council.

This document outlines the Study Plan for the Human Health and Community Safety discipline to support a coordinated Impact Assessment (IA) required for Project review by the Impact Assessment Agency of Canada (the Agency) under the federal *Impact Assessment Act* (IAA) and Environmental Assessment (EA) required for Project review by the Ontario Ministry of the Environment, Conservation and Parks (MECP) under the Ontario *Environmental Assessment Act*.

1.1 Federal and Provincial Terminology

The study plans have been prepared using federal terminology, however, the respective provincial terminology has been provided in **Table 1-1** for reference. The terms can be used interchangeably.

Table 1-1: Equivalent Federal and Provincial Terms

Provincial Term	Federal Term
Criteria	Valued Component
Impact Management Measure	Mitigation Measure
Net Effects	Residual Effects
Record of Consultation	Record of Engagement

Draft

1.2 Project Study Plans

This Study Plan is one of a group of study plans created for the Project. **Table 1-2** includes the study plans for each environmental[1] discipline currently planned for the Project and the valued components (VCs) covered by the study plans where applicable.

Table 1-2: Project Study Plans and Valued Components

Environmental Discipline	Study Plan Name	Valued Component(s)
Aboriginal and Treaty Rights and Interests	■ Aboriginal and Treaty Rights and Interests Study Plan	■ Indigenous Current Use of Lands and Resources for Traditional Purposes ■ Cultural Continuity (ability to practice and transmit cultural traditions)
Atmospheric Environment	■ Atmospheric Environment and Greenhouse Gases Study Plan	■ Air Quality ■ Greenhouse Gas Emissions
Climate Change	■ Climate Adaptation and Resiliency Study Plan	■ Climate Change
Acoustic and Vibration Environment	■ Acoustic and Vibration Environment Study Plan	■ Noise ■ Vibration
Physiography, Geology, Terrain and Soils	■ Physiography, Terrain and Soils Study Plan	■ Physiography, Terrain and Soils
Surface Water	■ Surface Water Study Plan	■ Surface Water
Groundwater and Geochemistry	■ Groundwater and Geochemistry Study Plan	■ Groundwater
Vegetation	■ Vegetation Study Plan	■ Wetland and Riparian Ecosystems ■ Upland Ecosystems ■ Designated Areas (Areas of Natural and Scientific Interest, Environmentally Significant Areas, Significant Woodlands, Critical Landform / Vegetation Associations) ■ Traditional Use Plants and SAR Plant Populations (including species with special conservation status or rarity in the province)
	■ Peatlands Study Plan	■ Peatland Ecosystems (bogs and fens)

1. *The use of the term environment in this document is inclusive of the components of the environment that are included in the Ontario Environmental Assessment Act definition, which includes a general description of the social, cultural, built and natural environments.*

Draft

Environmental Discipline	Study Plan Name	Valued Component(s)
Wildlife	■ Wildlife Study Plan	■ Bats (including SAR-bats such as: Little Brown Myotis [*Myotis lucifugus*], Northern Myotis [*Myotis septentrionalis*] and Tricolored Bat [*Perimyotis subflavus*]) ■ Fur Bearers (proxy VC[2] American Marten [*Martes americana*], Beaver [*Castor canadensis*] and Wolverine [*Gulo gulo*]) ■ Amphibians and Reptiles ■ Pollinating Insects
	■ Ungulates (Moose and Caribou) Study Plan	■ Moose (*Alces alces*) ■ Caribou, boreal population (*Rangifer tarandus*)
	■ Bird Study Plan	■ Forest Birds (proxy VC of Red-eyed Vireo [*Vireo olivaceus*] for deciduous forest, Ovenbird [*Seirus aurocapilla*] for mixedwood forest, Dark-eyed Junco [*Junco hyemalis*] for coniferous forest and disturbed forest ■ Raptors (proxy VC of Osprey [*Pandion haliaetus*] for diurnal raptors and Boreal Owl [*Aegolius funereus*] for nocturnal raptors ■ Shorebirds (proxy VC of Wilson's Snipe [*Gallingo delicata*]) ■ Waterfowl (proxy VC of Mallard [*Anas platyrhynchos*]) ■ Bog / Fen Birds and Other Wetland Birds (proxy VC of Palm Warbler [*Setophaga palmarum*] for bogs, Common Yellowthroat [*Geothlypis trichas*] for fens; and Northern Waterthrush [*Parkesia noveboracensis*] for swamps . ■ SAR birds: Canada Warbler (*Cardellina canadensis*), Chimney Swift (*Chaetura pelagica*), Common Nighthawk (*Chordeiles minor*), Eastern Whip-poor-will (*Antrostomus vociferous*), Eastern Wood-Pewee (*Contopus virens*), Evening Grosbeak (*Coccothraustes vespertinus*), Olive-sided Flycatcher (*Contopus cooperi*), Bald Eagle (*Haliaeetus leucocephalus)*, Peregrine Falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus)*, Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Black Tern (*Childonias niger*), Rusty Blackbird (*Euphagus carolinus*), Yellow Rail (*Coturnicops noveboracensis*)
Fish and Fish Habitat	■ Fish and Fish Habitat Study Plan	■ Lake Sturgeon (*Acipenser fulvescens*) ■ Walleye (*Sander vitreus*) ■ Brook Trout (*Salvelinus fontinalis*) ■ Northern Pike (*Esox lucius*) ■ Lake Whitefish (*Coregonus clupeaformis*) ■ Chain Pickerel (*Esox niger*) ■ Yellow Perch (*Perca flavescens*)

[2] *A proxy VC is used when looking at the effects of one species that represents many others.*

Draft

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Cisco (*Coregonus artedii*) ■ Burbot (*Lota lota*) ■ Longnose Sucker (*Catostomus catostomus*) ■ White Sucker (*Catostomus commersonii*) ■ Forage / Prey Species (including species such as Lake Chub [*Couesius plumbeus*]) ■ Lower Trophic Organisms (e.g., benthic invertebrates)
Social	■ Social Study Plan	■ Housing and Accommodation ■ Community Service and Infrastructure ■ Transportation ■ Community Well-being ■ Populations and Demographics
Economy	■ Economic Study Plan	■ Regional Economy ■ Labour Force and Employment ■ Government Finances
Land and Resource Use	■ Land and Resource Use Study Plan	■ Land Use Compatibility ■ Parks and Protected Areas ■ Extractive Industry ■ Forestry Industry ■ Energy and Linear Infrastructure ■ Recreation and Tourism
Human Health and Community Safety	■ Human Health and Community Safety Study Plan	■ Public Safety ■ Public Health ■ Diet ■ Environmental Factors Influencing Health
Visual Aesthetics	■ Visual Aesthetics Study Plan	■ Visual Contrast / Character ■ Visibility ■ Visual Sensitivity
Archaeological and Cultural Heritage	■ Cultural Heritage Study Plan	■ Archaeological Sites and Resources ■ Built Heritage Resources and Cultural Heritage Landscapes

It should be noted that while there is not a consultation study plan, the Project has developed the *Consultation and Engagement Plan to Support the Environmental Assessment / Impact Statement* (AECOM 2020) (referred to as the Impact Statement [IS] / EA Consultation Plan).

Draft

2. Purpose and Objectives

The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative, direct and indirect) of the Project and alternatives on the environment, determine measures needed to avoid or minimize adverse Project effects and enhance beneficial Project effects where feasible, and to undertake consultation and engagement throughout. The purpose of this Study Plan is to explain:

- A baseline[3] study methodology that will result in a comprehensive description of the existing environment potentially impacted by the Project;
- How efficient and transparent data management and analysis will be undertaken;
- Effects assessment scoping inputs specific to Human Health and Community Safety that will allow for potential effects of the Project on the existing environment to be appropriately assessed in the IS / EA Report; and
- How the Study Plan aligns with federal and provincial requirements and guidance, including the Agency's Tailored Impact Statement Guidelines (TISG), dated February 24, 2020 (the Agency 2020c), for this Project and applicable provincial agency comments on the Draft Terms of Reference (ToR)[4].

As required by the IAA and referenced in TISG Section 7.3, work plans will also be developed for disciplines as required. It is anticipated the work plans will include further details on how to action the study plans; for example they would contain scheduling information.

This Study Plan has been completed to be consistent with the Marten Falls Community Access Road Project TISG that were issued by the Agency. The Human Health and Community Safety Study Plan addresses issues related to:

- Biophysical determinants of health including air quality, noise, vibration, country foods and drinking water; and
- Social determinants of health including:
  - Diet and substance abuse;
  - Access to health services (community and educational services are excluded);
  - Food availability (material circumstances are excluded); and,
  - Psychosocial factors, violence and criminal activity.

3. *Baseline refers to the current conditions of the environment potentially impacted by the Project. Baseline conditions serve as a reference against which changes due the Project are measured.*
4. *If necessary, the Study Plan will be updated to reflect the approved ToR if approval is obtained.*

Draft

Health determinants related to social structures and equity factors will primarily be documented in other plans and reports. Related items not included in this Study Plan, but requested in the TISG, are covered under separate study plans for Social and Economics. Items not included explicitly within this Study Plan may be referenced and considered in the assessment of effects to relevant components of the Social environment such as community well-being.

The Human Health and Community Safety Assessment considers environmental and social determinants of health. In conducting the Human Health and Community Safety Assessment, information from the following disciplines will be considered:

- **Air Quality** – Potential changes to air quality will be considered as part of the human health risk assessment that will be conducted in support of the Human Health and Community Safety Assessment. Changes to air quality may influence human health.
- **Noise** – Potential changes to noise will be considered as part of the Human Health and Community Safety Assessment. Changes to noise may be an annoyance, as defined by Health Canada, to sensitive receptors near the Project activities. Noise related annoyances can have human health implications.
- **Surface Water and Groundwater** – Potential changes to surface water and/or groundwater quality (particularly in relation to drinking water sources) will be considered as part of the human health risk assessment that will be conducted in support of the Human Health and Community Safety Assessment. Changes to surface water and groundwater quality may impact human health.
- **Social Assessment** – Changes to traffic patterns and transportation may have an effect on the health of individuals in the Project area due to the potential for traffic accidents.
- **Economic Assessment** – Potential changes to food price levels and livelihoods of the local communities may alter the diet of those living in local communities.
- **Aboriginal and Treaty Rights and Interests Assessment** – Potential changes to Traditional land use and resource harvesting may influence human health. These changes will be considered in the assessment including social determinants and country food considerations.

Other relevant disciplines may also be considered depending on the nature of the information received, including the Land and Resource Use Assessment.

Draft

For the purposes of establishing appropriate context, the Study Plan begins with background and relevant information on:

- Study Plan related discussions with the Agency, the MECP and applicable agencies to date (**Section 3**);
- The approach to Project consultation and engagement (**Section 4**);
- How Indigenous Knowledge will be collected and used in the IA / EA (**Section 5**); and
- The spatial and temporal boundaries that will be used for the IA / EA (**Section 6**).

2.1 Approach to Handling Confidential Information

2.1.1 Indigenous Knowledge

Permission from the Indigenous community will be sought before including Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. Sensitive and / or confidential information will be specifically collected through the Indigenous Knowledge Program to inform the IS / EA Report, and its use and publication will be governed by Indigenous community-specific Indigenous Knowledge Sharing Agreements. Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared).

2.1.2 Health Information

If applicable, a process for handling confidential health information will be developed. This process will conform to Ownership, Control, Access, Possession (OCAP) (First Nations Information Governance Centre 2020) requirements and will also aim to preserve the confidentiality of individual persons providing information to the Project.

Draft

3. Study Plan Technical Discussions

To facilitate the development of satisfactory study plans and eventually a satisfactory IS / EA Report, MFFN previously submitted draft study plans in an effort to hold technical discussions with the Agency, the MECP and applicable agencies. A summary of technical discussions and correspondence held to date on this Study Plan has been provided in **Table 3-1**.

A technical meeting was held on October 29, 2020 to discuss various aspects of the initial draft Human Health and Community Safety Study Plan. Attendees included representatives of the Agency, Wage and Gender Equality Canada, Health Canada, Indigenous Services Canada, MECP, the Public Health Agency of Canada and the MFFN CAR Project Team.

Table 3-1: Summary of Study Plan Technical Discussions

Attendees / Responsible Party	Correspondence	Discussion Point	Solution
■ **The Agency**	■ Comments received following the Agency review of draft Study Plan.	■ **27-August-2020:** Comments and clarification questions received, including editorial comments, additional information requirements regarding study plan, baseline studies, data collection, Chemicals of Potential Concern and the human health risk assessment.	■ Additional details and clarification provided within the Study Plan, and responses to these comments are attached in **Appendix B**.
■ **MECP**	■ Comments received following the MECP review of draft Study Plan.	■ **08-August-2020:** Comments and clarification questions received, including editorial comments, additional information requirements regarding study design, study areas, Chemicals of Potential Concern and information sources.	■ Additional details and clarification provided within the Study Plan, and responses to these comments are attached in **Appendix B**.
■ **The Agency** ■ **Health Canada** ■ **MECP** ■ **Indigenous Services Canada**	■ Technical discussion of comments received following agency review of draft Study Plan, teleconference meeting.	■ **29-October-2020:** Country Food Tissue Sampling	■ Country food tissue sampling has not yet determined to be necessary, as the potential effects of the Project have not yet been identified. This information will be available through the Human Health Risk Assessment (HHRA).

Draft

Attendees / Responsible Party	Correspondence	Discussion Point	Solution
■ **Women and Gender Equality Canada** ■ **Public Health Agency of Canada** ■ **MFFN CAR Project Team**			The MFFN CAR Project Team will provide the HHRA Problem Formulation and appendices to the Federal Review Team. The MFFN CAR Project Team will give the Agency notice of when to expect the HHRA Problem Formulation. The HHRA Problem Formulation will determine the need for a country food tissue sampling program. **Section 7.2.1** of this Study Plan outlines the approach to the Problem Formulation. ■ A follow-up meeting with the Agency can be scheduled to discuss the results of the HHRA Problem Formulation once it has been reviewed by the Federal Review Team.
		■ **29-October-2020:** Collecting Information on Country Food Harvesting Practices during initial Indigenous consultation activities	■ Information on country food harvesting will be collected as outlined in **Section 7.2.1** of this Study Plan. The primary data will be collected through the Indigenous Knowledge Program and these data will be disaggregated by gender and age.
		■ **29-October-2020:** Community Engagement expectations	■ **Section 4** of this Study Plan includes a summary description of the engagement activities to be undertaken with interested Indigenous communities. Communities will be engaged to determine their interest in potential impacts of the Project on Human Health and Community Safety.
		■ **29-October-2020:** Data Verification and OCAP	■ The MFFN CAR Project Team will consider working with Chief and Council of applicable Indigenous communities and including OCAP principles in the Data Sharing Agreement. Data verification activities will be undertaken with those who provided the information by, for example, the sharing of meeting notes or survey results.

Draft

Attendees / Responsible Party	Correspondence	Discussion Point	Solution
			■ Where possible, the MFFN CAR Project Team will receive written responses for data verification from Indigenous communities. Meaningful opportunities will be provided to communities to respond to the data verification requests and this effort will be reflected in the IS / EA Report.

Draft

4. IS / EA Report Consultation and Engagement Process

4.1 Interested Persons and Government Agencies

The Proponent will provide Project notices and advise of opportunities for consultation and engagement with interested persons[5] which includes, at a minimum, members of the public outlined in the *Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020) (referred to as the Public Participation Plan). This will include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date. Government agencies and interested persons will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. The Project's approach to handling confidential and sensitive information is outlined in **Section 2.1**.

4.2 Indigenous Communities

The Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in **Table 4-1**, which is inclusive of all Indigenous communities identified in the *Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020a) (referred to as the Indigenous Engagement and Partnership Plan).

Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the IS / EA Report so that the Proponent can consider and incorporate, where appropriate Indigenous Knowledge and Indigenous land and resource use information into the Project as it pertains to the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. A variety of activities will be offered so that Indigenous communities are

5. *Interested persons, as defined in the IS / EA Consultation Plan, are individuals and groups (e.g., associations, non-governmental organizations, industry and academia) who could have an interest in the Project, including but not limited to communities in the region, those with commercial interests (e.g., forestry, trappers, outfitters, other mineral tenure holders in the area) and recreational users or those with recreational interest (e.g., campers, hunters and environmental groups).*

Draft

informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. The study plans have recognized Indigenous community input received on the Project to date. Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process.

Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations

Tribal Council Affiliation	Indigenous Community or Organization
Matawa First Nations Management (Nishnawbe Aski Nation)	■ **Marten Falls First Nation** (Proponent and potentially affected Indigenous community) ■ Aroland First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Ginoogaming First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Webequie First Nation
Matawa First Nations Management and the Union of Ontario Indians / Nishnawbe Aski Nation	■ Long Lake #58 First Nation**
Mushkegowuk Council (Nishnawbe Aski Nation)	■ Attawapiskat First Nation ■ Fort Albany First Nation ■ Kashechewan First Nation
Shibogama First Nations Council (Nishnawbe Aski Nation)	■ Kasabonika Lake First Nation ■ Kingfisher Lake First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Wunnumin Lake First Nation
Independent First Nations Alliance (Nishnawbe Aski Nation)	■ Kitchenuhmaykoosib Inninuwug First Nation
Independent First Nations (Nishnawbe Aski Nation)	■ Mishkeegogamang First Nation ■ Weenusk First Nation
Nokiiwin Tribal Council	■ Animbiigoo Zaagi'igan Anishinaabek First Nation *
Métis Nation of Ontario	■ Métis Nation of Ontario; Region 2*
Independent Métis Nation	■ Red Sky Independent Métis Nation*

*Notes: * Indigenous communities or organizations identified by the MECP who should be consulted on the basis that they may be interested in the Community Access Road.*
*** The MECP indicated in a letter to MFFN that Long Lake #58 First Nation was moved from interest-based to rights-based.*

Draft

4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement

To fulfill requirements of the IAA, the Consultation and Engagement Program will consider a diverse range of perspectives from interested persons and interested Indigenous communities and their members identified in the Agency's Indigenous Engagement and Partnership Plan and the Public Participation Plan. This will include at a minimum providing ongoing opportunities for engagement to:

- **Neighbouring Indigenous communities, including relevant subpopulations:**
  - Women;
  - Youth; and
  - Elders.
- **Non-Indigenous communities including:**
  - Women;
  - Youth; and
  - Activity-based subgroups (e.g., recreationalists, snowmobilers, tourism establishment operators).

The Proponent will also consult and engage with other subpopulations identified by communities during consultation and engagement. The information from these activities and any additional identity groups identified by communities through consultation and engagement will be considered by applicable environmental disciplines for the purposes of data collection and considering disproportionate effects.

During consultation and engagement, these aforementioned groups will be consulted and engaged with on targeted input**.** Specialized knowledge will be gathered through other disciplines such as Social, Economic, Land and Resource Use and Aboriginal and Treaty Rights and Interests that will support the Human Health and Community Safety assessment. The data collection programs for these disciplines is expected to include targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in socio-economic secondary data. These diverse populations include the aforementioned identity groups, which are also referenced in the IS / EA Consultation Plan, and those identified by communities during consultation and engagement. Subject to interest, community-led primary data collection and secondary data sharing for Indigenous Knowledge and Indigenous land and resource use will be completed through the Indigenous Knowledge Program and associated materials (see **Section 5**).

Draft

When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan. Specific to Gender-Based Analysis Plus (GBA+) objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement.

4.4 Consultation on Human Health and Safety

In conjunction with the Indigenous Knowledge Program and the Consultation and Engagement Program, information will be solicited on country food harvesting and consumption patterns for all age and gender categories. This information will be collected from Indigenous communities who have identified use of land within applicable areas of Project impact. If outcomes of this consultation effort are not sufficiently detailed, they may be used to guide the development of more detailed and specific surveys within applicable Indigenous communities.

Draft

5. Consideration of Indigenous Knowledge in the IS / EA Report

The following provides a general description of how Indigenous Knowledge will be considered in the IA / EA process. The extent to which Indigenous Knowledge is considered by each specific VC will vary depending on the nature of the VC, the potential for Project effects on the VC and whether Indigenous Knowledge that relates to a VC is provided / obtained. As such, not all aspects of the general approach described below may apply to all VCs / study plans.

There are two concurrent and complementary avenues for Indigenous communities and groups to be engaged with and provide input on the Project: the Indigenous Knowledge Program and the Consultation and Engagement Program. Both programs serve to support the collection of Indigenous perspectives, values, and input on the Project, including Aboriginal and Treaty Rights and how they may be impacted by the Project, to be integrated throughout the IA / EA process. However, the Indigenous Knowledge Program specifically aims to solicit and incorporate information that is considered sensitive and may have confidentiality requirements, including Indigenous Knowledge and information on Indigenous land and resource use. Indigenous Knowledge Sharing Agreements will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information.

All Indigenous communities and groups identified by the MECP and the Agency through the Indigenous Engagement and Partnership Plan have the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the Project, and / or complete Project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program includes opportunities for Indigenous communities and groups to meet with the Proponent to discuss the program, ask questions, and share concerns and interests. In support of this, the Proponent has created an Indigenous Knowledge Program Guidance Document (the Guidance Document) that provides:

- An overview of the Indigenous Knowledge Program and information on how Indigenous Knowledge, Indigenous land and resource use and cultural values and practices can be collected and / or shared;

Draft

- Information on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values and practices may be used in the planning and design processes; and
- A suite of guidance materials that were developed based on the information requirements of both the federal and provincial assessment processes, including: question guides to support the collection of information on historical and current community context; Indigenous Knowledge that may be relevant to the various technical disciplines; information on Indigenous land and resource use, cultural values and practices and associated spatial data; and perspective on potential Project-related effects and associated mitigation and / or enhancement measures.

The Guidance Document will also support participating Indigenous communities in providing Project-specific information in a manner that facilitates meaningful incorporation into the IS / EA Report.

The IS / EA Consultation Plan outlines the process for obtaining information and feedback about the Project from Indigenous communities (i.e., the Consultation and Engagement Program). All Indigenous communities identified by the MECP and the Agency have the opportunity to participate in the Consultation and Engagement Program through community-specific meetings, Public Information Centres, web conferences, and other formats. All Indigenous communities identified by the MECP and the Agency will be provided information related to the Project and invited to participate at various points throughout the IA / EA process.

There are also opportunities for technical teams to engage with Indigenous communities to solicit perspectives and information relevant to the Project, including information related to collection of existing information and the development of the IS / EA Report. The Proponent also invites feedback and inputs throughout the Project via the Project website and ongoing communications with the Proponent.

The Indigenous Knowledge and Consultation and Engagement programs are designed to be complementary and provide multiple opportunities for communities to offer feedback and information, including perspectives on Aboriginal and Treaty Rights and interests and how these may be impacted by the proposed Project. Relevant information collected through both the Indigenous Knowledge and Consultation and Engagement programs, including potential effect pathways on Aboriginal and Treaty Rights and interests, will be shared with each of the relevant disciplines throughout the IA / EA to: guide and inform VCs; support characterization of the existing environment; identify the potential effects of the Project on VCs; help identify mitigation measures and potential monitoring programs; and ultimately guide Project planning. The nature of how the Indigenous Knowledge becomes integrated into the IS / EA Report will be dictated by the specific information provided by each Indigenous community and the parameters set out in

Draft

the Indigenous Knowledge Sharing Agreements. A description of how Indigenous Knowledge was considered in the IA / EA and in each of the technical discipline areas will be included in the IS / EA Report.

It is also important to note that information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs, given the interrelated nature of Indigenous peoples and other environmental disciplines.

The Proponent will strive to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values will become part of the IS / EA Report, and how potential effects to Aboriginal and Treaty Rights and interests will be assessed. It is expected that measures to support this may include but are not limited to: engaging Indigenous communities to solicit information on Indigenous Knowledge and Indigenous land and resource use and cultural values to inform baseline conditions, providing Indigenous communities with draft sections of the IS / EA Report to illustrate how Indigenous Knowledge and information on Indigenous land and resource use and cultural values has been integrated and to confirm it has been presented appropriately, and completing collaborative working sessions with Indigenous communities for the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights will be assessed is provided in the Aboriginal and Treaty Rights and Interests Study Plan.

Draft

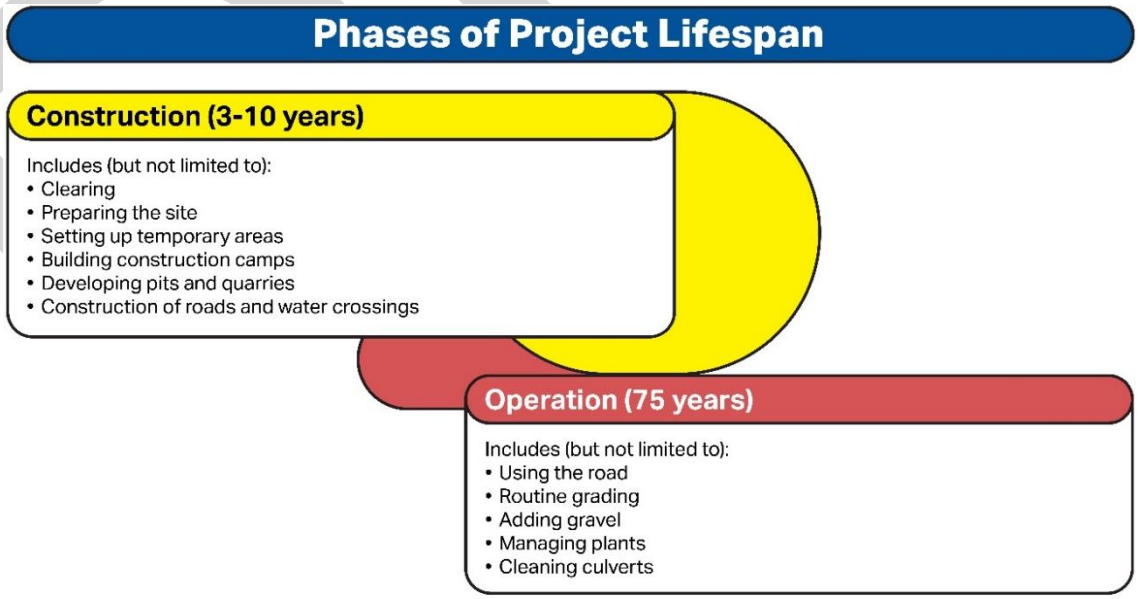
6. Assessment Boundaries

6.1 Temporal Boundaries: Project Phases

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the Project will be considered in the IS / EA Report. The Project is planned to occur in two phases, which are briefly described below and shown in **Figure 6-1**.

- **Construction Phase:**
  The time from start of construction, including site preparation activities, to the start of operations and maintenance of the CAR. Decommissioning of construction works is included in the construction phase. The construction phase is anticipated to take approximately 3 to 10 years to complete.
- **Operations and Maintenance Phase:**
  The operations and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The operations and maintenance phase of the Project is considered to be 75 years based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.

Figure 6-1: Project Schedule



Draft

There are currently no plans to decommission the CAR as there is no expected / known end date for its need. Therefore, future suspension, decommissioning and eventual abandonment of the CAR will not be considered in the IS / EA Report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long operations and maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations (Sustainability Principle #2[6]). The final temporal boundaries to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation process.

6.2 Spatial Boundaries: Study Areas

6.2.1 General Information

Study areas identify the geographic extents within which potential effects of the Project are likely to occur and will be considered in the IS / EA Report. The existing conditions and potential effects are documented for three study areas selected for the Project:

- **Project Development Area (PDA):** area of direct disturbance;
- **Local Study Area (LSA):** the area where most of the direct effects of the Project are likely to occur; and
- **Regional Study Area (RSA):** the area where indirect effects of the Project are likely to occur.

The PDA encompasses the 100 metre wide CAR right-of-way (ROW), temporary construction access roads, work areas, worker camps, and pits, quarries and associated access roads. The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4. The preliminary study area generally allows for the documentation of existing conditions and prediction of potential environmental effects for the Project. A 5 km wide study area also allows for route refinements during development of Project design (e.g., adjustment of the alignment to avoid sensitive features).

The specific location of Project components, including the roadway, quarries, pits and temporary infrastructure, are not yet known and will be included in the IS / EA Report. While most of the Project

6. *Sustainability Principles #2 is one of four sustainability principles included in Section 25 of the Project's TISG as further elaborated on in Section 9.7.*

Draft

components are expected to be located within the preliminary 5 km wide study area, benefits (e.g., reduced environmental disturbance, avoidance of sensitive features, technical considerations, concerns received through consultation) for locating Project components on lands outside of the 5 km wide study area may become known during the IA / EA process. If the need to locate Project components outside the 5 km wide study area is determined to be required or of benefit to the Project, the study area would be adjusted.

The study area for each environmental discipline may vary from the above-described general study area based on the potential for the Project to directly or indirectly affect each environmental discipline; therefore, discipline-specific LSAs and RSAs have been defined for the Project. In defining the final LSAs and RSAs, each environmental discipline will consider:

- Location and other characteristics of the environmental discipline relative to the Project;
- The anticipated extent of the potential Project effects;
- Federal, provincial, regional, and local government administrative boundaries;
- Indigenous groups listed in **Table 4-1**;
- Community knowledge and Indigenous Knowledge;
- Current or traditional land and resource use by Indigenous communities;
- Exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices; and
- Physical, ecological, technical, social, health, economic and cultural considerations.

The study areas included in this document are preliminary, covering the extent to which readily available information suggests the Project may have noticeable effects on the environment. The size, nature and location of past, present and reasonably foreseeable projects will be taken into consideration in the development of the cumulative effects assessment study area(s). The appropriate study area(s) to assess cumulative effects are dependent on the VCs predicted to have direct residual adverse effects as a result of the Project, and therefore, cannot be defined until the IS / EA Report has sufficiently advanced.

Relevant information related to construction and operation will be described as it relates to the PDA. However, much of the social determinants of health analysis will focus on communities, particularly those in the LSA. Detailed community health profiles will be developed for communities listed in the Community Health LSA. The Community Health RSA will be profiled in less detail with key interactions and thematic information provided. Statistics collected on the RSA will focus on larger regional areas such as unorganized regional districts. While many Indigenous communities are located within the RSA, these communities will not be profiled individually.

Draft

The Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in human health and community safety effects. To be included in the Community Health LSA, a community must demonstrate direct community-level health or social-economic interest in the Project footprint; from changing access to the MFFN community due to the Project; or due to potential direct and indirect effects Project effects on the environment that impact the human health and community safety environment. Considerations related to future mining activity or access to potential mining opportunities beyond the relevant local study areas will be reflected in the Community Health RSA. Based on the information provided, the Proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas.

Members in other communities who are involved in land use activities within the Project area are being assessed and considered under the Aboriginal Treaty Rights and Interests Assessment, and Land and Resource Use Assessment.

As further detailed in **Section 4**, the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs.

6.2.2 Human Health and Community Safety Study Areas

The LSA and RSA boundaries for the Human Health and Community Safety study, which includes the Human Health Risk Assessment (HHRA), are detailed in **Table 6-1** and shown on **Figure 6-2**. These boundaries are intended to be a starting point, and areas of interest and concerns related to the Project will be confirmed as information is gathered. It is anticipated that the HHRA will consider each community separately. However, if there are many common features and conditions across the communities, the HHRA may assess a more generic community that represents and applies to all individual communities, in a conservative manner. Rationale will be provided to support whichever approach to the HHRA of study area communities is ultimately undertaken.

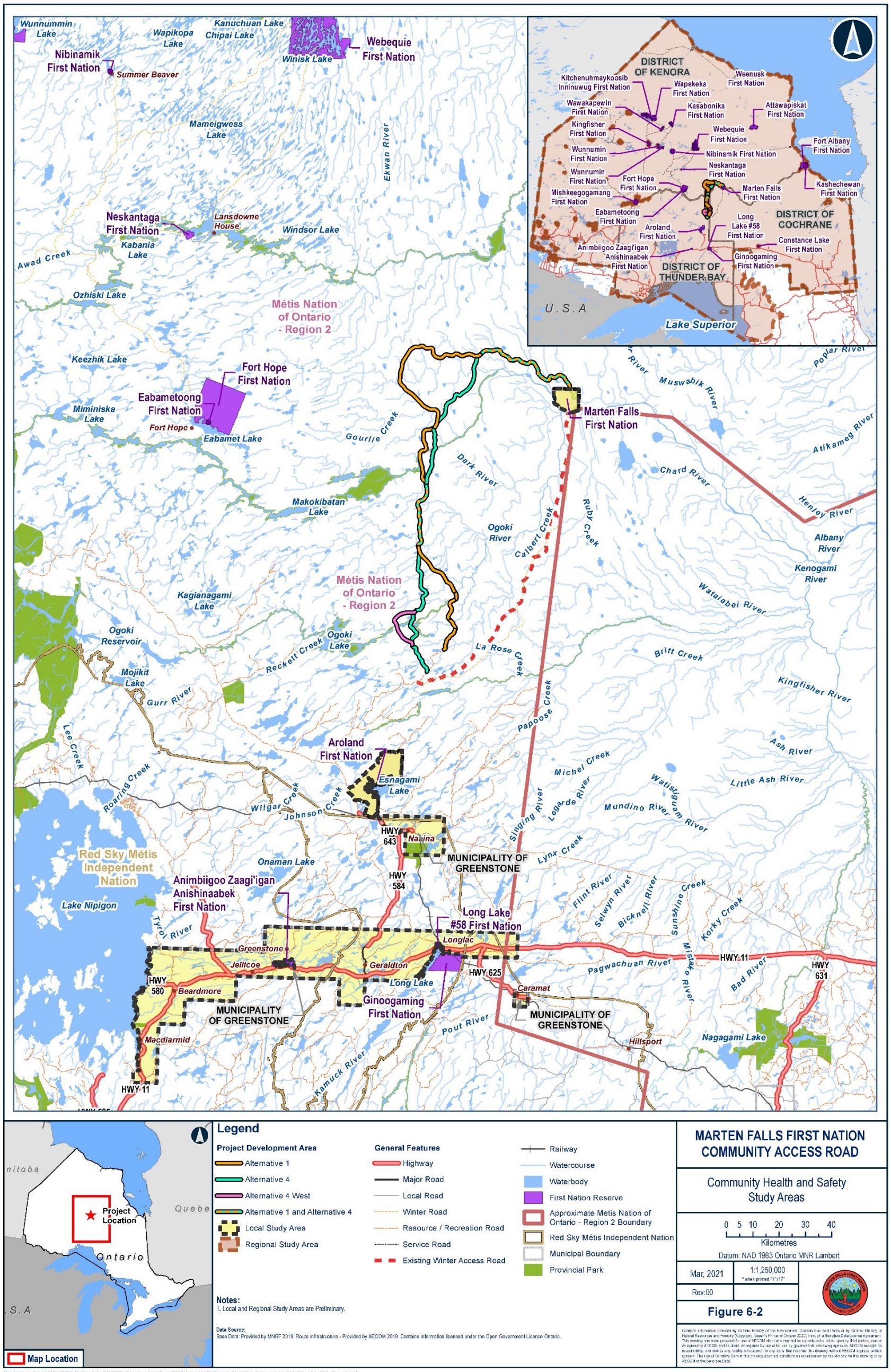
Table 6-1: Human Health and Community Safety Study Areas

Study Area	Geographic Extent	Rationale
Community Health LSA	■ The communities of: • MFFN; • Aroland First Nation; and • Municipality of Greenstone.	■ These communities are likely to have observable changes in health due to construction and / or the increased access to lands and communities associated with the Project. Increased access to services may place additional strain on the regional service centre.

Study Area	Geographic Extent	Rationale
Community Health RSA	■ The unorganized regional districts of: – Kenora, including the following Indigenous communities: • Attawapiskat First Nation • Eabametoong First Nation • Kasabonika First Nation • Kashechewan First Nation • Kitchenuhmaykoosib Inninuwug • Kingfisher Lake Fist Nation • MFFN • Mishkeegogamang First Nation • Neskantaga First Nation • Nibinamik First Nation • Wapekeka First Nation • Wawakapewin First Nation • Webequie First Nation • Weenusk First Nation • Wunnumin Lake First Nation – Thunder Bay, including the following Indigenous communities: • Animbiigoo Zaagi'igan Anishinaabek First Nation • Aroland First Nation • Ginoogaming First Nation • Long Lake #58 First Nation • Red Sky Independent Métis Nation • Métis Nation of Ontario, Region 2	■ Communities in these regions could be impacted from the Project (e.g., through employment opportunities and / or change in demand for regional health services).
Environmental Health LSA	■ The maximum boundary of the air quality, noise, and surface water local study areas.	■ Changes to the air quality, noise levels and surface water quality in the Project area may impact the health of individuals near the Project.
Environmental Health RSA	■ The maximum boundary of the air quality, and surface water regional study areas.	■ Changes to the air quality, and surface water quality in the Project area may impact the health of individuals near the Project.

Draft

Figure 6-2: Human Health and Community Safety Local and Regional Study Areas



7. Baseline Study Design

7.1 Desktop Assessment

A desktop review of existing information sources will be completed to identify information gaps that will need to be addressed through further study including potentially primary data collection activities. A preliminary list of applicable information sources has been included in Appendix A and reflects federal and provincial guidance received to date. This Study Plan focuses on the additional studies that are anticipated to be required to gather information beyond what is currently available through existing information sources, including those as described in Section 7.2 'Sources of baseline information' in the Agency's TISG for this Project.

7.1.1 Secondary Data Collection

Secondary source data will be collected for relevant land use activities within the Project area. The information will be collected for the purposes of assessing the effects of the Project on human health and community safety. The secondary data will be collected from:

- Statistics Canada;
- Municipal, provincial and Indigenous government / community websites;
- Municipal plans and reports;
- Provincial plans and reports;
- Local service providers;
- Regional reports;
- Industry reports;
- Academic research;
- Web-based sources such as firm websites; and,
- Previous relevant EAs.

Other secondary data sources publicly and readily available will also be considered and utilized as applicable. This will include sources identified in Appendix 1 of the TISG.

Draft

Data collected from secondary sources will be disaggregated when available and analyzed to cover a diverse range of subgroups applicable to the Project area. Attention will be paid to norms, roles and relations, power structures, and needs, constraints and opportunities. The purpose of the disaggregation will be to understand disproportionate effects that may result from the Project.

7.1.2 Primary Data Collection

7.1.2.1 Social Determinants of Health

The Public Health Agency of Canada advises that social determinants of health are the broad range of personal, social, economic and environmental factors that determine individual and population health. The main determinants of health include[7]:

1. Income and social status
2. Employment and working conditions
3. Education and literacy
4. Childhood experiences
5. Physical environments
6. Social supports and coping skills
7. Healthy behaviours
8. Access to health services
9. Biology and genetic endowment
10. Gender
11. Culture
12. Race / Racism

Social determinants of health refer to a specific group of social and economic factors within the broader determinants of health. These relate to an individual's place in society, such as income, education or employment. Experiences of discrimination, racism and historical trauma are important social determinants of health for certain groups such as Indigenous peoples. Data on the above factors will be collected to establish baseline conditions for communities in the Community Health LSA from which to assess whether the Project is likely to result in changes to any of these factors which could in turn impact health conditions.

7. https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html

Draft

Primary data collection will include field work to collect qualitative data on the social determinants of health with communities in the Community Health LSA. The MFFN CAR Project Team will undertake community visits for the purpose of data collection. The community visits are expected to include interviews, focus groups and other discussions with key community members to provide information on the social, health and safety related issues. The community visits will include:

- Data collection methods including interviews, focus groups and surveys designed with respect to cultural norms and the social and economic situation in a community;
- Focused data collection on gaps identified in the secondary sources related to criteria and indicators such as quality factors for services and infrastructure;
- Community consultation coordinators integrated in the data collection process to improve capacity;
- Engagement with knowledge holders including community government officials such as Chief, Council and band office staff;
- Engagement with relevant identity groups for the community including women, youth and elders, if culturally appropriate;
- Engagement with Indigenous community consultation co-ordinators to verify if the approach is applicable to the community and receive feedback prior to commencing activities; and,
- Cultural norms and participant confidentiality respected in all activities.

Primary data collection activities will be aligned with OCAP principles in relation to the protection of personal information collected for the IS / EA Report.

As part of the primary data collection program, information on the use of country foods will be collected from communities in the Community Health LSA and the potential for the Project to impact this will be assessed. These data collection program will be coordinated with the program to collect Indigenous Knowledge. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting. The specific details on the program to collect the information are to be developed.

Primary data collection will also explore mental health considerations and perceptions of risk as they relate to a road project.

The specific scope of the primary data collection program will be informed by the final community health study areas. However, it is anticipated data collection will focus on the communities most likely to be impacted by the Project including MFFN and Aroland First Nation. Primary data will also be collected in the

Draft

regional service centre of Geraldton. These communities are likely to experience the most Project-related change due to the location of the Project and its resulting access. Other communities could be included with the Community Health LSA as previously noted in this Study Plan (**Section 6.2**).

The primary data collection will be informed by the same objectives as the overall data collection. However, the primary data collection program will have the added focuses of filling gaps identified in secondary data and informing further secondary data collection based on issue-specific items raised through primary data collection. This includes the collection of Indigenous and local knowledge of the Social and Economic environments, disaggregated qualitative data by identity factors when volunteered and other information relevant to understanding the current state of human health and safety conditions in the Project area.

Data used in the Social Determinants of Health Assessment will be disaggregated (where possible) and analyzed to understand differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives related to the social determinants of health VCs and indicators. Those who provide information will be provided with the opportunity to validate that the information has been accurately recorded.

7.1.2.2 Tissue Sampling

The TISG references the need to undertake a tissue sampling program. If the problem formulation step of the HHRA identifies that an assessment of country food consumption is required, a tissue sampling program will be developed. This program will involve working with Indigenous communities to collect appropriate tissue samples from commonly harvested game species. The Proponent will advise the Agency of the results of the HHRA problem formulation step in regard to the needs for a tissue sampling program.

7.2 Study Methods

As noted in the TISG, human health effects are connected to environmental, social and economic effects. Human health effects are divided into two categories: social determinants of health and environmental determinants of health – though there may be interplay between effects. These effects will consider the biophysical, social and economic effects as they are related to health. These considerations will also consider perceptions of harm and the perceived risk to health. Throughout these assessments, GBA+ will be used to consider effects to disaggregated populations and will consider Indigenous Knowledge. The assessment will consider and utilize the sources and methods included in the TISG including Appendix 1.

Considering that the proposed Project is to construct and operate a new access road to the MFFN community, the main health and safety concerns related to the Project that will be the focus of the IA / EA

include: public safety related to vehicle use of the road once operational; changes in diet of community members; changes in public health conditions / services; and changes to environmental conditions (e.g., air emissions, noise, water / soil contamination from use of fuels / lubricants during road construction and during road operation).

7.2.1 Social Determinants of Health

The Social Determinants of Health Assessment will assess potential Project impacts using the same methodologies and frameworks as the larger Project IS / EA Report as described in the MFCAR Effects Assessment Methodology document. As per the TISG, the assessment will include:

- Predicted effects on the key criteria and indicators;
- Consideration of existing conditions data and impact assessments for criteria and indictors from other relevant reports. These include Social, Economy, Land and Resource Use Assessments and Indigenous Knowledge. The considerations include levels of health as described in the TISG such as:
  - Level-1 health determinants related to behavioural factors
  - Level-2 health determinants related to access to services
  - Level-2 health determinants related to material circumstances (economic factors)
  - Level-2 health determinants related to psychosocial factors for well-being
  - Level-3 health determinants related to structural and equity factors

These factors will be influenced by the GBA+ assessment and consider feedback from stakeholders and Indigenous communities.

- Assess disproportionate effects using a GBA+ framework such as the Public Health Agency of Canada Health Inequalities Tool;
- Consider relevance of the Project to existing plans and aspirational community goals;
- Define impact management measures with respect to diverse subgroups, where applicable and feasible (see below); and
- Consider future expenditure related to new community facilities, services and / or infrastructure due to Project effects.

It is recognized that the Project could impact the mental well-being of people in the potentially affected communities. This could result from a variety of factors including for example: improved social connections;

Draft

presence of outsiders in the community; changes in valued environmental features; concerns of impact on future generations; and feelings regarding change to the remoteness of the community. Related issues such as teen suicides and the impact that the Project could have on suicide rates will be considered.

As an initial step, potential effect pathways will be determined to provide a framework for the assessment of impact on the social determinants of health. It is expected that the MFFN community is the community most likely to experience changes to social determinants of health at it is the only community that will experience access changes. It is also noted that MFFN is the Proponent for the Project. Considering that the project will involve improved access to MFFN, the following are examples of pathways to be explored.

- Employment opportunities could improve and incomes could rise for more community members;
- There may be improved access to education opportunities;
- The potential for improved social support systems in the MFFN community; and
- Improved access to health services.

The Social Determinants of Health Assessment will be informed by academic literature, best practices in social impact assessment and previous similar IA / EAs. The methodology to complete the Social Determinants of Health Assessment will include gathering local knowledge and utilising consultation processes to analyze the concerns of interested and affected communities related to the VCs and indicators. Community stakeholders in the Community Health LSA and RSA will be involved in the assessment of health impacts, the analysis of alternatives, and the preparation of mitigation and monitoring plans.

7.2.2 Environmental Determinants of Health

To evaluate Environmental Determinants of Human Health, a human health risk assessment (HHRA) framework will be applied. This will include the problem formulation step of HHRA, which will be conducted to identify potential chemicals, exposure pathways, environmental media (e.g., air, soil, surface water, groundwater) and human receptors that may require evaluation.

Given requirements for recent IA / EAs of road projects, it is anticipated that there will be a need to at least conduct a focused HHRA of air emissions during Project construction and operations phases.

All HHRAs have several key steps, as follows:

- Problem Formulation
- Exposure Assessment

Draft

- Hazard (Toxicity) Assessment
- Risk Characterization
- Risk Management or Remedial Recommendations

As an initial step towards determining if a HHRA study is necessary or has sufficient data to proceed, a problem formulation (the first step in the HHRA process) will be conducted. Problem formulation steps do not involve exposure or risk modelling, but rather, focus on the key inputs into a HHRA. A problem formulation determines whether or not there are human receptors, environmental media, exposure pathways, chemicals of concern, or other stakeholder concerns, that should be evaluated in relation to the Project. If the problem formulation determines that a HHRA is required, then a HHRA study would be conducted according to current Health Canada guidance documents and recommended approaches. In that event, the Agency would be consulted for input. In addition, there would be community engagement activities. These activities would inform the communities on the HHRA plan and would also collect data from the communities to inform the HHRA, such that it reflects local land use patterns and human activities to the extent possible. There would also be community engagement to inform the communities of HHRA outcomes, and any recommended further assessment activities or mitigation. If the problem formulation determines that a HHRA study is not warranted in relation to the Project, rationale will be provided.

The HHRA problem formulation step provides the foundation for carrying out a HHRA study. Key tasks that comprise problem formulation are briefly described as follows:

- **Compiling of Issues of Concern**: Based on the outcomes of community engagement programs, human health-related issues of concern would be compiled and tabulated. The documented issues would be considered in the subsequent tasks of problem formulation with respect to whether or not and how they could be evaluated using HHRA tools and methods.
- **Study Area Characterization**: This task comprises a review of study area information and relevant documentation that pertains primarily to potential human exposure to chemicals in study area environmental media. This would include identifying contamination sources in relation to the Project and reviewing study area environmental media chemistry data that has been collected or estimated to date. This task would also include a data gap analysis. Data gap assessment is imperative to help to ensure that study area environmental media chemistry data are adequate and appropriate for risk assessment purposes. If key data gaps are identified, supplemental data collection may be necessary (if practical) to fill such gaps prior to commencing with further HHRA tasks and steps. If supplemental field investigations are required (e.g., for purposes of collecting study area soil, water, and / or country food item chemistry data), such investigations and programs will be scoped and designed to enable adequate data for HHRA purposes. Efforts will

Draft

be made, wherever possible, to retain study area Indigenous community members and / or staff for assistance / capacity building with respect to designing and implementing such field programs.

- **Selection of Exposure Pathways and Routes**: This task would be conducted via review and consideration of: study area baseline environmental media chemistry data (if available); locations of previously impacted areas within the study area (should any exist); Project emissions profiles or inventories (sources and types of emissions, and estimated emission rates and concentrations in study area media); physical-chemical, environmental fate and behaviour, and toxicological properties of contaminants of interest that may be present in study area environmental media and in Project emissions profiles / inventories; land uses with the study area including access constraints (if any); biophysical study area features that may affect exposure to Project-associated contaminants (e.g., surface coverings such as soil and vegetation, drainage / flow patterns, soil texture, depth to groundwater); groundwater use (potable or non-potable); surface water (potable or non-potable) use and presence or proximity to surface water bodies; proximity of receptor locations (e.g., residences, camps / cabins, hunting / fishing / harvesting locations) to Project emissions sources; areal extent of study area potentially impacted by Project emissions.
- **Identification of Chemicals of Potential Concern (COPCs):** This task would review Project emissions inventories / profiles and screen them to identify chemicals within emissions that may pose a potential human health concern. Various screening tools would be applied to applicable study area environmental media, as necessary, to identify chemicals in these media that may pose a human health concern. Screening tools and considerations would be expected to include the following: application of regulatory Canadian benchmarks (including federal and Ontario benchmarks) for air, soil, and drinking water benchmarks that are derived to be protective of human health; comparison of study area environmental chemistry data to environmental chemistry data for reference (background) areas (if such data are available); physical-chemical and environmental fate and behaviour properties of the emissions / contaminants of interest (e.g., partitioning to different media, degradation / transformations, tendency to bioaccumulate or biomagnify); essential nutrient status; ubiquity of certain chemicals in certain media; statistical and spatial relationships of contaminants in environmental media; local geology / geochemistry; speciation (chemical forms) of contaminants in study area environmental media.
- **Selection of Exposure Scenarios**: This task reviews and considers outcomes of study area characterization, exposure pathway and route selection, and COPC identification steps of problem formulation, as well as consideration of applicable regulatory HHRA guidance. The exposure scenarios in a HHRA must reflect the means by which human receptors are most likely

DRAFT

to come into contact with chemicals in study area environmental media and / or locally harvested food items, as a function of study area access and use patterns. Outcomes of community engagement and key IA / EA component studies will be used to refine the development of exposure scenarios.

- **Selection and Characterization of Human Receptors**: This task also reviews and considers the outcomes of study area characterization, exposure pathway and route selection, and COPC identification steps of problem formulation, as well as consideration of applicable regulatory HHRA guidance. This step also considers various behavioural and physiological factors that might increase a particular human receptors' COPC exposures relative to others, as well as the known sensitivity of certain human life stages to chemical exposures. Outcomes of community engagement will be used to refine the selection of relevant human receptors and receptor life stages within the HHRA. All potentially vulnerable human life stages would be considered.
- **Development of Conceptual Exposure Model (CEM):** This task summarizes the information from the previous steps of problem formulation in a simple visual manner that provides a representation of potential exposure pathways that link the identified COPCs to the human receptors of interest. CEMs are commonly revised and refined as the HHRA progresses, and as additional study area data are collected. The outcomes of community engagement will be used to refine and develop the CEM for the HHRA.

As noted previously, a HHRA of construction and operations phase air emissions is potentially necessary. Based on knowledge of HHRAs conducted in support of IAs of similar projects, air emissions during the Project construction phase are considered likely to comprise the Project COPCs for the most part, recognizing that additional or different COPCs may potentially be identified for the operations phase, or in other study area media as well. The key COPCs present in construction phase air emissions (from diesel and gasoline powered vehicles and equipment) would be anticipated to include the following:

- Nitrogen oxides (NOx);
- Particulate matter (e.g., PM2.5, PM10, total suspended particulate);
- Carbon monoxide (CO);
- Sulphur dioxide (SO2);
- Diesel particulate matter (DPM);
- Benzene, toluene, ethylbenzene, and xylene (BTEX); and,
- Polycyclic aromatic hydrocarbons (PAHs).

Draft

Construction phase air emissions would be temporary and likely highly localized to the areas of work during the specific timeframes planned for each section of road development. Following construction, the operation of the CAR would also contribute changes in local air quality from the use of the road by vehicular traffic (i.e., all-season availability compared to current use of winter road only). The emissions of interest would be expected to be the same as those during the construction phase.

If a HHRA beyond an evaluation of construction and operations phase air emissions is warranted (following the completion of the HHRA problem formulation step), it is expected that such a study may consider the environmental media of: outdoor ambient air, soil, surface water, sediments, drinking water, and potentially country foods. A more comprehensive HHRA, if necessary, would also be expected to consider all human receptor age classes (i.e., infant, toddler, child, adolescent, adult) for both males and females. Potential exposure pathways that would likely be considered in a more comprehensive HHRA include:

- Soil ingestion / dermal contact;
- Drinking water ingestion;
- Outdoor air and dusts inhalation; and,
- Country foods ingestion.

In the event that country foods ingestion warrants evaluation in a HHRA (if determined during the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities (i.e., traditional country food harvesting patterns), and what times of year (seasonal versus year-round harvesting). Such a survey could also determine the harvesting locations of country food items, which would inform whether or not the Project is likely to influence country food contamination at a given harvesting location. While efforts will be made to collect information on harvesting patterns during engagement and consultation activities, it is recognized that the information obtained through such programs may yield limited or insufficient data towards developing adequately robust consumption rates, frequencies and scenarios for HHRA purposes. In that event, more detailed dietary surveys would need to be developed and administered. However, it is anticipated that engagement and consultation programs could yield information that would be helpful in identifying / determining the need for potential community diet surveys, identifying key harvested food items, and identifying the key harvesting locations. If diet surveys are conducted, they will be designed to be stratified by age class and by gender, recognizing that there are often differences in country food consumption patterns between males and females and between age classes.

Draft

Country food items of interest may include but not necessarily be limited to various bird and mammal game species, fish, berries and various other traditional plants.

In the event that dietary surveys are not feasible to conduct, consideration will be given to using surrogate data from First Nations Food, Nutrition & Environment Study (FNFNES 2021) programs in order to estimate COPC exposures from country food item consumption exposure pathways. It is recognized that this is not ideal and not community-specific, but may become necessary.

A comprehensive HHRA, if necessary, would be anticipated to consider Project emissions and contaminants that are additional to those related to vehicle and equipment air emissions. This may include substances that may be already present in study area media (under baseline study area conditions), due to historical land uses within the Project footprint (including previous mineral exploration sites, or due to existing natural geological hazards). A comprehensive HHRA may also be anticipated to investigate the potential for Project-associated emissions to release or mobilize certain chemicals that may bioaccumulate in fish species that are harvested and consumed by local Indigenous communities.

If a comprehensive HHRA is deemed unnecessary following the completion of the problem formulation step (e.g., due to lack of operable exposure pathways, lack of identified chemicals of concern in relevant study area media), rationale will be provided and communicated to the Agency. Similarly, if certain chemicals, exposure pathways and receptors are deemed unnecessary to evaluate in certain media, or if there is reason to deviate from or modify Health Canada-recommended approaches, rationale will be provided for such exclusions and / or changes.

It is possible that a HHRA study may be deemed unnecessary for technical reasons (such as lack of exposure pathways or lack of chemicals of concern in study area media), but still be conducted to enable addressing public or other stakeholder concerns raised about human health issues. This would only occur though if HHRA tools and methods are capable of addressing the issue(s) effectively. The HHRA problem formulation step would inventory and list all documented public and other stakeholder concerns that relate to Project human health effects, and these concerns would be considered for all problem formulation tasks.

To facilitate communication regarding a HHRA study potentially being unnecessary, various checklists provided in Health Canada HHRA guidance documentation would be completed and provided.

Draft

8. Data Management and Analysis

Data management including quality assurance / quality control (QA / QC) will be employed to minimize potential for data entry and analysis errors, prepare data sets for analysis and limit sensitive data distribution in accordance to established agreements.

It is expected that there will be a multitude of data issues and limitations based on the Project area. This may include:

- The suppression of data by Statistics Canada due to low population numbers, particularly when disaggregating data related to income and other sensitive factors;
- Individuals volunteering to self-identify during the primary data collection program to support disaggregated data reporting; and,
- Community-specific research and planning documentation to support all elements of data collection including community-specific studies and specialized plans.

These issues may limit the information available to be reported by the Proponent as part of the IS / EA Report, particularly related to disaggregated data to support a GBA+ analysis. None of these issues are likely to limit the ability of the Proponent to assess Human Health and Community Safety effects but may result in more frequent assumptions related to the applicability of data across communities.

Draft

9. Effects Assessment

The following sections provide discipline-specific input and considerations as they pertain to the methodology for effects assessment. The Project is in the early stage of the IS / EA Report preparation and it is expected that the effects assessment methodology will be refined iteratively based on regulatory agency guidance, professional judgment and input received through the Project consultation and engagement process.

9.1 Project-Environment Interactions

The Project activities that may result in changes to the environment are described within the identified temporal and spatial boundaries. This includes identification of both direct and indirect changes by comparing the existing setting to the conditions anticipated to occur as a result of the Project. For each environmental discipline, the likely Project-environment interactions will be identified based on professional judgment, activities listed in TISG Section 3.2 as well as projects of similar magnitude and / or location.

A preliminary analysis of Project-environment interactions for the Human Health and Community Safety discipline is provided in **Table 9-1** and will be confirmed during the IA / EA process to identify the Project-environment interactions that are likely to have a potential effect, and to identify measures to avoid or minimize potential negative effects and enhance benefits.

Table 9-1: Project – Environment Interactions

Project Phases	Project Activities	Human Health and Community Safety Discipline
Construction Phase	*Mobilization of Equipment and Supplies*	**X**
	Temporary Construction Staging Areas[1]	**X**
	Temporary Access Roads and Trails[1]	**X**
	Temporary Construction Camps[1]	**X**
	ROW Clearing and Grubbing	**X**
	Brush and Timber Disposal	**X**
	Pits and Quarries[1]	**X**
	Drilling / Blasting / Aggregate Production	**X**
	Road Construction (stripping, subgrade excavation, embankment fill placement, grading, ditching)	**X**
	Bridge and Culvert Installation (approach embankments, foundations, substructures, superstructures, traffic protection, erosion controls)	**X**
	Construction Site Restoration	**X**

Draft

Project Phases	Project Activities	Human Health and Community Safety Discipline
Construction Phase: Decommissioning	*Pits and Quarries*	**X**
	Temporary Camps, Roads / Trails and Staging Areas	**X**
Operations Phase	*Road Usage*	**X**
	Maintenance[2]	**X**

Notes: 1. Includes construction and use of
2. Includes General Maintenance (e.g., grading, erosion control, quarrying, borrow pits), Seasonal Maintenance (e.g., snow clearing, bridge and culvert maintenance), and Special Maintenance (e.g., slope failures, road settlement / break-up.).

9.2 Valued Components and Indicators

VCs are the environmental, health, social, economic or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and are of concern or value to the public, Indigenous peoples, federal authorities and interested parties (the Agency 2020b). Indicators represent the resource, feature, or issue related to the VC that, if changed, may demonstrate an effect on the environment. The indicators and rationale for selection and measurement of potential effects, to be used to assess and evaluate the alternative routes in the IS / EA Report are provided in **Table 9-2**. The table includes both quantitative and qualitative indicators. The final list of VCs and indicators to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

The VCs of the Human Health and Community Safety discipline have been determined through consideration of the following factors listed in the TISG[8]:

- VC presence in the study area;
- the extent to which the VC is linked to the interests or exercise of Aboriginal and Treaty Rights of Indigenous peoples, and whether an Indigenous group has requested the VC;
- the extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the VC;
- the extent to which the VC may be under cumulative stress from other past, existing or future undertakings in combination with other human activities and natural processes;

8. *The TISG also states that information from ongoing and completed regional assessments in the proposed area of the Project should be used to inform VCs for the Project. In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/ EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project.*

- the extent to which the VC is linked to federal, provincial, territorial or municipal government priorities (e.g., legislation, programs, policies);
- the possibility that adverse or positive effects on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and
- whether the potential effects of the Project on the VC can be measured and / or monitored or would be better ascertained through the analysis of a proxy VC.

Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Human Health and Community Safety Study Plan.

Table 9-2: Human Health and Community Safety Indicators

Valued Component	Indicators	Rationale for Selection	Sources of Information
Public Safety	Project-related Accidents	■ Considers occurrence of work-related injuries reported at the Project site as a result of construction and maintenance activities. ■ Project construction and maintenance activities have the potential to injure members of the work force and community members.	■ Primary data; ■ Social Assessment; ■ Municipal, provincial and Indigenous government websites; ■ Indigenous plans and reports; ■ Provincial plans and reports; ■ Regional reports; ■ National reports; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
	Road Use Accidents	■ Considers changes in vehicular accidents on the CAR (e.g., with other vehicles, wildlife) and on roads leading to the Project as a result of an increase in traffic. ■ Project operation may lead to vehicle accidents harming individuals including those who may walk, hitchhike or cycle along the road).	■ Primary data; ■ Social Assessment; ■ Municipal, provincial and Indigenous government websites and reports; ■ Regional reports; ■ National reports; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
	Violence and Harassment	■ Resulting interactions between members of the work force and local community members that may result in violence or harassment. ■ Conflict between construction work force and the local communities may impact the health of individuals involved.	■ Primary data; ■ Social Assessment; ■ Municipal, provincial and Indigenous government websites and reports; ■ Regional reports; ■ National reports;

Draft

Valued Component	Indicators	Rationale for Selection	Sources of Information
		■ Address potential safety risks to Indigenous women from users of the road during the operations period e.g., human trafficking).	■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
Public Health	Access to Health Services	■ By providing all season road access, the Project may improve access to health services including specialized medical services which can have an overall positive impact on public health. ■ Regarding access to health services, mobility levels of MFFN residents will be considered. ■ The Project may also influence the supply and demand for health services during the construction period which will also be assessed.	■ Primary data; ■ Social Assessment; ■ Economic Assessment; ■ Municipal, provincial and Indigenous government websites; ■ Indigenous plans and reports; ■ Provincial plans and reports; ■ Local service providers; ■ Regional reports; ■ Industry reports; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
	Social and Economic Structures	■ The Project may influence social and / or economic structures which could also have potential impacts to health. Some of these include new employment opportunities / income, access to education, community well-being and changes to material structures such as living conditions and access to goods. Changes to these structures may influence physical and mental health of community members in the study area.	■ Primary data; ■ Social Assessment; ■ Economic Assessment; ■ Municipal, provincial and Indigenous government websites and reports; ■ Local service providers; ■ Regional reports; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
	Substance Abuse	■ The Project may facilitate easier access to drugs and alcohol.	■ Primary data; ■ Social Assessment; ■ Municipal, provincial and Indigenous government websites and reports; ■ Local service providers; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
	Mental Health	■ The Project could impact the mental well-being of people in the potentially affected communities. This could result from a variety of factors including for example: improved social connections; presence of outsiders in the community; changes in valued environmental features; concerns of impact on future generations; and feelings regarding change to the remoteness of the community.	■ Primary data; ■ Social Assessment; ■ Municipal, provincial and Indigenous government websites and reports; ■ Local service providers; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.

DRAFT

Valued Component	Indicators	Rationale for Selection	Sources of Information
Diet	Food Consumption	■ The Project may improve access to additional food supply and alter food price levels and livelihoods altering the diet of those in the local community.	■ Primary data; ■ Social Assessment; ■ Economic Assessment ■ Municipal, provincial and Indigenous government websites; ■ Indigenous plans and reports; ■ Provincial plans and reports; ■ Local service providers; ■ Regional reports; ■ Academic research; ■ Web-based sources; and previous relevant EAs.
	Food Supply	■ The Project may result in a change in consumption of traditional and non-traditional foods due to changes in access to harvesting areas; resource competition and access to non-traditional food stuffs including price changes.	■ Primary data; ■ Social Assessment; ■ Economic Assessment ■ Municipal, provincial and Indigenous government websites; ■ Indigenous plans and reports; ■ Provincial plans and reports; ■ Local service providers; ■ Regional reports; ■ Academic research; ■ Web-based sources; and, ■ Previous relevant EAs.
Environmental Factors Influencing Human Health	Air Quality	■ The Project may alter local and regional air quality which could impact human health.	■ Atmospheric Environment Assessment
	Noise	■ The Project may alter noise levels which could impact human health.	■ Acoustic and Vibration Assessment
	Country Foods	■ The Project may potentially alter contaminant levels in harvested country food items.	■ Atmospheric Environment Assessment ■ Surface Water Assessment ■ Physiography, Terrain and Soils Assessment ■ Human Health Risk Assessment (if deemed necessary) ■ Tissue residue data collection programs (if deemed necessary)
	Surface Water and Groundwater	■ The Project may alter surface water and groundwater quality which could impact human health.	■ Surface Water Assessment ■ Groundwater and Geochemistry Assessment
	Other Environmental Conditions and Changes	■ Changes to the environmental conditions within the Project area may negatively impact health due to perceptions of harm.	■ Relevant physical, biophysical, social, and economic studies conducted as part of the IA / EA; ■ Primary data; ■ Academic research; and, ■ Government reports.

Draft

9.3 Potential Effects

A direct effect occurs through the direct interaction of an activity with an environmental discipline. The Project-environment interactions currently anticipated, based upon preliminary analysis, to result in direct effects to Human Health and Community Safety discipline have been identified in **Table 9-1**. The potential direct effects resulting from the Project-environment interactions will be confirmed during the IA / EA process and will be based on input received through the Indigenous Knowledge Program and Consultation and Engagement Program, regulatory agency guidance, and professional judgement.

An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in air quality could indirectly affect human health). **Table 9-3** provides a preliminary identification of how Human Health and Community Safety may be affected by changes to other environmental disciplines.

Draft

Table 9-3: Potential Discipline Interactions

Discipline and Associated Valued Components	Aboriginal and Treaty Rights and Interests	Atmospheric Environment	Acoustic and Vibration Environment	Physiography, Geology, Terrain and Soils	Surface Water	Groundwater and Geochemistry	Vegetation	Wildlife	Fish and Fish Habitat	Social	Economy	Land and Resource Use	Human Health and Community Safety	Visual Aesthetics	Archaeological and Cultural Heritage
Human Health and Community Safety ■ **Public Safety** ■ **Public Health** ■ **Diet** ■ **Environmental Factors Influencing Health**	X	X	X	-	X	-	X	X	X	X	X	-		-	-

Notes: X = Potential pathway for indirect effect as a result of the Project.
- = No pathway for indirect effect is anticipated as a result of the Project.

Draft

9.4 Methods for Predicting Future Conditions

The Human Health and Community Safety Assessment will assess Project effects using similar methodologies and frameworks as outlined in the MFCAR Effects Assessment Methodology document.

The Human Health and Community Safety Assessment will be informed by academic literature, best practices and previous similar EAs. The methodology to complete the Human Health and Community Safety Assessment will include gathering local knowledge and utilising inputs from consultation activities to analyze the concerns of interested and affected communities related to the VCs and indicators as per **Section 9.2**. Community members in the Community Health LSA and RSA will be engaged with regarding the assessment of Human Health and Community Safety effects, the analysis of alternatives, and the preparation of mitigation and monitoring plans. Data used in the Human Health and Community Safety Assessment will be disaggregated (where possible) and analyzed to understand differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives related to the Human Health and Community Safety VCs and indicators.

Considerations related to Painter Lake Road and Anaconda Road will be addressed qualitatively based on the understanding that Aroland First Nation will be conducting their own study on improvements to these roads.

9.5 Mitigation and Enhancement Measures

Once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects beyond those that are already inherent to the design. These measures will consist of industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, Indigenous and community recommendations and recommendations from industry and environmental professionals based on expertise, scientific publications, experience and judgement.

It is important that mitigation and enhancement measures are achievable, measurable and verifiable and monitored for compliance and effectiveness during all temporal phases as part of the Project follow-up monitoring plan. Required environmental monitoring will verify the potential environmental effects predicted in the IS / EA Report, evaluate the effectiveness of mitigation and enhancement measures, and identify the process the Proponent will follow if mitigation and enhancement measures are not effective.

Draft

9.5.1 TISG Section 20 Requirements

The TISG (Section 20) provides one reference to the need for mitigation in relation to potential health impacts as noted in **Table 9-4**. As well, considering that the health and safety assessment will examine social determinants of health, **Table 9-4** also provides reference to potentially applicable social mitigation measures, which are also presented in the Social Environment Study Plan.

Table 9-4: TISG Section 20 Requirements for Human Health and Community Safety

Item #	TISG Section 20 Requirement	Response
1	■ Propose mitigation measures to reduce all potential adverse effects to health conditions of all potentially impacted communities and Indigenous groups and present opportunities for enhancing positive effects;	■ Mitigation measures will be developed to address potential adverse effects to health conditions on all potentially impacted communities. As well, opportunities to enhance positive effects will be recommended where applicable.
2	■ Describe mitigation measures that are specific to each environmental, health, social or economic effect identified. Mitigation measures are to be written as specific commitments that clearly describe when and how the proponent intends to implement them, what decision-making criteria will be used, and the outcome these mitigation measures are designed to address;	■ The Human Health and Community Safety Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment.
3	■ Describe mitigation measures that are specific to identified effects to Indigenous peoples;	■ The Human Health and Community Safety Assessment will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment, including measures that may be specific to Indigenous people.
4	■ Describe mitigation measures proposed by Indigenous peoples and the consideration of those in the Project;	■ The Human Health and Community Safety will include a description of applicable mitigation measures deemed to be required subject to the results of the impact assessment, including measures that may be specific to Indigenous people including measures that may have been suggested by Indigenous people.
5	■ Propose differentiated mitigation measures for all potential adverse effects identified, if applicable, so that adverse effects do not fall disproportionately on vulnerable populations, certain Indigenous groups, or certain communities, and they are not disadvantaged in sharing any development benefits and opportunities resulting from the Project. These mitigation measures should be developed in collaboration with those who are vulnerable and / or disadvantaged;	■ The development of applicable mitigation measures will take into account identified potential impacts on vulnerable populations and developed with the input of interested persons from those vulnerable populations.

Draft

Item #	TISG Section 20 Requirement	Response
6	■ Describe how disproportionate effects that were identified in the GBA+ results were used to inform mitigation and enhancement measures.	■ The Human Health and Community Safety Assessment will describe any identified disproportionate effects to sub-populations.

9.6 Residual Effects

Residual effects are the effects remaining after the application of mitigation measures. The IS / EA Report will describe in detail the potential adverse and positive residual effects in relation to each temporal phase of the Project (e.g., construction, operation). Residual effects will be described using criteria to quantify or qualify adverse and positive effects, taking into account any important contextual factors. The residual effects will therefore be described in terms of the direction, magnitude, geographic extent, duration, frequency, likelihood, and whether effects are reversible or irreversible[9]. Ecological and socio-economic context may also be relevant when describing a residual effect. Context relates to the existing setting, its level of disturbance and resilience to adverse effects. Context can also relate to timing as it applies to assessing the worst-case scenario (e.g., effect during migratory or calving season for wildlife). Where appropriate, information regarding residual effects will be disaggregated by sex, gender, age and other community relevant identifying factors to identify disproportionate residual effects for diverse subgroups.

For magnitude, environmental discipline-specific definitions are required and are proposed below in **Table 9-5**.

Table 9-5: Human Health and Community Safety Magnitude Definition

Magnitude Level	Definition	Rationale
Negligible	■ An effect that may or may not be discernible but is within the historical variability as defined by baseline conditions. ■ The effect is limited to a small number of people and would occur very infrequently if at all. ■ The effect is extremely unlikely to result in adverse changes to human health. The existing health system is expected to have the ability to address / mitigate it.	■ Negligible effects are small and may not be noticeable. These effects do not represent a change in day-to-day life at a community-level.
Low	■ An effect that is small but discernable and within historical variability as defined by baseline conditions. ■ The effect is limited to a small number of people and would occur infrequently.	■ Low effects are noticeable by a few community members but would occur infrequently. These effects do not represent

9. *TISG Section 13.1 identifies additional effects characteristics for certain disciplines (e.g., wetlands, birds, terrestrial wildlife, species at risk). These additional effects characteristics are described in the respective discipline-specific study plans.*

Magnitude Level	Definition	Rationale
	■ The effect is unlikely to result in adverse changes to human health, but may pose a nuisance. The existing health system is expected to have the ability to address / mitigate it.	a change in day-to-day life at a community-level.
Medium	■ An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. ■ The effect occurs to a larger number of people within a community and would occur with some frequency. ■ The effect may potentially result in adverse changes to human health, but the changes are unlikely to be severe and would be expected to be mild or moderate. The existing health system is expected to largely have the ability to address / mitigate it.	■ Medium effects are noticeable by many community members. These effects may or may not represent a change to day-to-day life but can be mitigated by the current health system.
High	■ An effect that is clearly discernable and beyond the historical variability as defined by baseline conditions. ■ The effect is widespread in a community or through multiple communities and is expected to occur frequently / have a long duration. ■ The effect is likely to result in adverse changes to human health that may range from moderate to severe. The existing health system is expected to struggle in its ability to address / mitigate it.	■ High effects are noticeable to a larger number / proportion of community members. These effects represent a change to day-to-day life and cannot be mitigated by the current health system resulting in systemic change to baseline health conditions.

9.7 Consideration of Sustainability Principles

The following provides a generic description of how sustainability principles will be considered in the effects assessment. The extent to which sustainability principles apply to a specific VC will vary depending on the nature of the VC and the potential for Project effects on the VC.

The effects assessment approach for the Project has included the consideration of the sustainability principles outlined in the Project TISG and the Agency's guidance on sustainability. The sustainability principles that have been considered include:

1. Consider the interconnectedness and interdependence of human-ecological systems;
2. Consider the well-being of present and future generations;
3. Consider positive effects and reduce adverse effects of the Project; and
4. Apply the precautionary principle by considering uncertainty and risk of irreversible harm.

The interconnectedness and interdependence of human-ecological systems will be considered through the assessment of potential indirect effects of each alternative. An indirect effect occurs when a change to one

environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in vegetation could indirectly affect wildlife). A preliminary assessment of indirect effects has been included in **Section 9.3**.

The well-being of present and future generations will be considered in the effects assessment through the application of the long-term operations phase temporal boundary of 75 years (**Section 6.1**) and through the effects characteristics description of duration and reversibility for each residual effect predicted.

The consideration of positive effects and reducing adverse effects of the Project is fundamental to the effects assessment methodology through the identification of mitigation measures to reduce potential adverse effects and the identification of the preferred alternative through the evaluation of advantages (e.g., positive effects) and disadvantages (e.g., adverse effects).

The effects assessment will apply the precautionary principle by clearly describing and documenting all uncertainties and assumptions underpinning the analysis and identifying information sources. The effects assessment will consider risk of irreversible harm through the effects characteristics description of reversibility for each residual effect predicted and will describe any uncertainty associated with the assessment of residual effects.

The scope of the sustainability assessment will be defined by issues of importance identified by Indigenous communities and interested persons through consultation and engagement activities, while also ensuring to be inclusive of the diversity of views expressed. The selection of VCs that will be the focus of the sustainability assessment will be aligned with the issues of importance identified by Indigenous communities and interested persons, as well as residual effects identified through the effects assessment process. The sustainability assessment will describe how the planning and design of the Project, in all phases including follow-up monitoring, considered the sustainability principles.

9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment

The Proponent recognizes that communities and sub-populations within those communities may be impacted differently by the Project with respect to VCs and indicators. As such, the Project aims to collect baseline information for the purpose of assessing differential effects and establishing relevant mitigation measures, as further elaborated on in **Section 4.3**. GBA+ will not be limited to community feedback; when offered or discussed in secondary texts, additional sub-population information as is applicable to the relevant assessment will be incorporated.

Draft

As noted in **Section 7.2**, GBA+ will be integrated throughout the Human Health and Community Safety Assessment. This analysis will be derived from our matrix-based approach for baseline collection which will be foundational to understanding and assessing differential effects to sub-populations. The approach to GBA+ will be largely qualitative, drawing on professional knowledge, best practices and relevant literature.

9.9 Follow-up Programs

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. Section 26 of the TISG provide a general reference to the need to develop monitoring activities that pose risks to health conditions. The identification of Human Health and Community Safety follow-up programs for the Project are not described in this Study Plan as the information needed to determine the need for and form of impact monitoring is dependent on the outcome of the effects assessment and on the results of consultation and engagement with Indigenous communities, agencies and interested persons.

Based on the results of the Human Health and Community Safety Assessment work, follow-up program recommendations will be made subject to their applicability and necessity. These programs may be targeted to specific communities and / or specific adverse effects and / or potential positive effects of the Project.

Draft

10. Assumptions

The MFFN CAR Project Team is not aware at this time of key assumptions that will be recognized in the Human Health and Community Safety Assessment. These will be determined during the IA / EA process. Key assumptions made and used in the assessment of Human Health and Community Safety impacts will be documented in the IS / EA Report.

Draft

11. Concordance with Federal and Provincial Guidance

This section provides the best information currently available on how federal and provincial requirements identified for the Project to date will be addressed. **Table 11-1** outlines how the Human Health and Community Safety Assessment will conform with the TISG. Presented in **Table 11-2** are the comments received on the draft provincial ToR that relate to the Human Health and Community Safety Assessment. **Table 11-3** outlines proposed deviations from the TISG requirements.

The final concordance with federal and provincial requirements will be included in the IS / EA Report, and will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

Draft

Table 11-1: Study Plan Federal Concordance – Conformance with Requirements

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
1	TISG Section 6	■ The Impact Statement must describe in the analysis a list of the: – Potential effects on the environmental, health, social and economic conditions of each Indigenous group, including sub-populations (e.g., Indigenous women and youth) that may be differentially impacted by the Project; – The predicted degree (e.g., high, moderate, low) of those effects; and – Resulting impacts on the exercise of Aboriginal and Treaty rights.	■ Effects on Human Health and Community Safety will be described consistent with these parameters as indicated in Section 9 of this Study Plan.	■ Section 9.0
2	TISG Section 9	■ Baseline information is required on existing human health conditions to understand where health inequalities currently exist in all potentially impacted local communities, including municipalities, and Indigenous groups. This information must include: – The current state of physical, mental and social well-being; and – A social determinants of health approach that moves beyond the biophysical health considerations.	■ Social determinants of health information including inequalities with be considered and data will be collected, where available. See list of VCs and indicators and respective data sources in Table 9.2.	■ Section 9.2
3	TISG Section 9	■ A determinants of health approach should recognize: – Health is more than the absence of disease; – Is a state of overall well-being; and – Is impacted by many factors (or determinants) including social and physical environment and Indigenous views of health.	■ Disease, overall well-being, and social and biophysical determinants of health will be considered in data collection. See list of VCs and indicators and respective data sources in Table 9.2.	■ Section 9.2
4	TISG Section 9	■ Approach places emphasis on: – Causes of physical diseases and mental illnesses (health-related behavioural and biological factors; and health determinants - service access and social, cultural and economic factors); and – Equal emphasis on the causes of these causes (health determinants - structural and equity factors).	■ Data on the causes of health issues will be collected and described. ■ Equality and disproportionate health effects will be considered in data collection and the IA / EA. Further, as noted in this Study Plan, health determinants related to social structures and equity factors will primarily be documented in other plans and reports. Related items not included in this Study Plan, but requested in the TISG, are covered under separate study plans for Social and Economics. Items not included explicitly within this Study Plan may be referenced and considered in the assessment of effects to relevant components of the Social environment such as community well-being.	■ Section 7.1.2.1 ■ Section 7.2
5	TISG Section 9	■ The scope and content will reflect the specific project context, taking into account: – Input of public and Indigenous groups; and – Indicators that are meaningful for the effects analysis.	■ Input from Indigenous communities will be considered and meaningful indicators will be used.	■ Section 7.1.2.1
6	TISG Section 9	■ The information provided must: – Provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data; – Describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; – Provide disaggregated data and gender statistics; – Conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services, and describe any relevant indicators and how they are reflective of community input; – Identify the environmental and social area of influence of the Project in preparing the report on baseline health conditions; and – Be disaggregated and analyzed to support the analysis of disproportionate effects as per the GBA+ and consideration of disproportionate effects to surrounding communities (e.g., health disparities), including Indigenous communities.	■ Community health profiles will be developed for communities within the Community Health LSA, including Indigenous communities and municipalities, using secondary sources and primary data, where available. High-level regional profiles will be included as well. ■ Indigenous Knowledge and engagement will be utilized. Data will be disaggregated based on relevant identity factors including sex and age. Gender will not be considered unless publicly available or volunteered by respondents to the primary program. This information will inform relevant intersectional analysis. Privacy and confidentiality will supersede all data requirements including disaggregation. Information from primary sources will only be reported with the informed consent of subjects. See Section 4.3 of this Study Plan.	■ Section 7.1.2.1 ■ Section 4.3
7	TISG Section 9	■ Identify the environmental and social area of influence of the Project.	■ Study areas have been defined with respect to these concerns.	■ Section 6.2

10. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
8	TISG Section 9	■ To understand the community and Indigenous context and baseline health profile: – Complete a community health profile that describes the overall health of the community across standard health indicators including any specific community identified health concerns (real or perceived) that may be impacted by the Project, this profile may include additional health information and community-relevant information; – Describe any context-specific definitions of health and well-being, including from the perspective of the relevant Indigenous cultures, including the community and spiritual well-being; – Describe relevant community and Indigenous history or context, including historical impacts on health, such as intergenerational trauma; – Use a social determinants of health approach to identify and describe the causal chain on relevant health outcomes, including how gender will impact outcomes, across diverse subgroups; – Use relevant social determinants of health based on community input, if possible, to reflect the setting and circumstances of the impacted communities - otherwise guidance may be drawn from the suite of determinants recognized by the Public Health Agency of Canada or the Determinants of Indigenous Peoples' Health in Canada; – Describe and characterize the existing health services and programs and any service delivery arrangements such as with the Geraldton Hospital, including health care provider capacity; – Describe how the Project may impact access to health services; – Describe the current health effects (physical, social, and mental) of geographic isolation and lack of economic development, to better understand the potential improvements; – Provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality, and noise level – at a minimum provide a map showing approximate locations of permanent residences, temporary land uses and known locations of sensitive human receptors; – Describe drinking water sources which may be affected by the Project, including surface and/or groundwater, their distance from project activities and approximate wellhead capture zones; – Provide baseline contaminant concentrations in drinking water and in the tissues of country foods consumed by Indigenous groups and local communities (for game samples work with local indigenous groups to gather tissues-samples as appropriate); – Describe the consumption of country foods outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value - specify species used, the quantity, frequency, harvesting locations, and how data was collected; – If Human Health Risk Assessment is required provide baseline contaminant concentrations in the tissues of country foods consumed by Indigenous groups and local communities; and – Describe the status of food security and food sovereignty within the Indigenous groups and local communities.	■ Data collection, information sources, study areas and assessment methods have been designed respective of the guidance included here. This will include drawing on other impact assessments (bio-physical, social, and economic), data sources provided by the Agency, and relevant primary and secondary data sources including the socio-economic primary data program and Indigenous Knowledge program.	■ Section 7.0
9	TISG Section 9	■ All collection, analysis and reporting of data must adhere to relevant ethical and cultural protocols. In the event of deviation from recommended baseline characterization approaches and methods or when determining such characterization is not warranted, a detailed rationale/explanation should be provided.	■ In all collection, analysis and reporting of data the Health Canada guidance documents will be used as best practices to be followed in the collection of baseline information to assess real and perceived project-related impacts to human health due to the changes in air quality, noise, drinking and recreational water quality, country foods and / or multiple pathways of exposure to contaminants.	■ Section 7.0
10	TISG Section 16	■ The adverse and positive effects of the Project on human health, particularly regarding the effects of the higher-level health determinants on well-being, must be assessed.	■ Adverse and positive effects will be considered.	■ Section 7.0
11	TISG Section 16	■ Assessment of the effects of the Project on human health must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices to determine perceived risk.	■ Real and perceived risk, as identified through engagement, will be considered in the assessment.	■ Section 7.0
12	TISG Section 16	■ Describe the interconnections between human health and other valued components and interactions between effects, particularly where it is suggested a potential impact occurring indirectly as a result of the Project.	■ The approach proposed is holistic and considers other relevant disciplines and potential impacts of the Project that could result in impacts to human health and safety.	■ Section 7.0

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
13	TISG Section 16	■ Include interactions within and across the higher-level health determinants in order to identify the pathways of health effects that are most likely to be affected by project-related changes to the determinant(s) of health.	■ Interactions between effects will be considered as part of the holistic approach.	■ Section 7.0
14	TISG Section 16	■ The indicators should: – Be developed using best practice, Agency guidance, and through engagement with Indigenous groups and the public; and, – Have a rationale for the indicators chosen.	■ Agency guidance has been and will continue to be utilized. Indicator rationale is included in Table 9.2.	■ Section 9.2 ■ Table 9-2
15	TISG Section 16	■ Describe how community and Indigenous knowledge was used to collect baseline data and assess health effects and disaggregate the source of community or Indigenous knowledge, as well as social, economic, and health data, by representation by sex, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+.	■ Primary information sources and data disaggregation with respect to the identity of those sources will be provided if informed consent is provided by interview subjects. Otherwise, confidentiality will be maintained. Secondary information will be disaggregated as the source allows into relevant identity factors including sex and age.	■ Section 4.3 and 7.0
16	TISG Section 16	■ Analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders).	■ This information will be included within the relevant assessments (including social and economic) and will be considered in the IA / EA.	■ Section 4.3 ■ Section 7.0
17	TISG Section 16	■ Apply determinants of health approach to show that there is an understanding of linkages and effect pathways, as well as the disproportionate effects across subgroups.	■ Interactions between effects will be considered as part of the holistic approach.	■ Section 7.0
18	TISG Section 16.1	■ Impact Statement must: – provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in: air quality, noise exposure, effects of vibration, current and future availability (including contamination and quality) of country foods, and current and future availability of water for drinking/recreational/cultural uses; – Identify predicted effects of the Project on the quality and quantity of ground or surface water use for domestic uses based on the most stringent guideline values of the Canadian Drinking Water Quality Guidelines, Ontario Drinking Water Quality Standards or Ontario Soil, Groundwater and Sediment Standards; – Describe and quantify the healthy risk from exposure to COPCs via consumption of country foods and differential risk for vulnerable subgroups; – Conduct a problem formulation exercise/preliminary model predictions to determine whether a Human Health Risk Assessment is required; – Rationale/explanation if problem formulation/preliminary model predictions indicated a Human Health Risk Assessment is not warranted; – If a Human Health Risk Assessment is required, the assessment must identify all potential contaminant exposure pathways for contaminants of concerns to adequately characterize potential biophysical risks to human health; – Provide a detailed rationale/explanation if a determination is made that an assessment of any COPCs or exposure pathways should be excluded and/or screened out of the assessment; – Describe and quantify the project-related activities, and provide an inventory of contaminants of potential concern and their sources, potential exposure pathways, adverse human health effects and the potential human receptors of these effects; – Describe nuisances and environmental, social and economic changes that could potentially be sources of adverse human health effects and the potential human receptors of these effects; – Provide a description of public concerns if raised regarding concern for human health effects despite project meeting air, water or noise emissions at local, provincial, territorial or federal guidelines; – Describe food security effects to availability, use and consumption of country foods and health impacts of these effects; and – Describe any project-related changes that may result in positive health effects.	■ The approach to environmental determinants of health is captured in section 7.2.1. This approach defines how the Human Health and Community Safety Study Plan will address the listed requirements including the approach to the HHRA problem formulation.	■ Section 7.2.1

ID #	Federal TISG Reference[10]	Requirement / Comment / Concern	Response	Study Plan Reference
19	TISG Section 16.2	■ With respect to Social Determinants of Health, the Impact Statement must: – Consider the social and economic valued components, and their respective indicators, and their potential links to effects on health; – Consider adverse and positive effects on health based on the social and economic valued components, and their respective indicators - specific priority indicators must be determined or validated by community members; – Describe how community and Indigenous knowledge was used in assessing human health effects; – Describe effects on the safety of women and girls from project activities including worker accommodation, and as a result of new roads in remote areas; – Identify predicted visual or other aesthetic effects of the project on existing land use in the study area; – Apply GBA+ across all relevant determinants of health and document how potential changes to these determinants may have differential effects on diverse subgroups or may create or exacerbate existing health disparities identified in baseline assessment; – Describe where biological factors can intersect with socio-economic position and other health determinants to compound vulnerability on subgroups; – Describe and quantify specific thresholds and document if different thresholds were considered for vulnerable populations - provide rationale and justification if specific thresholds are not used; – Identify which health effects (negative or positive) are expected to be short-term or long-term, as well as which may be contingent upon future economic development projects or road connections; and – Describe any positive health effects.	■ The IA / EA will consider a holistic approach including biophysical, social and economic factors as they relate to health. Both potential positive and negative effects will be considered. Specific factors identified including those related to identity will be considered in the IA / EA. Social determinant effects will be described qualitatively consistent with the magnitude definitions in Section 9.6. Quantification will be pursued when possible but may not be feasible for social factors related to human health and community safety. However, the magnitude of effect will be noted with respect to different sub-groups and relevant identity factors, where applicable. ■ Indigenous Knowledge will be collected and utilized. ■ See Visual Environment Study Plan for approach to the assessment of potential Project visual impacts. ■ The IA / EA will identify short and long term effects. The IA / EA will also consider cumulative effects.	■ Section 7.0 ■ Section 9.0
20	TISG Section 16.2	■ Describe variation of effects during different project phases and times of year, as well as the project-related effects on the community health profile.	■ Project effects will be described respective of Project phases (construction and operations phases) and with respect to the indicators. Project health and safety effects are not expected to vary by times of the year.	■ Section 9.0
21	TISG Section 16.2	■ Complete the checklists provided in the Health Canada guidance documents. Any deviation from recommended assessment approaches/methods or when determining such assessment is not warranted requires a detailed rationale/explanation.	■ Completion of a consolidated checklist applicable to the Project may be considered by the Proponent, if provided by Health Canada.	■ Section 9.0

Draft

Table 11-2: Study Plan Provincial Draft ToR Concordance - Conformance with Requirements

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
1	Draft ToR Comment from the Ministry of the Environment, Conservation and Parks (ID #118)	■ **#19 Appendix A, page 2** – Indigenous Knowledge may be a data source for the Ungulates and Human Health disciplines. Please add Indigenous Knowledge as a data source for Ungulates and Human Health.	■ A critical component of the EA is the integration of Indigenous Knowledge into Project planning and design. Indigenous Knowledge has been included as a possible data source for Ungulates and Human Health in Appendix A.	■ A critical component of the IA / EA is the integration of Indigenous Knowledge into Project planning and design. Indigenous Knowledge has been included as a possible data source for the Human Health and Community Safety Study Plan.	■ Section 2.1.1
2	Draft ToR Comment from the Ministry of the Environment, Conservation and Parks (ID #161)	■ **#5 9.1 Environmental Commitments Pg. 59** – Broad statement of a commitment to develop and implement measures that may relate to effects that may be an issue. – In the EA ensure, itemized impacts to natural environment and human health. Include risk level and mitigation factors to minimize environmental and health impacts. – Ex, waste oil spills, med level, training on prevention, spill kits, contract with approved hauler to remove waste material.	■ Section 9.1 of the ToR includes a commitment to the development and implementation of impact management measures during the EA. This commitment applies to each environmental discipline identified in the ToR, including the natural environment and human health, where potential effects are predicted due to the Project. ■ Section 5.2.2 of the ToR states that a Spill Management Plan will be developed to manage accidental releases. Specific impact management measures, such as those noted in the comment (e.g., training and prevention, spill kits on site, etc.), and recommendations for waste management and spills response will be developed during the EA.	■ Section 9.5 of this Study Plan includes a commitment to the development and implementation of impact management measures during the IA / EA. This commitment applies to human health, where potential effects are predicted due to the Project.	■ Section 9.5
3	Draft ToR Comment from Aroland First Nation (ID #224)	■ **"7.2.11 Socio- Economic and Built Environment** **8.3 Assess and Evaluate Net Effects"** – AFN expects significant potential impacts from the CAR if the CAR connects to the Ontario provincial highway network at Painter Lake. Traffic to and from the CAR will pass directly by Aroland First Nation's reserve community, and through a significant portion of Aroland's traditional territory. The potential direct changes and impacts that may be experienced by Aroland First Nation are not described in this section of the ToR. The exploration of these potential changes should be part of MFFN's consultation plan with AFN. – AFN submits that many of the effects of the Project, if the if the CAR connects to the Ontario provincial highway network at Painter Lake, driving traffic to and from a road that bisects and runs adjacent to AFN's reserve, will result in direct effects on AFN community members, and AFN rights and interests. This perspective should inform the assessment and evaluation of net effects in the ToR. – AFN submits that potential impacts form the CAR, if the CAR connects to the Ontario provincial highway network at Painter Lake, be subject to specific consultation activities with AFN to include, but not be limited to, potential negative and positive effects on AFN: • traffic • access to AFN's traditional territory • strain on public safety services • changes to population • changes to hunting/harvesting • changes to diet • effects on human health • changes to protected area lands	■ MFFN looks forward to engaging with AFN and receiving input on potential negative and positive effects of the Project on AFN to inform the assessment and evaluation of net effects in the ToR. As outlined in Table 4-2 of Appendix B, the EA Consultation Plan, MFFN plans to consult with Indigenous communities throughout the EA process to receive targeted input on such items as evaluation criteria and potential effects. ■ MFFN appreciates the input on potential negative and positive effects of the Project and confirms that potential effects listed will be considered in the EA. For clarification, in the list below the Environmental Discipline and criteria included in Appendix A that align with the effect AFN noted has been provided. ■ <u>Social Discipline</u> – traffic: considered under Transportation criteria – strain on public safety services: Community Services and Infrastructure criteria – changes to population: Populations and Demographics criteria – changes to regional access to education, training, recreation, and health services: Community Services and infrastructure criteria ■ <u>Human Health and Community Safety</u> – changes to diet: Diet criteria – effects on human health: all criteria under the Human Health and Community Safety discipline ■ <u>Indigenous Rights and Interests Discipline</u> – access to AFN's traditional territory: Ability to Exercise Aboriginal and Treaty Rights – changes to hunting/harvesting: Ability to Exercise Aboriginal and Treaty Rights	■ MFFN looks forward to engaging with Aroland First Nation and receiving input on potential negative and positive effects of the Project on Aroland First Nation to inform the assessment and evaluation of net effects. MFFN plans to consult with Indigenous communities throughout the IA / EA process to receive targeted input on such items as evaluation criteria and potential effects. ■ MFFN appreciates the input on potential negative and positive effects of the Project and confirms that potential effects listed will be considered in the IA / EA. ■ <u>In regard to Human Health and Community Safety, the following noted concerns will be examined:</u> – changes to diet: Diet criteria – effects on human health: all criteria under the Human Health and Community Safety discipline	■ Table 9-2

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
		• changes to recreation and commercial land uses • changes to access and use of traditional teaching sites • changes to industry and resource extraction activities such as mining, aggregate, forestry, linear infrastructure and energy projects • changes to the regional economy • changes to the local economy • changes to the cost of living in the community • changes to regional access to education, training, recreation, and health services	– changes to access and use of traditional teaching sites: Availability and Access to Sites and Areas for Cultural Practices ■ <u>Land and Resource Use Discipline</u> – changes to protected area lands: Parks and Protected Areas criteria – changes to industry and resource extraction activities such as mining, aggregate: Extractive Industry criteria – changes to industry and resource extraction activities such as forestry: Forestry Industry criteria – changes to industry and resource extraction activities such as linear infrastructure and energy projects: Energy and Linear Infrastructure criteria ■ <u>Recreation and Tourism Discipline</u> – changes to recreation and commercial land uses: Recreation and Tourism criteria ■ <u>Economy Discipline</u> – changes to the regional economy: Regional Economy criteria – changes to the local economy: Regional Economy criteria – changes to the cost of living in the community: Regional Economy criteria		
4	Draft ToR Comment form Aroland First Nation (ID #226)	■ **8.2 Proposed Criteria and Indicators** – Invasive species could provide an indicator of the status of the Wetland Ecosystems, Upland Ecosystems, Designated Areas and Critical landform / Vegetation Associations. Size in concert with distribution could provide a more fulsome indicator of the status of the Wetland Ecosystems, Upland Ecosystems, Designated Areas and Critical landform / Vegetation Associations. – Direct (e.g., vehicle collisions) and indirect (e.g., population isolation) impacts of the project on SAR wildlife should be considered an indicator. Indigenous Knowledge could provide further information on the indictors for moose and caribou. Indigenous Knowledge could provide further information on the species of fish to be considered. AFN expects this project will impacts its communities' rights and interests; as such, AFN requires a detailed Indigenous Knowledge Land Use and Occupancy Study, Socio- Economic and Built Environment Impact Assessment, and Cultural Heritage Resource assessments to adequately assess how AFN may be affected and determine mitigation/accommodation measures. – For groundwater indicators, include spring water sources – For vegetation, include presence of invasive species in each category – For vegetation, expand on the "Distribution" "indicator to Distribution and Size For wildlife include, direct and indirect impacts of the project on wildlife SAR For ungulates, include Indigenous Knowledge – For fish and fish habitat, ensure fish species important to Indigenous communities are included	■ MFFN appreciates Aroland First Nation's input on the potential indicators to be included in the EA. Many if not most of the suggested indicators were included in the list of criteria and indicators, as outlined in Appendix A of the Draft ToR. Please note that Appendix A has been revised to include Indigenous Knowledge as data source for ungulates. Please also note that many of the suggested indicators Aroland First Nation has provided for Indigenous Knowledge and Land Use are captured in other discipline areas (e.g., wildlife, vegetation). ■ In addition, as noted in Section 3.4.2.1 of the ToR, an Indigenous Knowledge Program has been initiated for the Project, which will include Project-specific Indigenous Knowledge Studies (which include Indigenous land and resource use). ■ Information collected and shared with MFFN through this program will be used to inform criteria and indicators, as well as identify specific features and species of value to Indigenous communities including Aroland Frist Nation.	■ MFFN appreciates Aroland First Nation's input on the potential indicators to be included in the IA / EA. In regard to the comment on impact on country foods, a Diet valued component is included as outlined in Table 9-2 of this Study Plan. The impact of the project on country food harvesting and use will be assessed.	■ Table 9-2

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
		– For Indigenous Knowledge and Land use - Traditional Use of Land and Resources and Aboriginal and Treaty Rights, in addition to what is listed in the Draft ToR, include: • Number and value of fish spawning • Number and value of mammal habitat • Number and value of mammal migration • Number and value of bird habitat • Number and value of bird migration stopovers • Number and value of reptile/amphibian habitat • Number and value of plant habitat • Number and value of mineral licks • Number and value of species at risk • Number and value of spring water sources valued by Indigenous people • Number and value of boat launches • Number and value of commercial harvesting locations • Number and value of historical village/archaeological locations • Number and value of historic trails locations • Number and value of changes noticed to the environment • Number and value of teaching sites valued by Indigenous people for transferring knowledge between generations • Number and value of meeting sites valued by Indigenous people for cultural, recreational and social purposes – **For all Human Health criteria include information available from First Nation governments** – **For Human Health – Diet, include a specific country foods study undertaken in collaboration with AFN** For Cultural Heritage landscapes, include data from provincial and federal databases – For archaeological resources: • Include an investigation of historic shorelines • Include an investigation of pictographs and petroglyphs • Include an investigation of all sites identified as indicating archaeological potential as identified in the Standards and Guidelines for Consultant Archaeologists (2011) • Do not use the alternative standards and guidelines for assessing archaeology in Northern Ontario. Because less is known about the archaeology of the north, additional rigor should be undertaken, not less – the regular – Standards and Guidelines for Consultant Archaeologists (2011) should be employed for this project.			

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
5	Draft ToR Comment from Attawapiskat First Nation (ID #258)	■ **Section 7.1.4.12 (p. 43):** – The EA must analyze the important connection between traditional subsistence harvesting and human health. The fish and wildlife populations harvested in the western portions of Attawapiskat territory are a shared resource with Marten Falls First Nation, and developments in the area of the proposed road will therefore have consequences for the health of our community. The foods that make up for a shortfall in country foods tend to be high in sugar and fat. The inability to access country foods therefore has links to diseases such as diabetes , stroke, heart disease, high blood pressure , cancer, and obesity.	■ The EA will consider dietary factors within the Human Health and Community Safety section as indicated in Section 7.2. The assessment will be conducted respective to the EA study areas.	■ The IA / EA will consider dietary factors within the Human Health and Community Safety Study Plan as indicated in Table 9-2. The assessment will be conducted respective to the EA study areas.	
6	Draft ToR Comment from Neskantaga First Nation (ID #351)	■ The final report of the National Inquiry into MMIWG detailed how resource extraction projects can drive violence against Indigenous women in several ways, including issues related to transient workers, harassment and assault in the workplace, rotational shift work, substance abuse and addictions, and economic insecurity. How will Marten Falls ensure that these impacts are studied with respect to the distinct culture and geographic vulnerability of each of the remote communities?	■ The Project to be studied within the EA is the Marten Falls Community Access Road, which does not include resource extraction beyond aggregate for the road construction. It is anticipated the potential mining projects would conduct their own assessment of these important risks as components of their socio-economic impact assessments. Depending on the findings of the Project assessment, these factors may be considered within the cumulative effects assessment.	■ The Project to be studied within the EA is the MFFN CAR, which does not include resource extraction beyond aggregate for the road construction. It is anticipated the potential mining projects would conduct their own assessment of these important risks as components of their socio-economic impact assessments. Depending on the findings of the Project assessment, these factors may be considered within the cumulative effects assessment. ■ Specifically related to the MFFN CAR Project, as outlined in Table 9-2 under the VC Public Safety, the indicator Violence and Harassment will be assessed.	■ Table 9-2
7	Draft ToR Comment from Neskantaga First Nation (ID #396)	■ Will the baseline studies consider mental health and well-being in Neskantaga and other affected communities?	■ MFFN recognize this is a sensitive issue within the context of this region. Mental health will be considered as part of the federal Impact Assessment that is also to be completed for the Project. The provincial EA will collect valuable baseline data on health and well-being for communities within the study areas for the social discipline.	■ MFFN recognize this is a sensitive issue within the context of this region. Mental health will be considered as part of the federal Impact Assessment that is also to be completed for the Project. We note reference to the indicator Other Environmental Conditions and Changes which will consider changes to the environmental conditions within the Project area that may negatively impact health due to perceptions of harm. ■ The provincial EA will collect valuable baseline data on health and well-being for communities within the study areas for the social discipline.	■ Table 9-2
8	Draft ToR Comment from Neskantaga First Nation (ID #397)	■ How will the Marten Falls demonstrate that the project will improve mental health and wellbeing in the context of mitigating the ongoing crises? What kinds of evidence will Marten Falls rely on to demonstrate this?	■ MFFN recognize this is a sensitive issue within the context of this region. Mental health will be considered as part of the federal Impact Assessment that is also to be completed for the Project. The provincial EA will consider potential changes to health and well-being (Section 7.2.10 of ToR) as result of the Project including identifying impact managements measures relevant to the Project.	■ MFFN recognize this is a sensitive issue within the context of this region. Mental health will be considered as part of the federal Impact Assessment that is also to be completed for the Project. ■ The IS / EA Report will consider potential changes to health and well-being as result of the Project including identifying impact management measures relevant to the Project. Under the VC Public Health, the indicator Social and Economic Structures would assess these types of effects.	■ Table 9-2

Draft

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
9	Draft ToR Comment from the Ministry of Energy, Northern Development and Mines (ID #491)	■ **8. ROFS Section 5.1 Page 10, 11** – Par. 5 Consider adding to the rationale: community social needs, community health needs, community economic needs, community education needs, community wellness, basic service needs. These are key reasons for the proposed MFFN CAR road Par. 3 Consider adjusting text related to MFFN realignment of the winter road and MNRF 2011 approval. Review purpose, rationale, and what was actually completed (only ½ of upgrades completed) – Par.3 Reference to ROF and lack of access should be a separate paragraph and highlighted at the end of the section - could be confused with rationale for the CAR. ■ **Pg. 11, par. 1** – – Ontario Infrastructure Plan – please use the correct title – Suggest enhancing the sections to emphasize the key rationale for the road – Correct name of the MOI plan Building Better Lives: Ontario's Long-Term Infrastructure Plan 2017. Please make change throughout document.	■ Comments have been taken into consideration and the text of Section 5.1 altered accordingly.	■ Comments have been taken into consideration in the VCs and indicators presented in Table 9-2. We also note that some of these suggested considerations are also identified as indicators in other study plans including Social and Economics.	■ Table 9-2
10	Draft ToR Comment from the Ministry of Energy, Northern Development and Mines (ID #518)	■ **34. ROFS Section 7.1.4.12 Pg. 43** – Human Health – suggest adding Community Safety to the Heading because both human health and community safety are discussed in this section – Suggest adding Community Safety to the Heading	■ Community safety has been added to the heading title for Human health and has been considered under this discipline.	■ The Study Plan is now titled Human Health and Community Safety and includes references to Community Safety throughout.	■ Throughout the Study Plan
11	Draft ToR Comment from the Ministry of Energy, Northern Development and Mines (ID #519)	■ **35. ROFS Section 7.2 Pg. 47, 48** – Table 7.4 Social, Economic and Built Environment – suggest including social cohesion – Under Human Health discipline include Community safety (see comment 32) – Suggest adding in as a potential effect changes to social cohesion in the Social discipline – Suggest adding community safety to discipline heading	■ Community well-being includes social cohesion as a component of the assessment. Community safety has been added to the human health heading title. The section is now titled Human Health and Community Safety.	■ Community well-being includes social cohesion as a component of the assessment. Community Safety has been added to the Human Health heading title. The Study Plan is now titled Human Health and Community Safety.	■ Study Plan Title
12	Draft ToR Comment from the Ministry of Energy, Northern Development and Mines (ID #521)	■ **37. ROFS Section 7.2.11 Pg. 52-53** – Par. 1, Bullet 1 suggest including changes to community cohesion her as well. – Bullet 2, suggest including public safety – Suggest adding in changes to community cohesion at the end of bullet 1. – Suggest adding in public safety after human health in line 1 of bullet 2.	■ Social cohesion has been added to bullet 1 as requested. Public safety is included in bullet 3.	■ Social cohesion has been added as a consideration in the assessment.	■ See Social Study Plan

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
13	Draft ToR Comment from the Ministry of Energy, Northern Development and Mines (ID #533)	■ **49. ROFS Appendix A Pg. 3,5** – Pg. 3: Is Indigenous knowledge an environmental discipline or does it inform disciplines? Perhaps the discipline is Traditional Land Use. See also Table 7-1 and make consistent – Indigenous knowledge can inform many disciplines. – Pg 5: Suggest naming the discipline Human Health and Community Safety. – Consider mental health as another indicator of Health under the Health discipline – Suggest changing name of discipline to Traditional Land Use and ensure that Indigenous Knowledge is a data source – Suggest naming the discipline Human Health and Community Safety.	■ Comment taken into consideration and Table 7-1, Table 7-2 and Appendix A have been edited accordingly.	■ The Study Plan is now titled Human Health and Community Safety. Mental health will be considered as part of the federal Impact Assessment that is also to be completed for the Project.	■ Study Plan Title.
14	Draft ToR Comment from Long Lake #58 First Nation (ID #552)	■ Transportation: LL58 understands that the project will lead to increased traffic through LL58's homelands in the future, most notably once a connection is established to the Ring of Fire. ■ LL58 needs to understand potential implications for the health and safety of our members while travelling on the provincial highway system, and what increased traffic loads will mean to our membership (especially in light of the increasingly tragic traffic accidents with transport trucks observed in recent years). LL58 would like to see measures in-place to improve driver safety throughout the Trans-Canada Highway system.	■ The ToR has proposed vehicular accidents as an indicator of personal safety to be assessed as part of the alternatives assessment. The safety features of the proposed Project will be addressed through the design and engineering of the road.	■ Vehicular accidents are proposed as an indicator of personal safety to be assessed as part of the alternatives assessment. The safety features of the proposed Project will be addressed through the design and engineering of the road.	■ Table 9.2
15	Draft ToR Comment from Ginoogaming First Nation (ID #569)	■ Transportation: GFN understands that the project will lead to increased traffic through GFN's homelands, most notably once a connection is established to the Ring of Fire. GFN needs to understand the potential implications for the health and safety of our members while travelling on the provincial highway system, and what increased traffic loads will mean to our membership (especially in light of the increasingly tragic traffic accidents with transport trucks observed in recent years). GFN would like to see measures in-place to improve driver safety throughout the Trans-Canada Highway system.	■ The ToR has proposed vehicular accidents as an indicator of personal safety be assessed as part of the alternatives assessment. The safety features of the proposed Project will be addressed through the design and engineering of the road.	■ Vehicular accidents are proposed as an indicator of personal safety be assessed as part of the alternatives assessment. The safety features of the proposed Project will be addressed through the design and engineering of the road.	■ Table 9.2
16	Draft ToR Comment from Webequie First Nation (ID #617)	■ **7.1.4.12 Socio-Economic and Built Environment (Page 39) "Will consider six components: Social, economy, land and resource use, recreation and tourism, human health and visual esthetics"** – Please include these components: • -gender relations, • -human safety (in addition to health)	■ Community safety has been added to the heading title for Human health and will be considered under this discipline. Gender and other identity factors have and will continue to be considered as part of the federal Impact Assessment.	■ Community Safety has been added to the title for this Study Plan and will be considered under this discipline. Gender and other identity factors have and will continue to be considered as part of the federal Impact Assessment.	■ Study Plan Title
17	Draft ToR Comment from Webequie First Nation (ID #620)	■ **7.1.4.12 Socio-Economic and Built Environment (Page 40)** – Gender considerations also missing from Economy sections – there is an imbalance in labour between men and women? And if so how does this impact women's health and safety and the gender relations, and then, how will/how can the CAR impact the issues related to women and gender?	■ A GBA+ framework will be utilized for the federal Impact Assessment that is also to be completed for the Project to consider gender and other identity factors.	■ A GBA+ framework will be utilized for the federal Impact Assessment including for the Health and Community Safety assessment.	■ Section 4.3

ID #	Commenter	Requirement / Comment / Concern	Response Related to Draft Provincial ToR	Response (edited to Study Plan context)	Study Plan Reference
18	Draft ToR Comment from Fort Albany First Nation (ID #663)	■ **Section 7.2.11 Socio-Economic and Built Environment p. 53** – The ToR provides a list of potential effects on the socio-economic and built environment. This list does not consider effects associated with increased access for illicit activities. – Please include increased access for illicit activities (e.g., transportation and sale of illegal drugs) in the list of potential effects. – Increased access to remote communities is known to result in health and wellbeing impacts as a result of increased illicit activities.	■ The ToR will be revised to reference that the EA will examine the potential for increased illicit activities.	■ The health assessment will examine the potential for increased illicit activities and potential for easier access to drugs and alcohol.	■ Table 9.2
19	Draft ToR Comment from Fort Albany First Nation (ID #678)	■ **Appendix A Draft Criteria & Indicators for Alternatives Evaluation p. 4** – The ToR includes indicators for Community Well-being, but does not include indicators to capture impacts from increased disposable income, increased access to southern communities and increased access to elicit activities (e.g., transportation and sale of drugs). – Please include indicators of Community Well-being that capture impacts from increased disposable income, increased access to southern communities and increased access to elicit activities (e.g., transportation and sale of drugs), or indicate how the proposed indicators capture these elements. – The project has the potential to result in impacts associated with increased disposable income, increased access to southern communities and increased access to elicit activities.	■ These potential noted impacts will be considered as part of the EA.	■ The health assessment will examine the potential for increased illicit activities and potential for easier access to drugs and alcohol,	■ Table 9.2

Draft

Table 11-3: Study Plan Federal and Provincial Concordance - Requirement Deviations

ID #	Federal TISG Reference[11] or Provincial Draft ToR Comment Reference	Requirement / Comment / Concern	Response (Rationale for not meeting requirement)	Justification (for not complying with requirement including for example scientific research, precedence)	Proposed TISG Amendment
1	■ TISG Section 16.2	■ Describe and quantify specific thresholds and document if different thresholds were considered for vulnerable populations - provide rationale and justification if specific thresholds are not used;	■ Social determinant effects will be described qualitatively consistent with the magnitude definitions in Section 9.6.	■ Quantified data may not be available.	■ Quantification will be pursued when possible but may not be feasible for social factors related to human health and community safety. However, the magnitude of effect will be noted with respect to different sub-groups and relevant identity factors, where applicable.

11. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)

Draft

12. References

AECOM Canada Ltd., 2020:

Marten Falls First Nation Proposed Terms of Reference Marten Falls Community Access Road – Environmental Assessment, Appendix B: Consultation & Engagement Plan to Support the Environmental Assessment / Impact Statement.

First Nations Information Governance Centre, 2020:

Our Data. Our Stories. Our Future. https://fnigc.ca/splash/

Impact Assessment Agency of Canada, 2019:

Impact Assessment Act. https://laws-lois.justice.gc.ca/eng/acts/I-2.75/

Impact Assessment Agency of Canada, 2020:

Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133934E.pdf

Impact Assessment Agency of Canada, 2020a:

Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment. https://iaac-aeic.gc.ca/050/documents/p80184/133936E.pdf

Impact Assessment Agency of Canada, 2020b:

Glossary of Terms for the impact assessment of designated projects under the IAA. https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/glossary-of-terms.html

Impact Assessment Agency of Canada, 2020c:

Tailored Impact Statement Guidelines for the Marten Falls Community Access Road Project. https://iaac-aeic.gc.ca/050/documents/p80184/133937E.pdf

Ontario Government, 1990a:

Environmental Assessment Act. https://www.ontario.ca/laws/statute/90e18

Draft

Appendix A

Preliminary List of Data Sources

Draft

Secondary Data Sources

- Marten Falls CAR IA Social Assessment Reporting
- Marten Falls CAR IA Economic Assessment Reporting
- Marten Falls CAR IA Aboriginal and Treaty Rights Reporting
- Municipal, provincial and Indigenous government websites;
- Indigenous plans and reports;
- Provincial plans and reports;
- Federal Reports and Data;
- Academic research; and,
- Previous relevant EA Reports.

COPC Toxicological Benchmarks References

Canadian Council of Ministers of the Environment:
Canadian Ambient Air Quality Standards (CAAQS)..
https://www.ccme.ca/en/current_priorities/air/caaqs.html

Canadian Council of Ministers of the Environment:
Canadian Environmental Quality Guidelines.
https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html

Ministry of the Environment, Conservation and Parks (MECP), 1999:
Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy. July, 1994. Reprinted February, 1999. PIBS 3303E.

Ministry of the Environment, Conservation and Parks (MECP), 2008:
Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An Integrated Approach. May, 2008. Standards Development Branch, Ontario Ministry of the Environment. PIBS 6658e

Ministry of the Environment, Conservation and Parks (MECP), 2011:
Rationale for the Development of Soil and Groundwater Standards for Use at Contaminated Sites in Ontario. April 2011. Prepared by: Standards Development Branch. Ontario Ministry of the Environment. PIBS 7386e01.

Draft

Health & Social Impact Assessment Guidance

Government of Canada:

Positive Mental health Surveillance Indicator Framework https://health-infobase.canada.ca/positive-mental-health/Publications

Government of Canada:

Social Determinants of Health and Health Inequalities. https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html

Greenwood, M., s. de Leeuw and N.M. Lindsay, 2015:

Determinants of Indigenous Peoples' health, Second Edition: Beyond the Social. https://www.canadianscholars.ca/books/determinants-of-indigenous-peoples-health

Health Canada, 2017:

Evaluating Human Health Impacts in Environmental Assessments: Air Quality. http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-air-quality.html.

Health Canada, 2018:

Guidance for Evaluating Human Health Impacts in Environmental Assessments: Country Foods.

Health Canada, 2019:

Guidance for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment.

Impact Agency of Canada:

Guidance: Gender-based Analysis Plus in Impact Assessment https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html

International Finance Corporation, 2009:

Introduction to Health Impact Assessment: https://www.ifc.org/wps/wcm/connect/e7f68206-7227-4882-81ad-904cd6387bb7/HealthImpact.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-e7f68206-7227-4882-81ad-904cd6387bb7-jqeABQN

Draft

Public Health Expertise and Reference Centre. 2014:
Social Impact Assessment in the Environmental Sector: health network support guide.
https://www.inspq.qc.ca/en/publications/1800

Stakeholder Participation Working Group of the 2010 HIA of the Americas Workshop, 2012:
Guidance and Best Practices for Stakeholder Participation in Health Impact Assessments.
https://humanimpact.org/wp-content/uploads/2012/03/HIA-Best-Practices-2012.pdf

Food Assessment Guidance

First Nations Food, Nutrition and Environment Study:
www.FNFNES.ca

Health Canada. 2017:
Evaluating Human Health Impacts in Environmental Assessments: Country Foods. Available at http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-country-foods.html.

Health Canada:
Health Canada Guidance Document Checklists: Air Quality, Noise, Drinking and Recreational Water Quality, Country Foods, and Human Health Risk Assessment

University of Ottawa, Université de Montréal, and Assembly of First Nations, 2014:
First Nations Food, Nutrition & Environment Study, Results from Ontario 2011 – 2012.
http://www.fnfnes.ca/docs/FNFNES_Ontario_Regional_Report_ENGLISH_2019-10-16.pdf.

Draft

Appendix B

Agency Comments on the Draft Study Plan

Draft

Draft Study Plan Comments – Federal

Dra

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-01	■ General Comment	■ **Section 5, Section 6, Section 7, Section 13, Section 19.2, Section 25**	■ In addition to the required actions detailed below, other required actions to be addressed in the update to this study plan are detailed in a separate table titled "2020-07-02 – IAAC to MFFN - General Comments on MFCAR Draft Study Plans". The Agency has provided these other required actions to highlight common sections of the Tailored Impact Statement Guidelines (Guidelines) where requirements were not met in the draft study plans submitted to the Agency. These additional actions must be addressed in the updated study plans.		■ We have reviewed the relevant comments and incorporated where appropriate. Please refer to the General Comments Table Response submitted separately to the Agency for specific responses.	■ Various Sections
HH-02	■ General Comment	■ **Section 5** – "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan…"	■ The required actions detailed below apply to all potentially impacted members of the public.		■ The updated Study Plan includes a commitment to engage with the public as per the *Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment.*	■ Section 4.1
HH-03	■ General Comment	■ **Section 6** – "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the Indigenous Engagement and Partnership Plan…"	■ The required actions detailed below apply to all potentially impacted Indigenous groups.		■ The updated Study Plan includes a commitment to engage with the Indigenous Communities as per the *Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment.*	■ Section 4.2
HH-04	■ General Comment	■ **Section 22** – "The proponent must identify and assess the Project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative environmental, health, social and economic effects."	■ Ensure that the Impact Statement analyzes cumulative effects assessment for the Project, including cumulative health effects.		■ The updated Study Plan includes a commitment to assess potential cumulative health effects.	■ Section 7.2
thrHH-05	■ General Comment	■ **Section 9** – "…To understand the community and Indigenous context and baseline health profile, the proponent must… • describe any context-specific definitions of health and wellbeing, including from the perspective of the relevant Indigenous cultures, including community and spiritual wellbeing; • describe relevant community and Indigenous history or context, including historical impacts on health, such as intergenerational trauma… • Examples of social determinants of health… ○ housing availability, housing affordability, and home ownership, disaggregated by sex and gender; ○ education levels (number of residents completed high school, college or higher), disaggregated by sex and gender…	■ The study plan does not provide detail regarding several baseline data recommended to be collected as indicators of social determinant of health in Section 9 of the Guidelines. While many of the indicators of social determinants of health are provided as examples, explanations are not provided for the omission of the proposed indicators and whether Indigenous groups suggested alternative indicators better suited to the Project. ■ For example, there is no indication of indicators regarding: – context-specific definitions of health and well-being (including community and spiritual wellbeing); – relevant community and Indigenous history or context (including	■ Provide detailed information in the study plan regarding the indicators to measure social determinants of health. ■ If an indicator is excluded, explain the omission of that proposed indicator, and whether Indigenous groups suggested alternative indicators better suited to the Project.	■ The updated Study Plan includes a list of VCs and indicators and respective data sources. Further comments are as follows. ■ The indicator "Social and Economic Structures" will consider the potential for impact on community well being. The Social Study Plan also includes the VC Community Well Being, the assessment of which will be considered in the Health and Community Safety Assessment. ■ Historical health information will be considered in the description of baseline health conditions of communities in the Community Health LSA. ■ Education levels will be described in the description of baseline Social conditions. ■ Social cohesion is an indicator in the Social Assessment as outlined in the Social Study Plan.	■ Table 9-2, Social Study Plan

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
		○ social cohesion or social capital;… ○ mobility (proportion of residents who hold driver's licences and own vehicles, intra- and intercommunity transportation), disaggregated by sex and gender…"	historical impacts on health, such as intergenerational trauma); – education levels disaggregated by sex and gender (e.g., number of residents completed high school, college or higher); – social cohesion or social capital; – mobility (proportion of residents who hold driver's licences and own vehicles, intra- and inter-community transportation), disaggregated by sex and gender; etc.		■ In regard to the health assessment, mobility levels will be examined as part of the assessment of the indicator Access to Health Services as well as in relation to the indicator Social and Economic Structures, which will consider potential changes to access to goods and services.	
HH-06	■ **Section 2.0: Purpose and Objectives** – "Health determinants related to social structures and equity factors will primarily be documented in other reports." – "Items not included explicitly within this study plan may be referenced and considered in the assessment of effects to relevant components of human health and community safety such as community well-being."	■ **Section 16** – "…The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Applying a "determinants of health approach" in the assessment of human health effects will support the identification of these linkages, as well as of disproportionate effects across subgroups…"	■ The study plan does not provide enough clarity as to which "Health determinants related to social structures and equity factors" are considered in other study plans and which have their baseline information documented in other relevant, baseline study reports.	■ Update the study plan to clearly cross-reference other study plans when items not included explicitly within the human health study plan are considered in the assessment of effects to relevant components of human health and community safety such as community wellbeing.	■ Table 9-2 outlines for each indicator the information sources that will be considered, including reference to the other assessments / study plans.	■ Table 9-2
HH-07	■ **Section 3.0** – Information received from interested persons and groups will be documented with a description of how the information was considered within the Human Health and Community Safety Assessment. An example of how this will be documented is included in Table 1. (…) In addition to engagement data, it is expected Indigenous Knowledge will be integrated into the Human Health and Community Safety Assessment, where applicable. (…) Indigenous Knowledge collected through means other than	■ **Sections 5** – "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan…" ■ **Section 6** – "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the Indigenous Engagement and Partnership Plan…" ■ **Section 7.4** – "…The spatial and temporal boundaries determined and established for the impact assessment will vary depending on the valued component and are considered separately for each valued component, including valued components related to the environmental, health, social and economic conditions of Indigenous peoples, or other potential effects	■ The study plan does not include information on when and how input, such as but not limited to, baseline data collection, indicators, and the assessment of impacts on human health and community safety, will be collected from the public and Indigenous groups to meet the requirements of several Sections of the Guidelines, in particular Sections 5, 6, 7.4. ■ Regarding primary data collection, the study plan requires additional detail on how the methodologies to be implemented to meet the expectations of Sections 9, 16 and 16.2 of the Guidelines.	■ Provide further details on when and how input will be collected from the public and Indigenous groups to meet the requirements of Sections 5, 6 and 7.4 of the Guidelines. ■ Describe the methodologies to be implemented to meet the expectations of Sections 9, 16 and 16.2 of the Guidelines that: – Specify types of engagement activities (surveys, questionnaires, community sessions, chief and council sessions, workshops, etc.). – Describe how Gender Based Analysis plus (GBA+) has been/will be applied to the consideration of engagement activities. – Identify any specific methods targeted to specific subgroups. – Specify participants in engagement activities (reflecting the Indigenous groups listed in the Indigenous Engagement and	■ Section 7.1.2.1 provides information on the planned primary data collection activities in relation to the social determinants of health including the use of interviews, focus groups and other discussions with community members. ■ The Study Plan includes a commitment to collect disaggregated qualitative data by identity factors when volunteered to support the Human Health and Community Safety Assessment. Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report. ■ Table 4-1 provides a list of the Indigenous communities that will be engaged with as part of the engagement program to support the IS / EA Report.	■ Section 7.1.2.1 ■ Table 4-2 ■ Section 4.3

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	engagement (Indigenous Knowledge program and Socio-economic Primary Data Collection program) will be integrated into the reporting with relevant contextual information."	and impacts referred to above. The spatial and temporal boundaries to be used in the impact assessment are outlined and discussed through the tailoring process, and include comments and input from federal and provincial government departments and agencies, local government, Indigenous groups, the public and other interested parties. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups..." ■ **Section 9** – "…The scope and content of the human health baseline will reflect the specific project context, taking into account input of public and Indigenous groups, and should include indicators that are meaningful for the effects analysis. The information provided must:… • describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; – …Relevant social determinants of health should be selected based on community input, if possible, to reflect the setting and circumstances of the impacted communities..." ■ **Section 16** – "…Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided…" ■ **Section 16.2** – "With respect to Social Determinants of Health, the Impact Statement must: … • Describe how community and Indigenous knowledge was used in assessing human health effects…"		Partnership Plan and reflecting public representation listed in the Public Participation Plan), including rationale for how the selection of participants meets the objectives of the study and demonstrates accessibility considerations (e.g., language requirements) and GBA+. – Describe the approach the proponent intends to take to encourage or attract participation, including how opportunities to participate will be planned and advertised. – Describe how Indigenous knowledge will be used to inform types of engagement activities and participant selection. – If sample questionnaires, interview questions, or other data collection tools exist, identify them in an appendix to the study plan, and provide clear links to how they relate to physical and cultural heritage. – Identify past public or Indigenous engagement activities that have taken place and are being used to inform this study plan.	■ To attract Indigenous community participants to the Human Health and Community Safety primary data collection program, Community Consultation Coordinators will be leveraged to advertise data collection activities, encourage participation, identify barriers to participation and identify key socio-community knowledge holders. Community Consultation Coordinators will also play a key role in the identification of community-specific identity factors to be considered in the Human Health and Community Safety Assessment. ■ Sample questionnaires and interview questions have not yet been prepared. ■ For a description of engagement activities undertaken to date, please refer to the separate IS / EA Report Consultation Plan.	
			■ Refer to the following resource when engaging on the Human Health and Community Safety Assessment: Stakeholder Participation Working Group of the 2010 HIA of the Americas Workshop (2012). Guidance and Best Practices for Stakeholder Participation in Health Impact Assessments. Available at: https://humanimpact.org/wp-content/uploads/2012/03/HIA-Best-Practices-2012.pdf		■ This document will be considered in the completion of the assessment and has been listed as a preliminary data source in Appendix A.	■ Appendix A

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-08	■ **Section 3.0** – "Information received from interested persons and groups will be documented with a description of how the information was considered within the Human Health and Community Safety Assessment. An example of how this will be documented is included in Table 1."	■ **Section 6.3** – "…The Impact Statement must include, at a minimum:… • the engagement activities undertaken with each Indigenous group, including the date, means and results of engagement… • a description of the efforts to discuss and validate with Indigenous groups how the information they provided was applied to the selection of valued components, indicators, effects assessment, mitigation measures and follow-up programs, and conclusions…." ■ **Section 9** – "…The information provided must: • be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP); • describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; • provide disaggregated data and gender statistics..."	■ The study plan is unclear on the methods or tools for engagement and how ethical guidelines, like OCAP, will be respected. ■ The study plan does not provide enough information on how diverse subgroups will be engaged, and specific methods and tools to seek input from these subgroups (e.g., youth, women). ■ The example provided in Table 1 of the study plan describing how the proponent intends to record input received from Indigenous groups and the public during engagement activities does not reflect all the information required to be recorded as identified in Section 6.3 of the Guidelines.	■ Provide further information on methods and tools for engagement, and on how ethical guidelines (like the OCAP) will be respected during the engagement with Indigenous groups and the public on human health effects for the Project. ■ Provide further information on how diverse subgroups will be engaged, such as specific methods and tools to seek input. ■ Update the study plan to ensure that the approach to be taken in recording the information received during engagement activities meets the requirements outlined in Section 6.3 of the Guidelines.	■ Section 7.1.2.1 provides information on the planned primary data collection activities in relation to the social determinants of health including the use of interviews, focus groups and other discussions with community members. ■ Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report. ■ The IS / EA Report Consultation Plan is to be referred to for commitments to OCAP. ■ The IS / EA Report Consultation Plan should be referred to for a description of how engagement activities will be recorded. Regarding primary data collection activities to support the Human Health and Community Safety Assessment, attempts to engage with targeted individuals and the results of those engagements will be documented in the IS / EA Report.	■ Section 7.1.2.1 ■ Section 4.3
HH-09	■ **Section 3** – "In addition to engagement data, it is expected Indigenous Knowledge will be integrated into the Human Health and Community Safety Assessment, where applicable. Due to sensitivities regarding these data, it is not expected a table similar to Table 1 will be provided. Instead, Indigenous Knowledge collected through means other than engagement (Indigenous Knowledge program and Socio-economic Primary Data Collection program) will be	■ **Section 6.2** – "…In the Impact Statement, the proponent is required to describe the type of confidential information provided by each Indigenous group without compromising stipulations in the confidentiality agreements and state how that information impacted the project design, baseline data, effects assessment or mitigation measures. – The proponent is required to provide evidence to the Agency in the form of a letter from the Indigenous group that provided confidential information confirming that: • the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed;	■ The study plan states that data will be protected and privacy of personal information will be respected, but it does not indicate how the primary data collection strategy aligns with the standards for the management of Indigenous data, which are outlined in the principles of Ownership, Control, Access, and Possession (OCAP), as outlined in Section 9 of the Guidelines.	■ Provide further details to indicate how primary data collection for the Project will align with the OCAP principles as required in Section 9 of the Guidelines. ■ Provide further details on how input received from Indigenous groups will be tracked, considered, and reported in the Impact Statement as required in Section 6 of the Guidelines.	■ Primary data collection activities will be consistent with OCAP principles as they apply to the protection of personal information.	■ Section 7.1.2.1

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	integrated into the reporting with relevant contextual information provided at a level of detail consistent with the confidentiality requested by participants." ■ **Section 4** – "(…) Overall, data collection will be completed in support of the following objectives (…). While these objectives are important, the most consequential objective of the data collection will be to provide protection and respect for privacy and of personal information."	• the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed…" ■ **Section 9** – "…The information provided must: • be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP)…"				
HH-10	■ **Section 3, Table 1**	■ **Section 5.2** – "…The Impact Statement must include, at a minimum:… • the engagement activities undertaken by the proponent, including the methods used, where and when engagement activities were held, the persons, organizations and diverse groups engaged, and results of engagement…"	■ The example provided in Table 1 of the study plan for tracking the information that was considered in the Human Health and Community Safety Assessment does not include all information required by Section 5.2 of the Guidelines (e.g., a description of the public engagement activities undertaken by the proponent, dates of engagement activities, etc.).	■ Update the information provided in Table 1 of the study plan to ensure that the method proposed to track information meets the requirements outlined in Section 5.2 of the Guidelines.	■ The study plan includes a commitment to collect disaggregated qualitative data by identity factors (when volunteered) to support the Human Health and Community Safety Assessment. Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report.	■ Section 4.3
HH-11	■ **Section 4.1.1** – "This includes the collection of Indigenous and local knowledge of the socio-economic environment, disaggregated qualitative data by identity factors when volunteered and other information relevant to understanding the current state of human health and safety conditions in the Project area."	■ **Section 5.2** – "…The Impact Statement must include, at a minimum:… • a description of efforts made by the proponent to engage diverse populations, including groups identified by gender, age or other community relevant factors (e.g., recreational hunters) to support the collection of information needed to complete the GBA+…" ■ **Section 6.3** – "…The Impact Statement must include, at a minimum:… • a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters,	■ The study plan does not provide enough information on how the proponent intends to ensure that data collection will be ethical and confidential, including how the ownership, control, access and possession of data will be managed. ■ More information is required to understand how GBA+ will be applied when assessing effects that may affect diverse subgroups differentially. ■ The study plan does not demonstrate how the proponent will make efforts to engage diverse populations and gather information sufficient to complete the Gender Based Analysis Plus (GBA+).	■ Provide more detail on how data collection will be ethical and respectful of confidentiality, including how the ownership, control, access and possession of data will be managed. ■ Update the study plan to include a description of how diverse populations will be engaged to collect information necessary to support the GBA+. ■ Provide details on the approach to assess differential effects that may affect diverse subgroups. This may require research on similar projects or communities using existing data sources and literature if information not volunteered by community members. Consent forms with information on how information will be protected should be provided in an annex.	■ Indigenous Knowledge and data obtained through engagement activities will be utilized in the assessment. Data will be disaggregated based on relevant identity factors including sex and age. Gender will not be considered unless publicly available or volunteered by respondents in the primary data collection program. This information will inform relevant intersectional analysis. Privacy and confidentiality will supersede all data requirements including disaggregation. Information from primary sources will only be reported with the informed consent of subjects. ■ Section 4.3 provides a commitment to engage with various sub-groups.	■ Section 2.1 ■ Section 4.3

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
		trappers, and other harvesters) to support the collection of information needed to complete the GBA+;…" ■ **Section 9** – "…The information provided must: • be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP); • describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; • provide disaggregated data and gender statistics; • conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; describe any relevant indicators, and how they are reflective of community input…" ■ **Section 16** – "…The proponent must describe how community and Indigenous knowledge was used to collect baseline data and assess health effects and disaggregate the source of community or Indigenous knowledge, as well as social, economic, and health data, by representation by sex, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+. In assessing effects to valued components listed below, the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders)…"				

Draft

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-12	■ **Section 4.1.1** – "Data collection will focus on the communities most likely to be impacted by the Project including Marten Falls and Aroland First Nations. Based on the nature of the socio-community, primary data will also be collected in the regional service centre of the Municipality of Greenstone. These communities are likely to experience the most Project-related change due to the location of the Project and its resulting access." ■ **Section 5.1.2** – "The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in human health and community safety effects. To be included in the community health LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that impact the human health and community safety environment." – "Based on the information provided, the proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas."	■ **Section 5** – "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan." ■ **Section 6** – "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the Indigenous Engagement and Partnership Plan…" ■ **Section 7.4** – "…The spatial and temporal boundaries to be used in the impact assessment are outlined and discussed through the tailoring process, and include comments and input from federal and provincial government departments and agencies, local government, Indigenous groups, the public and other interested parties. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups. The proponent should validate with the Agency the spatial and temporal boundaries for each valued component." ■ **Section 7.4.1** – "…Spatial boundaries are defined taking into account the appropriate scale and spatial extent of potential effects and impacts of the Project; community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; and physical, ecological, technical, social, health, economic and cultural considerations…"	■ The study plan does not provide a rationale to justify why other communities with members who are involved in land use activities within the project area would not be considered in the community health local study area (LSA). ■ The study plan does not provide enough clarity as to why most of the social determinants of health analysis will focus on communities in the LSA. Other communities in the region may be indirectly impacted by the Project, for example through potential decrease in country food availability. Project-related benefits may also be relevant to other communities in the region. ■ The study plan provides no information on how temporal boundaries of the impact assessment will be established for the Project. ■ Sections 5 and 6 of the Guidelines provide direction about the Agency's expectations for meaningful engagement with members of the public, at a minimum those listed in the Public Participation Plan (PPP), and Indigenous groups, at a minimum those listed in the Indigenous and Engagement Partnership Plan (IEPP) during the impact assessment process. The Agency expects the proponent to engage with all Indigenous groups listed in the IEPP and with the members of the public listed in the PPP to gather baseline data and to assess Project's effects.	■ Update the study plan to provide further details on defining the spatial boundaries of the Project to justify whether other communities, with members who are involved in land use activities within the project area, are or are not considered. ■ Update the study plan to define how temporal boundaries of the impact assessment will be established for the Project. ■ Demonstrate that all Indigenous groups listed in the IEPP will have an opportunity to comment on the list of criteria and indicators in the study plan and indicate whether the screened out groups have a direct community-level socio-community interest in the project footprint, prior to being screened out of the socio-community Local Study Area. Update the study plan to provide details on the engagement activities with other communities than those currently considered in the community health local study area. As per Section 5 of the Guidelines, the Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan. (This is important to confirm the assumptions made prior to finalizing the community health local study area as described in Section 4.1.1 of the study plan.)	■ Section 6.2 has been updated to provide further details on the spatial boundaries of the Human Health and Community Safety Assessment. All communities identified in Table 4-1 will be engaged with to determine their interest and / or concern with respect to potential health and safety effects of the Project. As noted in the Study Plan, the Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in Human Health and Community Safety effects. To be included in the Community Health LSA, a community must demonstrate direct community-level health or socio-economic interest in the Project footprint; from changing access to the MFFN community due to the Project, or due to potential direct and indirect Project effects on the environment that impact the Human Health and Community Safety. ■ For information regarding the larger engagement program, please refer to the IS / EA Report Consultation Plan.	■ Section 6.2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	– "Members in other communities who are involved in land use activities within the Project area are being assessed and considered under the Indigenous Knowledge Assessment, and Land and Resource Use Assessment." ■ **Table 2**: – "The communities of Marten Falls First Nation; Aroland First Nation; and Municipality of Greenstone. These communities are likely to have observable changes in health due to construction and/or the increased access to lands and communities associated with the Project. Increased access to services may place additional strain on the regional service centre." – "However, much of the social determinants of health analysis will focus on communities, particularly those in the local study area."					
HH-13	■ **Section 4.1.2** – "If the problem formulation step of the Human Health Risk Assessment (HHRA) identifies that a HHRA related to country food consumption is required, a tissue sampling program will be developed. This program will involve working with Indigenous communities to collect appropriate tissue samples from commonly harvested game species. It is anticipated that tissue sampling would focus on chemicals identified as being of concern in the Guidelines (e.g., arsenic,	■ **Section 9** – "…To understand the community and Indigenous context and baseline health profile, the proponent must:… • provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities. For game animals, the proponent is expected to work with local Indigenous groups to gather tissues-samples, as appropriate; • describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value;	■ According to the study plan, the scope of tissue sampling will be limited to an investigation of game species and a few contaminants of potential concern (COPCs). No rationale is provided for the exclusion of other types of country food (e.g., vegetation, fish) as required in the Guidelines. The COPCs (i.e., arsenic, chromium, mercury) were listed in the Guidelines as examples, based on their prevalence in certain environments and their toxicological significance to human health, but they should not be considered as an exhaustive list.	■ Update the study plan to provide further information on tissue sampling for all relevant country food types/species (e.g., plants, fish, birds and wildlife) that are identified through Indigenous engagement activities or a dietary/consumption survey. ■ Update the study plan to provide further information on COPCs from project-associated emissions, and transport pathways of the COPCs into country foods (e.g., atmospheric deposition). For instance, dust, diesel particulate matter (DPM) and polycyclic aromatic hydrocarbons (PAHs) from construction activities and road traffic could deposit onto soil/vegetation on which country foods grow/occur, or which other country foods (game/higher trophic level species) may consume.	■ See Section 7.1.2.2 for more information regarding tissue sampling. See Section 7.2.1 regarding the problem formulation step that is proposed that will examine potential COPCs of the Project.	■ Section 7.1.2.2 ■ Section 7.2.1

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	chromium, mercury and methylmercury)."	• if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities; and…" ■ **Section 16.1** – "With respect to biophysical determinants of health, the Impact Statement must…describe and quantify the health risk from exposure to COPCs (e.g., arsenic, chromium, mercury) via consumption of country foods and differential risk for vulnerable subgroups…"				
HH-14	■ **Section 5.1.2:** – "To be included in the community health LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that impact the human health and community safety environment. Community-level socio-economic impacts can be defined as changes to the indicators (Section 5.2) that can reasonably be expected to potentially exceed a negligible magnitude (Section 6.2)." – "Detailed community health profiles will be developed for communities listed in the community health LSA. The community health RSA will be profiled in less detail with key interactions and thematic information provided. Statistics collected on the RSAs will focus on larger regional areas such as	■ **Section 6** – "…the proponent must provide Indigenous groups with an opportunity to:… – comment on the list of valued components and indicators…" ■ **Section 9** – "…To understand the community and Indigenous context and baseline health profile, the proponent must: • complete a community health profile that describes the overall health of the community across standard health indicators including any specific community identified health concerns (real or perceived) that may be impacted by the Project…"	■ It is unclear whether Indigenous groups will be provided with the opportunity to comment on the current list of criteria and indicators provided in the human health and community safety study plan prior to the proponent determination that an Indigenous group requires a community health profile that is detailed or less detailed. ■ It is unclear why members in other communities who are involved in land use activities within the project area will be assessed and considered under the Indigenous Knowledge Assessment and the Lands and Resource Use Assessment rather than assessed and considered in the human health and community safety study plan.	■ Update the study plan to demonstrate that the Indigenous groups have been provided an opportunity to comment on the list of criteria and indicators in the human health and community safety study plan prior to the determination that the Indigenous groups will require detailed or less detailed community profiles. ■ Update the study plan to clarify and cross-reference information collected through the land and resource use and Indigenous knowledge data collection that will be considered in the human health and community safety study. ■ Revise the study plan to clarify what human health and community safety assessment will be considered under the Indigenous Knowledge Assessment and the Lands and Resource Use Assessment for those communities who are involved in land use activities within the project area.	■ The list of VCs and indicators have not yet been circulated to Indigenous Communities for review and comment. They are considered to be draft and will be made available to interested communities once the IA / EA has commenced. ■ The study plan includes references to the consideration of Indigenous Knowledge in the Human Health and Community Safety Assessment (See Section 5). Table 9-2 outlines which other assessment results will be considered in the assessment of Human Health and Community Safety effects.	■ Section 5 ■ Table 9-2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	unorganized regional districts. While many Indigenous communities are located within the regional study area, these communities will not be profiled individually given their relation to the Project is predominantly focused on cumulative effects from future developments." – "Members in other communities who are involved in land use activities within the Project area are being assessed and considered under the Indigenous Knowledge Assessment, and Land and Resource Use Assessment."					
HH-15	■ **Section 5.2, Table 3** – "Human Health and Community Safety Criteria and Indicators Criteria: Public safety Indicators: Project-related Accidents; Vehicular Accidents; Violence and Harassment"	■ **Section 16.2** – "With respect to Social Determinants of Health, the Impact Statement must:… • describe effects on the safety of women and girls from project activities including worker accommodation, and as a result of new roads in remote areas…"	■ The study plan only considers violence and harassment between the work force and the community, and does not explicitly discuss how the Project may affect the safety of Indigenous women and girls, particularly the risk of opening a road in general – including issues such as hitchhiking and additional safety risks for Indigenous women and girls.	■ Revise the study plan to provide more information around the 'Violence and Harassment' indicator to describe how it will address the safety risks to Indigenous women and girls.	■ The Violence and Harassment indicator has been expanded to consider this impact and includes the following statement: "Also to address potential safety risks to Indigenous women from users of the road during the operations period (e.g., human trafficking)."	■ Table 9-2
HH-16	■ **Section 5.2** – "At this time, criteria and indicators have been developed considering engagement undertaken to date with Indigenous communities, the nature of the project, and knowledge of the northern Ontario community health environment. Criteria and indicators may be further refined through future engagement activities and the collection of Indigenous knowledge."	■ **Section 16** – "…Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided... – …In addition to the references listed in sections 7.2 and 9, the following sources offer examples of data tools or data sources that include indicators potentially relevant to reporting on the determinants of health: • PHAC, Health Inequalities Data Tool: (https://healthinfobase.canada.ca/health-inequalities/indicat); • Statistics Canada: (https://www150.statcan.gc.ca/n1/daily-quotidien/160412/dq160412a-eng.htm);	■ The study plan does not identify best practice approaches for the development of criteria and indicators for the human health impact assessment. ■ The study plan only mentions past and future engagement activities and Indigenous knowledge as the basis for developing criteria and indicators without providing further details. ■ The Guidelines provide resources on health impact assessment (HIA) which includes scoping of determinants of health. A systematic approach using factors such as public interest, availability of data, and potential impact on health would	■ Provide an explanation for which best practices or other relevant guidance were used to identify, prioritize and select the proposed criteria and indicators. ■ Provide a clear description in the study plan of how all Indigenous groups listed in the IEPP will have opportunities to provide Indigenous knowledge, including the validation of the baseline data collected. This should include a description of the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the group, to demonstrate that guidance outlined in Section 6.2 of the Guidelines has been incorporated into this study plan.	■ Section 9.2 outlines factors that were considered in the selection of the VCs and indicators. It is also noted that the VCs and Indicators are draft and subject to further input from interested persons. Specific comments on the indicators identified or suggestions for other indicators by the Agency is welcome. ■ See previous responses regarding commitment to engage with interested communities, as well as Section 4 of the Study Plan and the IS / EA Report Consultation Plan for more information on engagement. ■ Section 7.2 includes a statement that commits to validating that information	■ Section 7.2 ■ Section 9.2 ■ Table 9-2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	■ **Table 3: Human Health and Community Safety Criteria and Indicators** – Criteria: Public safety Indicators: Project-related Accidents; Vehicular Accidents; Violence and Harassment	• Canadian Institute for Health Information (CIHI): (http://www.cihiconferences.ca/indicators/epub/tables_e.ht ml#comm_health); • First Nations Information Governance Centre: (https://fnigc.ca/rhs3report); • Positive Mental Health Indicators Framework (PHAC): (https://health-infobase.canada.ca/positive-mental-health/); and • Past health impact assessments (https://www.pewtrusts.org/en/projects/health-impactproject)..."Section 16.2 – "With respect to Social Determinants of Health, the Impact Statement must:… describe effects on the safety of women and girls from project activities including worker accommodation, and as a result of new roads in remote areas;…"	avoid bias and increase transparency in the criteria/indicator selection process. For example, a determinant that has a high potential to negatively impact health and has a high level of public interest/concern would be considered a higher priority than a determinant that has a low potential impact on health and little to no public interest/concern. If there are any high priority determinants that are being excluded from further assessment, a sound rationale should be provided. ■ The following is observed from the study plan: – Although the rationale provided for the "Project-related Accidents" indicator includes potential injuries to community members, the expression of change is limited to work-related injuries reported at the project site. The assumption that all community-member injuries would be reported at the project site is not justified. – The rationale provided for the "Violence and Harassment" indicator only mentions conflicts with the construction work force, and does not reflect transportation and access that the road may facilitate during operations (e.g., to work, to communities, to services). For instance, the road may be used for hitchhiking, which may introduce additional safety considerations for Indigenous women and girls. – The rationale for the "Vehicular Accidents" indicator does not specify whether the assessment will consider foot traffic along the road.	■ Provide a rationale for the proposed expression of change for the "project-related accidents" indicator with respect to injuries to community members. ■ Provide further information on whether non-vehicular use of the road (e.g., hitchhiking, walking) will be considered in the assessment, and how this will be considered in the indicators and expressions of change. The proportion of residents who own a vehicle or driver's license could be an indicator of how the road will be used, disaggregated by GBA+ factors. Provide further information on whether and how the Public Safety indicators will specifically address concerns for the safety of Indigenous women and girls.	received has been accurately documented. ■ The Project-related Accidents indicator is focused on construction and operations and maintenance activities. It is distinct from the indicator that will examine Road Use Accidents. More information on this indicator can be found in Table 9-2. ■ The Road Use Accidents indicator will consider the potential for accidents to all road users, including pedestrians and hitchhikers. More information on this indicator can be found in Table 9-2.	

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-17	■ **Section 6.2 Table 4: Social and Environmental Determinants of Health Magnitude Definitions** – Definitions: An effect that [may or may not be/ is small but/ is clearly] discernible and [within/beyond] the human health and community safety variability defined by baseline conditions. The effect is [within/beyond] the capacity of the health system to respond and/or [will not/ will] alter the current health structures. – Rationales: [negligible/low/medium/high] effects [are small and may not be/ are] noticeable. These effects [do not/may or may not/do] represent a change in day-to-day life at a community level and [can/ cannot] be responded to within the current health system resulting in systemic change.	■ **Section 16.2** – "…The variation of effects during different project phases and times of year should be described as well as potential project-related effects on the community health profile (e.g., changes to existing communal activities, support networks and cultural/spiritual practices that may contribute to community resilience…" ■ **Section 21** – "…Proponents must describe the extent to which residual effects are adverse. Where relevant, or where best practice or evidence-based thresholds exist, effects should be described using criteria to quantify adverse effects... – In addition, effects should be characterized using language most appropriate for the effect (for example, impacts on the exercise of Aboriginal and Treaty rights and social effects may be described differently from biophysical effects) … – The Impact Statement must:… • characterize residual effects for human health using human health-related criteria most appropriate for the carcinogenic and non-carcinogenic health effects of non-threshold contaminants;… • provide the rationale for the choice of criteria used to determine the extent to which the predicted effects are adverse. The information provided must be clear and sufficient to enable the Agency, review panel, technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of effects;…"	■ In the study plan, the magnitude of residual effects is proposed to be determined partly based on a discernable effect, which is a qualitative criterion. ■ There is no indication on what type of information will be used (e.g., professional judgement, community, national or internationally recognized thresholds) to apply the criterion to each of the indicators proposed in Section 6.2 of the plan. ■ Magnitude is also proposed to be determined based on the capacity of the "health system and structures" without defining what these comprise, nor their scale (e.g., community-based, local, regional). The difference between a medium and high magnitude appears to be solely linked to the capacity of health care services rather than the human health risk itself.	■ Provide clear definitions for quantitative and qualitative criteria that will be used to measure the expression of change for each indicator in Section 6.2 of the study plan, in order to demonstrate that the requirements of Sections 16.2 and 21 of the Guidelines would be met. ■ Quantitative indicators (preferably comprising evidence-based thresholds) should be used for the assessment of residual effects on biophysical determinants of health (e.g., federal and provincial environmental quality standards and guidelines) and human health risks (e.g., Hazard Quotient and Incremental Lifetime Cancer Risk). ■ Clarify how a discernable effect will be identified and used to determine the magnitude of residual effects. Where possible, include quantitative indicators and evidence-based thresholds / definitions relevant to the proposed indicators in Section 6.2 of the study plan, in order to demonstrate that the requirements of Sections 16.2 and 21 of the Guidelines would be met. ■ Provide a definition of the "health system and structures", including location with respect to potentially affected communities, and links to other health practices or community support services that contribute to resilience.	■ Please see Section 7.2.1 regarding the proposed approach to problem formulation in regard to environmental determinants of health. Should a HHRA study be determined to be warranted, more specific thresholds can be developed. Social determinants of health effects will be described qualitatively in a manner consistent with the magnitude definitions in Section 9.6. Quantification will be pursued where possible but may not be feasible for social factors related to Human Health and Community Safety. However, the magnitude of effect will be noted with respect to different sub-groups and relevant identity factors, where applicable.	■ Section 7.2.1
			■ Refer to the following resources for best practices on developing assessment criteria: International Finance Corporation. 2009. Introduction to Health Impact Assessment. Available at: https://www.ifc.org/wps/wcm/connect/e7f68206-7227-4882-81ad-904cd6387bb7/HealthImpact.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-e7f68206-7227-4882-81ad-904cd6387bb7-jqeABQN.		■ This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A.	■ Table 9-2 ■ Appendix A
			■ Public Health Expertise and Reference Centre. 2014. Social Impact Assessment in the Environmental Sector: health network support guide. Available at: https://www.inspq.qc.ca/en/publications/1800		■ This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A.	■ Table 9-2 ■ Appendix A

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-18	■ **Section 6.1.1** – "Construction of future expenditure related to new human health and community safety facilities, services and/or infrastructure due to Project effects."	■ **Section 9** – "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… • access to health services;…"	■ The study plan does not include information on access to health services, nor the impact of the Project on existing health services.	■ Provide further information on access to health services as well as potential increase in burden to existing community health centres (i.e., nursing stations), due to project construction activities.	■ As outlined in Table 9-2, the indicator Access to Health Services is included and will also consider demand changes to health services during the construction period.	■ Table 9-2
HH-19	■ **Section 6.1.2** – "Selection of Exposure Scenarios: This task reviews and considers outcomes of study area characterization, exposure pathway and route selection, and COPC identification steps of problem formulation, as well as consideration of applicable regulatory HHRA guidance. The exposure scenarios in a HHRA must reflect the means by which human receptors are most likely to come into contact with chemicals in study area environmental media and/or locally harvested food items, as a function of study area access and use patterns. Outcomes of community engagement and key IA component studies will be used to refine the development of exposure scenarios." – "In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates,	■ **Section 9** – "…The information provided must…describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups;…" – "…To understand the community and Indigenous context and baseline health profile, the proponent must:… • describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys);…"	■ The study plan states that a dietary/consumption survey will be considered only if a HHRA is deemed to be warranted rather than as part of the problem formulation step. ■ This is despite the statement that "the exposure scenarios in a HHRA must reflect the means by which human receptors are most likely to come into contact with chemicals in study area environmental media and/or locally harvested food items, as a function of study area access and use patterns." ■ Insufficient detail is provided on the proposed Indigenous Engagement and Indigenous Knowledge Program (see HH-07) to confirm whether a dietary/consumption survey component is included, despite the statement in Section 6.1.2 that "Outcomes of community engagement… will be used to refine the development of exposure scenarios".	■ Provide a characterization of local Indigenous people's consumption of country foods as part of the baseline assessment, as per Section 9 of the Guidelines. ■ Provide a description of how site-specific information on the consumption of country foods will be acquired to establish the baseline conditions and form the HHRA's problem formulation step. Alternatively, consider making use of surrogate data from reference sites. ■ Refer to the following sources to acquire country food consumption data: – University of Ottawa, Université de Montréal, and Assembly of First Nations. 2014. First Nations Food, Nutrition & Environment Study, Results from Ontario 2011 – 2012. Available at: http://www.fnfnes.ca/docs/FNFNES_Ontario_Regional_Report_ENGLISH_2019-10-16.pdf. – Health Canada. 2018. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Country Foods. – Health Canada. 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment.	■ As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection programs will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting. ■ The data sources references will be considered and are listed as preliminary data sources in Appendix A	■ Table 9-2 ■ Appendix A

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	frequencies, and quantities. Such a survey could also determine the harvesting locations of country food items, which would inform whether or not the project is likely to influence country food contamination at a given harvesting location."					
HH-20	■ **Section 6.1.2** – "If the problem formulation determines that a HHRA is required, then a HHRA study would be conducted according to current Health Canada guidance documents and recommended approaches. In that event, IAAC would be consulted for input (…) If the problem formulation determines that a HHRA study is not warranted in relation to the project, rationale will be provided." – "Compiling of Issues of Concern: Based on the outcomes of community engagement programs, human health-related issues of concern would be compiled and tabulated. The documented issues would be considered in the subsequent tasks of problem formulation with respect to whether or not and how they could be evaluated using HHRA tools and methods." – "It is possible that a HHRA study may be deemed unnecessary for technical reasons (such as lack of exposure pathways or lack of chemicals of concern in study area media), but still be conducted to enable	■ **Section 16.1** – "With respect to biophysical determinants of health, the Impact Statement must: … • in situations where project related air, water or noise emissions meet local, provincial, territorial or federal guidelines, and yet public concerns were raised regarding human health effects, provide a description of the public concerns and how they were or are to be addressed;…"	■ The study plan does not present an approach that demonstrate that concerns raised by Indigenous groups and the public regarding human health effects will be recorded and addressed also in situations where project related air, water or noise emissions meet local, provincial, territorial or federal guidelines.	■ Update the study plan to demonstrate that the record of engagement will include descriptions of how issues raised by Indigenous groups and the public regarding the human health risk assessment have been considered in the Impact Statement and how they were addressed throughout the impact assessment, including situations where project related air, water or noise emissions are predicted to meet local, provincial, territorial or federal guidelines.	■ The documentation for the Human Health and Community Safety Assessment will include all issues raised related to this discipline as well as the responses to these issues, including how applicable and relevant issues and concerns were assessed.	■ IS / EA Report Consultation Plan ■ Record of Consultation and Engagement
			■ If a human health risk assessment is not deemed capable of effectively addressing human health related issue(s) raised by public, Indigenous groups or other stakeholders, the proponent should consider additional measures (e.g., ambient monitoring of air, water, country foods). ■ Refer to the following sources to support the monitoring of potentially impacted environmental media: as per Health Canada's guidance documents: – Section 6.8 of Health Canada's 2016 Guidance for Evaluating Human Health Impacts in Environmental Assessment: AIR QUALITY. – Section 6.1.4 of Health Canada's 2016 Guidance for Evaluating Human Health Impacts in Environmental Assessment: DRINKING AND RECREATIONAL WATER QUALITY. – Section 5.4 of Health Canada's 2018 Guidance for Evaluating Human Health Impacts in Environmental Assessments: COUNTRY FOODS.	■ Issues related to air and water quality will be covered by other disciplines, including the Atmospheric Environment Study Plan and Surface Water Study Plan. As noted in Table 9-2, the results from these other assessments will be considered in the Human Health and Community Safety Assessment.	■ Table 9-2 ■ Atmospheric Environment Study Plan ■ Surface Water Study Plans

DRAFT

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	addressing public or other stakeholder concerns raised about human health issues. This would only occur though if HHRA tools and methods are capable of addressing the issue(s) effectively. The HHRA problem formulation step would inventory and list all documented public and other stakeholder concerns that relate to project human health effects, and these concerns would be considered for all problem formulation tasks."					
HH-21	■ **Section 6.1.2** – "In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities. Such a survey could also determine the harvesting locations of country food items, which would inform whether or not the project is likely to influence country food contamination at a given harvesting location."	■ **Section 9** – "…The information provided must:… • describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups;… – To understand the community and Indigenous context and baseline health profile, the proponent must:… • describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys);…"	■ The study plan indicates it will consider a dietary/consumption survey only if a human health risk assessment is warranted. ■ An explicit list of all country foods consumed by the Indigenous groups should be included as part of the baseline assessment. Indigenous groups must be provided opportunities to identify country foods that are harvested and consumed, and at what rates, frequencies, and quantities prior to, or during, the problem formulation step.	■ Provide, as part of the baseline human health assessment, further information about the plan to collect data regarding country foods consumed by each Indigenous group, including the country foods that are harvested and consumed, and consumed at what rates, frequencies, and quantities. ■ Refer to the First Nations Food, Nutrition and Environment Study to obtain suggested sources for consumption data, available at www.FNFNES.ca	■ As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection programs will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting.	■ Table 9-2
HH-22	■ **Section 6.1.2** – "A more comprehensive HHRA, if necessary, would also be expected to consider all human receptor age classes (i.e., infant, toddler, child, adolescent, adult) for	■ **Section 16.1** – "With respect to biophysical determinants of health, the Impact Statement must:… • provide a detailed rationale/ explanation if a determination is made that an assessment of any COPCs (e.g., arsenic, chromium, mercury) or exposure pathways should be	■ The study plan does not provide enough detail regarding how "human receptor age classes" have been considered. ■ It is unclear how the study plan will meet the requirements of Sections 16.1 and 16.2.	■ Provide more information on how human receptor age classes will be considered, as per Sections 16.1 and 16.2 of the Guidelines, for the determination of whether a human health risk assessment is required.	■ In the collection of primary data, age will be considered. Targeted engagement with different age groups (e.g., youth and elders) will be undertaken. As noted in Section 9.6, where appropriate, information regarding residual effects will be disaggregated by sex, gender, age	■ Section 9.6

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	both males and females. Potential exposure pathways that would likely be considered in a more comprehensive HHRA include: • soil ingestion/dermal contact • drinking water ingestion • outdoor air and dusts inhalation • country foods ingestion – In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities."	excluded and/or screened out of the assessment and if the proponent decides to deviate from the suggested assessment approaches and methods or determines that such assessment is not warranted;… • food security: describe effects to availability, use and consumption of country foods (traditional foods) and health impacts of this effect; and …" ■ **Section 16.2** – "With respect to Social Determinants of Health, the Impact Statement must:… • describe and quantify specific thresholds and document if different thresholds were considered for vulnerable populations, including by sex and age; provide rationale and justification if specific thresholds not used;…"			and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups.	
HH-23	■ **Section 6.2, Table 4** – "An effect that may or may not be discernible but is within the human health and community safety variability defined by baseline conditions. The effect is within the capacity of the health system to respond and/ or will not alter the current health structures." – "An effect that is clearly discernable and beyond the human health and community safety variability defined by baseline conditions. The effect is beyond the capacity of the health system to respond and/ or will alter the current economic structures."	■ **Section 16.2** – "…The variation of effects during different project phases and times of year should be described as well as potential project-related effects on the community health profile (e.g., changes to existing communal activities, support networks and cultural/spiritual practices that may contribute to community resilience…" ■ **Section 21** – "After considering the consequences of technically and economically feasible mitigation measures, the Impact Statement must describe any residual environmental, health, social or economic effects of the Project and whether those effects would occur in the local or regional study area. This includes consideration of both positive and negative effects of the Project and input received from the public, Indigenous groups,	■ It is not clear that the definitions of magnitude follow the guidance provided in the Guidelines. There is no discussion of input from Indigenous groups and other stakeholders in defining magnitude of effect and it is not clear how the level of concern expressed through engaging with the affected Indigenous groups and community members will be taken into consideration. ■ The study plan does not explain why health system capacity is an indicator of magnitude and not effect to human health. Health system capacity typically deals with symptomatic people who have in most cases, reached a state of ill health and disease while the goal of an impact	■ Revise the study plan to provide definitions of magnitude that follow the guidance provided in the Guidelines. ■ Update the study plan to provide clarity on how 'discernable' effects will be defined and how the input and level of concern of Indigenous groups and the public will be taken into consideration. ■ Update the study plan to clarify why the indicator 'health system capacity' is proposed as an indicator of magnitude and not of effect to human health.	■ Definitions of magnitude of effect have been edited to be more consistent with the TISG. The reference to "health system capacity" relates to the capacity of the health system to mitigate possible effects. This has been clarified in Table 9-4.	■ Table 9-4

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
		lifecycle regulators, jurisdictions, federal authorities and other interested parties. If an Indigenous group identifies that there are residual effects to rights or interests, those effects should be carried through for residual effects analysis. Where appropriate, information regarding residual effects should be disaggregated by sex, gender, age and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups as per the GBA+… – Characterizing effects should be based largely on the level of concern expressed through engaging with the affected Indigenous groups and community members…"	assessment is to avoid adverse effects. Using health system capacity as an indicator of magnitude does not align with this goal.			
HH-24	■ **Section 7, Table 5, ID 6**: – 'Gender will not be considered unless publicly available or volunteered by respondents to the primary program."	■ **Section 6.3** – "…The Impact Statement must include, at a minimum:… • a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+;…" ■ **Section 7.1** – "…The application of GBA+ to baseline conditions for diverse subgroups is necessary to support the GBA+ of effects. GBA+ uses standard social science quantitative and qualitative data collection and analysis methods to describe baseline conditions across diverse subgroups…" ■ **Section 9** – "…The information provided must:… • conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; describe any relevant indicators, and how they are reflective of community input;…"	■ The study plan indicates that gender will not be considered unless publicly available or volunteered by respondents to the primary program, but provides no further information on why GBA+ or its analytical framework will not be considered. ■ Section 6.3 of the Guidelines requires the proponent to provide a description of effects to collect and compile information needed for a GBA+ analysis. This may require research on similar projects or communities using existing data sources and literature if information not volunteered by community members. Consent forms with information on how the information will be protected should be provided in an annex.	■ Provide details on how the proponent plans to assess effects that may affect diverse subgroups to meet the requirements of the Guidelines. ■ Describe how the proponent will engage diverse populations to collect information necessary to support the GBA+.	■ Section 4.3 outlines the proposed approach to the consideration of identify and GBA+. If primary data are not available from all communities in the LSA to support the GBA+ analysis, then information from secondary sources would be considered to complete the assessment to the best of our ability. Ideally, sufficient primary data is provided to support the GBA+ analysis can be obtained. If this information is not provided by the communities then an approach to complete the GBA+ assessment without these data will be developed with input from the Agency.	■ Section 4.3
			■ The proponent should seek to solicit information necessary to support the GBA+, and if unsuccessful, efforts made should be described in the Impact Statement. Section 6.3 of the Guidelines state that the Impact Statement must include, at a minimum, a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+. ■ Refer to Agency guidance for more information on the GBA+ approach: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html	■ Noted. See above response.	■ Section 4.3

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-25	■ **Section 7, Table 5, ID 8**: – "Data collection, information sources, study areas and assessment methods have been designed respective of the guidance included here. This will include drawing on other impact assessments (bio-physical and socio-economic), data sources provided by IAAC, and relevant primary and secondary data sources including the socio-economic primary data program and Indigenous knowledge program."	■ **Section 9** – "…In preparing the report on baseline community health profile, the proponent must identify the environmental and social area of influence of the Project. To understand the community and Indigenous context and baseline health profile, the proponent must: • provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities… • describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys); • if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities; and • describe the status of food security and food sovereignty within the Indigenous groups and local communities."	■ The study plan does not present a clear approach to understand which country foods (traditional foods) are consumed by Indigenous groups and local communities. ■ It is also unclear if the proposed human impact assessment will consider food security and effects to country foods (traditional foods) availability, use and consumption by Indigenous groups and local communities. ■ The concordance table in Section 7 indicates that the requirements of the Guidelines are covered in Section 2, 3, 4, 5 and 6 of the study plan, although this information is not presented with a level of detail that allows validation.	■ Update the study plan with the description of the approach proposed to understand which country foods are consumed by Indigenous groups and local communities, as required by Section 9 of the Guidelines. Provide further information on the assessment of food security, availability and use. ■ Provide a description of the approach to collect baseline contaminant concentrations in country food tissues. ■ Refer to the First Nations Food, Nutrition and Environment Study to access existing study/data sources for baseline consumption of country foods, and food security, available at www.FNFNES.ca	■ As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection program will be co-ordinated with the program to collect Indigenous Knowledge. See Appendix B of the Aboriginal & Treaty Rights study plan for sample questions related to country food harvesting. The specific details on the program to collect the information are to be developed. ■ Refer to section 7.1.2.2 regarding tissue sampling. ■ The referenced study will be reviewed and considered and has been included in the preliminary list of data sources in Appendix A.	■ Table 9-2 ■ Section 7.1.2.2 ■ Appendix A
HH-26	■ **Section 7, Table 5, ID 8:** – "Data collection, information sources, study areas and assessment methods have been designed respective of the guidance included here. This will include drawing on other impact assessments (bio-physical and socio-economic), data sources provided by IAAC, and relevant primary and secondary data sources including the socio-economic primary data program and	■ **Section 9** – "…To understand the community and Indigenous context and baseline health profile, the proponent must:… • provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels…. • describe drinking water sources which may be effected by the Project… • provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods)	■ The study plan does not present a clear approach to meet requirements of Section 9 of the Guidelines. There is no specific reference to the checklists requested for completion, which would support the Health Canada verification of the assessment's main components.	■ Provide further clarification in the concordance table to indicate explicitly how the Section 9 requirements of the Guidelines will be addressed in the human health and community safety study plan. Provide further information to indicate whether the checklists from Health Canada guidance documents will be included in the Impact Statement. ■ Refer to the following Health Canada guidance document checklists: Air Quality, Noise, Drinking and Recreational Water Quality, Country Foods, and Human Health Risk Assessment	■ The referenced Health Canada guidance documents will be referenced and considered in the assessment.	■ Appendix A

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	Indigenous knowledge program." ■ **Section 7, Table 5, ID 21**: – "Completion of a consolidated checklist applicable to the Project may be considered by the proponent, if provided by Health Canada."	consumed by Indigenous groups and local communities… • describe the consumption of country foods (traditional foods) outside of the commercial food chain… • if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities;…" ■ **Section 16.2** – "…It is requested that the proponent complete the checklists provided in the Health Canada guidance documents so as to assist Health Canada and other participants verify that the main components of the assessment are completed and to identify the locations of this information. Completing the checklists is especially useful when the analyses on a topic are found in multiple sections of the Impact Statement documentation..."				
HH-27	■ **Section 7, Table 5, ID 11**: – "Assessment of the effects of the Project on human health must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices to determine perceived risk. Real and perceived risk, as identified through engagement, will be considered in the assessment."	■ **Section 16** – "…The assessment must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices and as reflected in these guidelines, to determine perceived risk..."	■ The study plan does not provide a description of how the perception of risk related to food and water will be considered.	■ Provide further information on how the Impact Statement will consider the perception of risk related to food and water.	■ When engaging with communities as part of the primary data collection program, individual perceptions of risk regarding the project will be explored.	■ Section 7.1.2.1
			■ Baseline study/survey should be conducted using standardized public opinion and risk perception questionnaires to assess risk perceptions within the affected communities.		■ The use of surveys and questionnaires will be considered when exploring issues and concerns related to risk perception of the project, including the perceived risk associated with road use.	■ Section 7.1.2.1
HH-28	■ **Section 2**: – "Health determinants related to social structures and equity factors will primarily be documented in other reports." ■ **Section 6.1.1:** – "The Social Determinants of Health Assessment will assess Project and cumulative impacts using the same	■ **Section 10** – "…Baseline information must be sufficiently disaggregated and analyzed to understand the differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities; and the impact of these differences in their lives, including consideration of disproportionate effects to surrounding communities…"	■ The study plan does not provide a description of how data used to assess the social determinants of health will be disaggregated and analyzed to show differences in norms, roles, and relations, needs, effects, etc. ■ The study plan indicates that the methodologies and frameworks to assess the social determinants of	■ Update the study plan to provide clarification on the methodology that will be used to assess the possible impact of the proposed project on the social determinants of health. Health Canada supports a detailed human impact assessment, as indicated in the Guidelines, be used in determining whether positive and/or adverse impacts to the determinants of health are expected to result from a project. Appendix 1 of the Guidelines	■ Sections 7.1.2.1 and 7.2 provide an expanded description of the approach to the social determinants of health. References have been added to potential pathways which will be confirmed during the IA / EA process.	■ Section 7.1.2.1 ■ Section 7.2

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
	methodologies and frameworks as the larger Project Impact Assessment." – "The Social Determinants of Health Assessment is informed by academic literature, best practices in social impact assessment and previous similar EAs. The methodology to complete the Social Determinants of Health Assessment will include gathering local knowledge and utilising consultation processes to analyze the concerns of interested and affected communities related to the criteria and indicators as per Section 5.2. (…) Data used in the Social Determinants of Health Assessment will be disaggregated (where possible) and analyzed to understand differences in norms, roles, and relations for diverse subgroups; the different level of power their hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives related to social determinants of health criteria and indicators." ■ **Section 7, Table 5, ID 12:** – "The approach proposed is holistic and considers relevant disciplines." ■ **Section 7, Table 5, ID 13 and ID 17:** – "Interactions between effects will be considered as part of the holistic approach."	■ **Section 16** – "…Interconnections between human health and other valued components and interactions between effects must be described, particularly where proponents suggest a potential impact occurring indirectly as the result of the proposed Project. Given that changes to any given health determinant may result in an impact to one or more health outcomes, it is important to include interactions within and across the higher-level health determinants (i.e., Level 2, pertaining to material circumstances/resources and psychosocial factors, and Level 3, pertaining to structural factors and equity factors) in order to identify the pathways of health effects that are most likely to be affected by project-related changes to the determinant(s) of health… The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Applying a "determinants of health approach" in the assessment of human health effects will support the identification of these linkages, as well as of disproportionate effects across subgroups... – A detailed health impact assessment inclusive of other reasonably foreseeable future projects would be appropriate to capture potential positive and adverse effects on social factors and economic factors (and where applicable cultural factors) in addition to the biophysical environmental factors. A health impact assessment may be able to assess the positive and negative consequences (i.e., differential) of effects on the environment and human health of those Indigenous groups whose territories are lost or removed along the road alignment..."	health will be similar to the methodology used in the larger, project impact assessment. However, it does not mention which methodologies and frameworks are being referred to, and subsequent sections only refer to academic literature, best practices in social impact assessment, and previous similar EAs. The best practices in HIA proposed in the Guidelines are not mentioned in the study plan. However, there is mention of "best practices in social impact assessment" and "previous similar EAs" (which would have been completed under previous assessment legislation), without explaining how these are equivalent to the recommendations in the Guidelines. ■ Specifically, the study plan appears to be focused on collecting data on biophysical and social determinants of health, without providing details on how these will be analyzed holistically in the human health assessment. The plan does not provide a preliminary list of determinants that may be considered. Additionally, no detail is provided on how health determinants documented in other reports (e.g., related to social structures and equity factors) will be incorporated in the health assessment. Given that project-related changes to one or more determinants of health may lead to secondary changes ultimately affecting the immediate health determinants (health-related behaviour and human biology) underlying health outcomes, it is important to include interactions within and across health determinants in order to assess actual health impacts.	includes a number of resources and guidance to support a human impact assessment. ■ Provide a preliminary list of determinants of health relevant to the Project. Resources and examples of potentially relevant indicators are provided in the Guidelines. ■ Describe how the assessment will identify interactions within and across health determinants and the linkages between effects. Effect pathways (causal models) can be used to outline how the Project could directly and indirectly affect specific health issues. This approach will help prioritize the health effects for further assessment. A matrix with supporting explanation can be a useful way to organize a qualitative analysis and to convey results in a manner that is easy to understand. Describe how data will be disaggregated and analyzed to show differences in norms, roles, and relations, needs, effects, etc.		

Comment # / Ref #	DRAFT Study Plan Section	TISG Section	Comment / Context	Action Item	Final Response	Study Plan Reference
HH-29	■ **Section 7, Table 5, ID 18:** – "Describe food security effects to country foods and health impact of these effects."	■ **Section 9** – "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… • food security, access to country foods (traditional foods);…"	■ The study plan does not describe the approach proposed to collect baseline data on access to country food, nor the impact of the Project on country food availability and food security.	■ Update the study plan to provide information on how baseline studies will collect information on access to country foods and on the potential impact of project construction on the availability of country foods (traditional foods) and on food security.	■ As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection program will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting. The specific details on the program to collect the information are to be developed.	■ Section 7.1.2.1 ■ Table 9-2
HH-30	■ **Section 7, Table 5, ID 24:** – "Will the baseline studies consider mental health and well-being in Neskantaga and other affected communities?" ■ **Section 7, Table 5, ID 25:** – "How will Marten Falls demonstrate that the Project will improve mental health and wellbeing in the context of mitigating the ongoing crises? What kinds of evidence will Marten Falls rely on to demonstrate this?	■ **Section 9** – "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… • community mental health and well being (including feelings of isolation, remoteness, concern for future generations, and other elements that have been raised in the wake of youth suicides in rural and remote FN communities);…"	■ The study plan does not consider the issue of mental health as a valued component related to public health and therefore, it remains unclear how changes to mental health will be evaluated.	■ Update the study plan to provide further information on how baseline studies may consider the mental health and well-being of potentially affected communities, and how the Project may positively or adversely affect mental health and well-being, particularly in the context of the ongoing crises affecting other communities.	■ An indicator specific to the potential for changes to Mental Health has been added to Table 9.2. Section 7.2 has also been added to specifically reference the consideration of potential changes to mental health as a result of the Project.	■ Section 7.2 ■ Table 9-2

Draft

Draft Study Plan Comments – Provincial

Dra

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
1	■ N/A	■ MECP, Environmental Assessment Branch	■ Please review EAB comments on the Wildlife, Ungulates and Vegetation work plans that may apply to this work plan.		■ Applicable comments and responses have been included in this table.	■ N/A
2	■ Page 9, 2. 5.1.2	■ MECP, Environmental Assessment Branch	■ Page 9 states: "The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in human health and community safety effects. To be included in the community health LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that impact the human health and community safety environment. Community-level socio-economic impacts can be defined as changes to the indicators (Section 5.2) that can reasonably be expected to potentially exceed a negligible magnitude (Section 6.2)." ■ This excerpt implies that it is up to Indigenous communities to self-identify and demonstrate as being potentially impacted by the project from a human health perspective in order to be considered in the human health assessment. The proponent is required to identify and consider all potential impacts, direct and indirect, from its project. The proponent should ensure it is capturing these potential effects to all relevant communities. The proponent should also ensure that communities are aware of opportunities to provide input and raise concerns, including for the human health assessment.	■ Please ensure the EA study design will capture potential direct and indirect effects to all relevant Indigenous communities. The proponent should also ensure that communities are aware of opportunities to provide input and raise concerns, including for the human health assessment.	■ Section 6 has been updated regarding the spatial boundaries of the Human Health and Community Safety Assessment. All communities will be engaged with to determine interest and / or concern with respect to potential health and safety effects of the Project. As noted in the Study Plan, the Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in Human Health and Community Safety effects. To be included in the Community Health LSA, a community must demonstrate direct community-level health or social-economic interest in the Project footprint; from changing access to the MFFN community due to the Project; or due to potential direct and indirect effects Project effects on the environment that impact the Human Health and Community Safety environment.	■ Section 6
3	■ Page 10, Table 2	■ MECP, Environmental Assessment Branch	■ Table 2 indicates the Project Study Area "encompasses the 100 m wide CAR right-of-way (ROW), temporary construction access roads, work areas, worker camps, and long-term aggregate sources and associated access roads." ■ It is not clear whether this refers to all alternatives or if the proponent intends to narrow the scope to the preferred alternatives for the road and supporting infrastructure.	■ Please clarify if the Project Study Area refers to all alternatives or if the proponent intends to narrow the scope to the preferred alternatives for the road and supporting infrastructure.	■ The Project Development Area refers to all route alternatives plus other project components determined to be required (e.g., pits and quarries).	■ Section 6.2
1	■ General	■ MECP (Senior Regulatory Toxicologist Comments)	■ The document highlights the need for site characterisation, hazard identification, and potential risk identification. The document identifies the need to assess the human health status of the current population which is very small (about > 250 people) sized.	■ Further clarifications needed in this document are listed below.	■ Refer to responses to detailed comments following this comment.	■ N/A

DRAFT

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
2	■ Page 6, s. 4.1.2	■ MECP (Senior Regulatory Toxicologist Comments)	■ The document indicates tissue samples of commonly harvested game species will be analyzed.	■ Clarification is required what these species are and why it is limited to game species only?	■ The tissue sampling program, if determined to be warranted, would be focussed on species that are consumed by local communities. The exact species will need to be confirmed.	■ Section 7.1.2.2
3	■ Page 19, s. 6.1.2	■ MECP (Senior Regulatory Toxicologist Comments)	■ COPCs are identified in this document. However, these COPCs require proper justification for their selection.	■ Please provide justification for the COPCs.	■ As outlined in Section 7.2.1, the Problem Formulation Step would confirm the applicable COPCs.	■ Section 7.2.1
4	■ General	■ MECP (Senior Regulatory Toxicologist Comments)	■ For proper exposure assessment, background air, water and soil COPCs concentration is required and how it will be conducted should be included in the document. The methods and plans for sampling, analyzing COPCs should be explained.	■ Please include methods for identifying background concentrations. Please explain methods and plans for sampling and analyzing COPCs.	■ As outlined in Section 7.2.1, the Problem Formulation Step would confirm the applicable COPCs.	■ Section 7.2.1
5	General	■ MECP (Senior Regulatory Toxicologist Comments)	■ The information/literature sources to identify the toxicological benchmarks for these COPCs should be mentioned.	■ Please provide information/literature sources.	■ See Appendix A	■ Appendix A
1	■ Page 2, s. 2 Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ Key objectives of conducting an EA include the elements mentioned in the work plan and also describing the existing environment, describing potential effects (positive and negative) of the project and alternatives, and consult about the project.	■ Suggest the following revisions to add additional key objectives of the EA process: *The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative) of the project and alternatives on the environment, ~~on Ungulates (moose and woodland caribou)~~ and determine measures needed to avoid or minimize adverse Project effects and enhance beneficial Project effects where feasible, and undertake consultation.*	■ Made the following revisions to add additional key objectives of the EA process: – The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative) of the project and alternatives on the environment and determine measures needed to avoid or minimize adverse Project effects and enhance beneficial Project effects where feasible, and undertake consultation.	■ Section 2
2	■ Page 2, footnote Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ The footnote is appreciated though requires clarification. Will the study plans be updated to reflect any other comments during the ToR review process or post-ToR, e.g., federal, Indigenous, public?	■ Please clarify if the study plans will be included with the ToR submission. ■ If not included in the ToR submission, please clarify if and when the project team intends to consult broadly on the work plans. The footnote should also be revised to state that the study plans will be updated to reflect the approved ToR if approval is obtained.	■ The Study Plans will not be included with the ToR submission. They have considered public, agency, and Indigenous input received on the Project to date. Government agencies, interested persons, and Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. Further details have been provided in Section 3 of the Study Plans. ■ The revision regarding the footnote has been incorporated into the updated Study Plan.	■ Section 2

Comment # / Ref #	DRAFT Study Plan Section	Agency / Regulatory Body Comments Received From	Comment / Context	Action Item	Final Response	Study Plan Reference
3	■ Pages 6-7, Figures 3-1 and 3-2 Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ Figures 3-1 and 3-2 are missing locations for other project infrastructure – can this be added to the maps?	■ Please add locations of other project infrastructure and associated study areas to Figures 3-1 and 3-2, or clarify when these locations will be known.	■ Location for Project components other than the route itself are unknown at this time and will be established during the IA / EA phase of the Project.	■ Section 6.2
6	■ Page 30, s. 6.3 Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ A few comments on the first paragraph: – It is stated that project phases include construction and operation. It would be helpful if this section clarifies that the construction phase includes decommissioning of temporary infrastructure, per page 14 of the draft ToR. – Residual effects are mentioned but not explained. For clarity, there should be a statement that residual effects (net effects using provincial language) are the effects left over after application of impact management measures, per Ontario's EA Code of Practice. – The paragraph states the residual effects will "be described in terms of the magnitude, geographic extent, **timing, duration,** frequency, **social and ecological context,** likelihood, and whether effects are reversible or irreversible." These characteristics are not all the same as what was stated in the draft ToR: "direction, magnitude, geographic extent, direction [sic], frequency, reversibility and likelihood" (p. 54-55 of draft ToR). Bolded font added to show differences. The remainder of section 6.3 describes further effects assessment methodology. The work plan and final ToR should align in methodology.	■ Please add to this section that the construction phase includes decommissioning of temporary infrastructure, using consistent language as the ToR. ■ Please add to this paragraph that 'residual (net) effects are the effects remaining after the application of impact management measures.' ■ Please align the work plan methodology with the final ToR methodology in terms of assessing effects and alternatives, or provide sufficient rationale if methodologies are different. Per Ontario's EA Code of Practice, the evaluation method(s) chosen must be able to produce an assessment that is clear, logical and traceable.	■ Added the following "Decommissioning of construction works is included in the construction phase. " ■ Added the following "Residual effects are the effects remaining after the application of impact management measures." ■ Revised the following "The residual effects will therefore be described in terms of the direction, magnitude, geographic extent, timing, duration, frequency, reversibility (reversible or irreversible), social and ecological context, and likelihood, and whether effects are reversible or irreversible."	■ Section 6.1 Section 9.6.
7	■ Indigenous knowledge Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ The work plan indicates that the EA will consider Indigenous knowledge to inform the effects assessment. The work plan does not provide a proposed methodology for how the proponent intends to seek Indigenous knowledge, from whom, and how it will be incorporated.	■ Please provide further details about how Indigenous knowledge will be collected and incorporated. Alternatively it may be helpful to include a reference to the relevant components of the ToR and ToR consultation plan that provide further details.	■ Consideration of Indigenous Knowledge and the methodology for seeking it is described in Section 5.	■ Section 5
8	■ Criteria and indicators table Same comment in Wildlife, Ungulates and Vegetation work plans	■ MECP, Environmental Assessment Branch	■ For the tables containing criteria and indicators, some work plans include the three columns Valued Component, Indicators and Rationale for Selection. Other work plans include the columns Indicator, Expression of Change and Rationale for Selection. The table formats of criteria and indicators should be consistent across work plans. ■ There are also differences between the criteria/indicators in the draft work plans vs. the criteria and indicators in the draft ToR	■ Please review draft work plans to achieve consistent format in how criteria and indicators are presented in the tables. ■ Where there are differences between the criteria/indicator tables in the draft work plans and the draft ToR Appendix A, please ensure the work plans and final ToR align so that the assessment methodology is consistent and to avoid confusion.	■ This table has been updated in the Study Plan and updates will be coordinated with other disciplines for consistency.	■ Table 9-1

Comments on Marten Falls Community Access Road Project (Project) revised Human Health and Community Safety Study Plan – January 7, 2022

It is essential that the Impact Statement for the Marten Falls Community Access Road Project (the Project) address all requirements outlined in the Tailored Impact Statement Guidelines (the Guidelines), and that the study plans outline a clear approach to achieving these requirements. The Impact Assessment Agency of Canada (the Agency) has highlighted sections of the Guidelines where requirements were not met in the draft study plans submitted to the Agency. Note that this is not an exhaustive list of Guidelines requirements and the Guidelines should be reviewed in its entirety, including the sections identified below.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
GC-01	**Section 5 - Public Participation and views (including 5.1, 5.2)**	Provide a clear description in the study plans of how public engagement opportunities have been and/or will be integrated into the impact statement phase. This must include detail on how the public will have opportunities to provide input to contribute to the development of the Impact Statement, as required in Section 5 of the Guidelines. Describe what engagement with the members of the public listed in the Public Participation Plan has been done in the development of the study plans, and/or any planned engagement with members of the public on the proposed study plans.	Section 4: describes how the Proponent will provide Project notices and opportunities with members of the public listed in the Public Partnership Plan. This will also include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date.	**Section 4.1** "A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input."	Section 4.1 of the study plan mentions that "*a variety of activities will be offered*", however, no details on the likely engagement activities are provided. As required by Section 5 of the Guidelines, the Impact Statement must provide a record of engagement that describes all efforts taken to seek the views of local communities and other stakeholders with respect to the Project, including on the study plans. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement, including prior to and during the planning phase, and in the preparation of the Impact Statement. Provide details on the timeline for public engagement relative to the project workplan, including engagement relative to the schedule for baseline work, and in consideration of the project team's timeline for the development of the Impact Statement. Demonstrate in the Impact Statement that comments provided by members of the public on human health and community safety conditions are taken into consideration. Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions
GC-02	**Section 6 - Description of Engagement with Indigenous Groups (including 6.1, 6.2, 6.3)**	Provide a clear description in the study plans of how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will have opportunities to provide Indigenous knowledge, including the validation of how information they provided was applied. The study plan should include a description of the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the group, to demonstrate that the guidance outlined in Section 6.2 of the Guidelines has been incorporated into the study plans. Describe what engagement with all the Indigenous groups listed in the Indigenous Engagement and Partnership Plan has been done in the development of the study plans, and/or any planned engagement with Indigenous groups on the proposed study plans,	In Section 4.2 it is noted that the Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in the Indigenous Partnership and Engagement Plan. A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input. Section 2.1.1 outlines the approach to handling confidential information, by means of permission from Indigenous communities to include Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. The study plans have recognized Indigenous community input received on the Project to date.	**Section 4.2** "…A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to provide their input…" "…Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process…" **Section 4.4** "…This information will be collected from Indigenous communities who have identified use of land within applicable areas of Project impact…" **Section 6.2.1** "The Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in human health and	Section 4.2 of the study plan states that "*a variety of activities will be offered*", however, no details on the planned engagement activities are provided. Section 4.2 of the study plan also states that "*Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process*", however, it is unclear on which components of the study plans the project team plans to engage. It is also unclear whether Indigenous groups will be provided with a meaningful opportunity to provide input on a preliminary approach/method for baseline data collection, as required in Section 6 of the Guidelines, or if engagement will take place after the baseline data collection is complete. Provide details on the timeline for Indigenous engagement on the human health and community safety study plan, including engagement relative to the schedule for baseline work, and spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge, and in consideration of the project team's timeline for the development of the Impact Statement.

[1] Refer to complete sections of the Guidelines for more context.

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
		particularly in relation to collection of Indigenous knowledge (i.e. develop the work plan in collaboration with those Indigenous groups that would need to provide knowledge).		community safety effects. To be included in the Community Health LSA, a community must demonstrate direct community-level health or social-economic interest in the Project footprint; from changing access to the MFFN community due to the Project; or due to potential direct and indirect effects Project effects on the environment that impact the human health and community safety environment. Considerations related to future mining activity or access to potential mining opportunities beyond the relevant local study areas will be reflected in the Community Health RSA. Based on the information provided, the Proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas."	Demonstrate in the Impact Statement that comments provided by Indigenous groups on health conditions, including social determinants of health, were taken into consideration. Comments provided to the Agency are available on the Canadian Impact Assessment Registry Internet site at: https://iaac-aeic.gc.ca/050/evaluations/proj/80184/contributions As per Section 6 of the Guidelines, the Agency expects the proponent to engage with, at a minimum, the Indigenous groups listed in the Indigenous Engagement and Partnership Plan.
GC-03	**Section 6.2 - Analysis and response to questions, comments, and issues raised**	Revise the study plans to include an approach to handling confidential information that demonstrates adherence to the guidance provided in Section 6.2 of the Guidelines.	Section 2.1.1: Section has been updated to include information regarding both confidentiality and permission information on all collected Indigenous Knowledge, regardless of the source. This section also includes how information regarding the Indigenous Knowledge Sharing Agreements will be established by the Proponent and Indigenous community participating in the Program.	**Section 2.1.1** "…Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared)…"	As required in Section 6 of the Guidelines, describe the confidential information provided by each Indigenous group. Present the content in sufficient detail to support understanding of the potential effects and impacts on rights, while also protecting confidential/sensitive specifics and respecting stipulations in the confidentiality agreements (e.g, use buffer areas instead of specific locations, etc.). Provide to the Agency, in the form of a letter from the Indigenous group that shared confidential information, a letter confirming that: • the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; • the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed.
GC-04	**Section 7.4 Spatial and temporal boundaries**	Describe the approach to be implemented to demonstrate how the definitions of the proposed study area boundaries: • encompass the anticipated boundaries of the Project's effects, including all potentially impacted local communities, municipalities and all Indigenous groups listed in the Indigenous Engagement and Partnership Plan; and • take into account community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; physical, ecological, technical, social, health, economic and cultural considerations; and the size, nature and location of past, present and foreseeable future projects and activities.	Section 6.2: General information on study areas for the Project, including a detailed list of what was considered to develop the discipline-specific local and region study areas, is included in each study plan. Each study area has been proposed taking into consideration community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices, physical, ecological, technical, social, health, economic and cultural considerations available at this time. The proposed discipline-specific study areas are preliminary. The proposed study areas will be consulted and engaged on early in the IA / EA process. In addition, the Indigenous Knowledge Program provides additional opportunities for community knowledge and Indigenous Knowledge, current or traditional land and resource use by Indigenous communities, and the exercise of Aboriginal and Treaty Rights of Indigenous peoples to be shared in greater detail.	**Section 4.4** "…information will be collected from Indigenous communities who have identified use of land within applicable areas of Project impact…" **Section 6.2.1** **"**The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4" "The Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in human health and community safety effects. To be included in the Community Health LSA, a community must demonstrate direct community-level health or social-economic interest in the Project footprint; from changing access to the MFFN community due to the Project; or due to potential direct and indirect effects Project effects on the environment that impact the	Section 7 of the Guidelines, states that "The size, nature and location of past, present and foreseeable future projects and activities are factors that should be included in the definition of spatial boundaries." It is unclear how a Local Study Area of 2.5 km from the centreline of the Project would be appropriate to assess direct effects on human health and community safety conditions. At a minimum, all project components (including aggregates sources, access roads, etc.), the upgrades to the Anaconda and Painter Lake forestry access roads, the Northern Road Link Road Project, the Webequie Supply Road Project, as well as winter roads, and activities and communities connected through these roads, should be included in the Local Study Area. As required in Section 7.4.1 of the Guidelines, provide information regarding how the following were/will be taken into account in defining the spatial boundaries: community knowledge and Indigenous knowledge; current and traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights, including cultural and spiritual practices; physical, ecological, technical, social, health,

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
				human health and community safety environment. Considerations related to future mining activity or access to potential mining opportunities beyond the relevant local study areas will be reflected in the Community Health RSA. Based on the information provided, the Proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas."	economic and cultural considerations; and the size, nature and location of past, present and reasonably foreseeable future projects and activities. Ensure that the human health and community safety conditions Regional Study Area encompasses the spatial boundary of cumulative effects. Provide the above information in a way that allows those who provided the knowledge to the proponent and the Agency to see their input reflected in the Impact Statement. It is not sufficient to state that "input from participants will be/was taken into account".
GC-05	**Section 7 - Baseline Methodologies (Including 7.1, 7.2, 7.3, 7.4)**	Provide clear descriptions in the study plans of the proposed study areas and the criteria used to define the study areas for each valued component. Provide clear descriptions of the timing of previously collected data (days/month/year) and future approximate (month/year or season/year) for every field work planned and the criteria used to tailor the temporal boundaries to the valued components under consideration. Describe how all Indigenous groups listed in the Indigenous Engagement and Partnership Plan will be, or have been, engaged to provide input on spatial and temporal boundaries. Explain how the Agency will be provided opportunities to validate spatial and temporal boundaries.	- Local Study Area (LSA) and Regional Study Area (RSA) for each valued component are described in Table 6-1, including rationale used to define the area. - Study plans have been designed considering historical information, where applicable and available. Study plans will be updated with appended Work Plans, to be submitted at a future date, which will detail upcoming planned field activities. - As detailed in both Section 4.2 and Section 6.2 the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs. Government agencies and interested persons will have the opportunity to comment on component of the study plans throughout the IS / EA Report consultation and engagement process	**Section 4.3** "…The data collection programs for these disciplines is expected to include targeted interviews, focus groups, questionnaires and other niche tools to gather information from diverse populations to resolve gaps in socio-economic secondary data. These diverse populations include the aforementioned identity groups, which are also referenced in the IS / EA Consultation Plan, and those identified by communities during consultation and engagement…" **Section 4.4** "…In conjunction with the Indigenous Knowledge Program and the Consultation and Engagement Program, information will be solicited on country food harvesting and consumption patterns for all age and gender categories. This information will be collected from Indigenous communities who have identified use of land within applicable areas of Project impact…" **Section 7.1.2.1** "…Focused data collection on gaps identified in the secondary sources related to VCs and indicators such as quality factors for services and infrastructure…"	To ensure that baseline data collection will meet the requirements of the Guidelines, the Agency advises the project team to share a work plan describing how the survey for human health and community safety data collection will be conducted. If it is not possible to provide this information in the study plans or work plans, the Agency requires an opportunity to review the collected baseline data/baseline reports prior to the preparation of the Impact Statement documentation. Include in the Impact Statement a human health and community safety baseline community profile for <u>each</u> Indigenous group listed in the Indigenous Engagement and Partnership Plan and for each local community listed in the Public Participation Plan, to meet the requirements of Section 9 of the Guidelines. The baseline community profiles should be used to inform the effects assessment required by Section 16 of the Guidelines.
GC-06		Provide further details in the study plans on how GBA+ has been integrated into all aspects of data collection methodology, as per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 13, 20, 21, and others, related to effects assessments of the Guidelines	Section 4.3 has been updated to include the consideration of Identity and Gender-Based Analysis Plus (GBA+) including both Indigenous communities and their relevant subpopulations and non-Indigenous communities and their subpopulations. During consultation and engagement activities these groups (and any others defined during consultation) will be engaged with on targeted input.	**Section 4.3**	Describe how GBA Plus has been or will be applied to the consideration of engagement activities. Identify specific methods targeted to specific subgroups. Provide detail on how GBA Plus has been integrated into all aspects of data collection methodology, including for the definition of indicators, as per Section 7.1 of the Guidelines, and into the assessment of effects and impacts, as mentioned in Sections 9, 13, 20, 21, and others, related to effects assessments of the Guidelines. It is not sufficient to mention that GBA Plus will be applied to the assessment. Clear descriptions of how GBA Plus was integrated (including to which variables, method, and how it

General Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Road Draft Study Plans – July 2, 2020					
#	**Guidelines Section[1]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Agency comments**
					influenced results' interpretation) are needed in the Impact Statement.
GC-07	**Section 13 - Effects Assessment (including 13.1, 13.2)**	Provide details to demonstrate how the Project's potential effects will be considered, as per the requirements in Sections 13 to 19 of the Guidelines. Ensure that the effects assessment considers the effects of each of the project components and physical activities, in all phases, and that it is based on a comparison to the proposed baseline work. Provide detail on how engagement with all Indigenous groups listed in the Indigenous Engagement and Partnership Plan and the public will inform the effects assessment and the selection of mitigation measures and follow-up program measures.	Project environmental interaction are separated into Project phases, and Project activities for each environmental discipline in their VC-specific study plan listed as Table 9-1. Information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests environmental discipline, as well as the identification of potential mitigation measures and monitoring programs.	**Throughout the study plan, Section 9**	As required in Sections 7 and 13 of the Guidelines, ensure that the effects assessment considers the effects of each of the project components (including but not limited to all alternative routes brought forward in the Impact Statement, all aggregates sources, access roads, etc.) and physical activities, in all phases, and that the assessment is based on a comparison to the data and information gathered during the proposed baseline work. Clarify the level of information that will be shared with, and explained to, the Indigenous Knowledge Program leads and whether study plans will be made available to all Indigenous groups listed in the Indigenous Engagement and Partnership Plan.
GC-08	**Section 13.1**	Provide clear descriptions of the rationale behind the assumptions, including but not limited to the assumed average daily traffic and vehicles composition during the construction and operation phases that will be considered for the effects assessment and the cumulative effects assessment.	- Section 10: Current assumptions to be used in the effects assessment have been identified. Any additional assumptions will be identified and rationale will be provided in the IS / EA Report.	**Section 10** "…The MFFN CAR Project Team is not aware at this time of key assumptions that will be recognized in the Human Health and Community Safety Assessment. These will be determined during the IA / EA process. Key assumptions made and used in the assessment of Human Health and Community Safety impacts will be documented in the IS / EA Report…"	Before conducting the effects assessment analysis, the Agency advises the proponent to seek the Federal Review Team's confirmation of the assumptions that will be used in the analysis or, at a minimum, to discuss the type of assumptions that will be considered. As required by Section 13.1 of the Guidelines, ensure that the Impact Statement clearly outlines the assumptions used for the assessment of effects, including cumulative effects, on each valued component.
GC-09	**Section 19.2 - Impacts on the Exercise of Aboriginal and Treaty Rights**	Describe an approach for identifying the potentially impacted rights of Indigenous peoples of Canada that are recognized and affirmed by section 35 of the *Constitution Act, 1982*, and for integrating the potential impacts on those rights into the collection of baseline information and the effects assessment.	All study plans reference how potential effects on Indigenous rights will be assessed in the Aboriginal and Treaty Rights and Interests Study Plan. Impacts on Rights considerations are explained in the rationale for defining a Local Study Area and Regional Study Area for Aboriginal and Treaty Rights and Interests VCs. Further information for this is listed in Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan.	**Section 5, and Section 6.2.2 in the Aboriginal and Treaty Rights and Interests Study Plan**	Feedback was provided in the Federal Review Team's comments package on the Aboriginal and Treaty Rights and Interests Study Plan.
GC-10	**Section 20 - Mitigation and enhancement measures**	Provide detail on the approach to meeting the requirements of Section 20 of the Guidelines regarding the identification of mitigation and enhancement measures.	Section 9: Approach to mitigation and enhancement measures, specifically noting that once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects.	**Section 9.5** "Once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects beyond those that are already inherent to the design"	Ensure that the Impact Statement provides a description of the method or approach followed to meet the requirements of Section 20 of the Guidelines
GC-11	**Section 25 – Description of the Project's contribution to sustainability**	Provide detail on the approach to meeting the requirements of Section 25 of the Guidelines regarding the description of the Project's contribution to sustainability.	Section 9: the sustainability assessment for the Project will be undertaken on the preferred alternative and will characterize the Project's contribution to sustainability incorporating the requirements set out in Section 25 of the TISG.	**Section 9.7**	Section 9.7 of the study plan is listing the requirements outlined in Section 25 of the Guidelines. Ensure that the Impact Statement provides a description of the method or approach followed to meet the requirements of Section 25 of the Guidelines.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
HH -02	**General Comment**	**Section 5** "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan…"	The required actions detailed below apply to all potentially impacted members of the public.	The updated Study Plan includes a commitment to engage with the public as per the Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment.	**Section 4.1**	Required action was partially addressed. See comment GC-01 above
HH -03	**General Comment**	**Section 6** "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the Indigenous Engagement and Partnership Plan…"	The required actions detailed below apply to all potentially impacted Indigenous groups.	The updated Study Plan includes a commitment to engage with the Indigenous Communities as per the Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment.	**Section 4.2**	Required action was partially addressed. See comment GC-02 above
HH -04	**General Comment**	**Section 22** "The proponent must identify and assess the Project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative environmental, health, social and economic effects."	Ensure that the Impact Statement analyzes cumulative effects assessment for the Project, including cumulative health effects.	The updated Study Plan includes a commitment to assess potential cumulative health effects.	**Section 7.2**	Required action was addressed.
HH -05	**General Comment**	**Section 9** "…To understand the community and Indigenous context and baseline health profile, the proponent must… - describe any context-specific definitions of health and well-being, including from the perspective of the relevant Indigenous cultures, including community and spiritual wellbeing; - describe relevant community and Indigenous history or context, including historical impacts on health, such as intergenerational trauma… - Examples of social determinants of health… o housing availability, housing affordability, and home ownership, disaggregated by sex and gender; o education levels (number of residents completed high school, college or higher), disaggregated by sex and gender… o social cohesion or social capital;… o mobility (proportion of residents who hold driver's licences and own vehicles, intra- and inter-community transportation), disaggregated by sex and gender…"	Provide detailed information in the study plan regarding the indicators to measure social determinants of health. If an indicator is excluded, explain the omission of that proposed indicator, and whether Indigenous groups suggested alternative indicators better suited to the Project.	The updated Study Plan includes a list of VCs and indicators and respective data sources. Further comments are as follows. The indicator "Social and Economic Structures" will consider the potential for impact on community well being. The Social Study Plan also includes the VC Community Well Being, the assessment of which will be considered in the Health and Community Safety Assessment. Historical health information will be considered in the description of baseline health conditions of communities in the Community Health LSA. Education levels will be described in the description of baseline Social conditions. Social cohesion is an indicator in the Social Assessment as outlined in the Social Study Plan. In regard to the health assessment, mobility levels will be examined as part of the assessment of the indicator Access to Health Services as well as in relation to the indicator Social and Economic Structures, which will consider potential changes to access to goods and services.	**Table 9-2, Social Study Plan**	Required action was addressed.
HH -06	**Section 2.0: Purpose and Objectives** "Health determinants related to social structures and equity factors will primarily be documented in other reports."	**Section 16** "…The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Applying a "determinants of health	Update the study plan to clearly cross-reference other study plans when items not included explicitly within the human health study plan are considered in the assessment of effects to relevant components of human health and community safety such as community well-being.	Table 9-2 outlines for each indicator the information sources that will be considered, including reference to the other assessments / study plans.	**Table 9-2**	Required action was addressed.

[2] Refer to complete sections of the Guidelines for more context

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	Study Plan (2020)	Guidelines Section[2]	Required Action for Proponent	Proponent Response	Study Plan (2021)	Agency response
	"Items not included explicitly within this study plan may be referenced and considered in the assessment of effects to relevant components of human health and community safety such as community well-being."	approach" in the assessment of human health effects will support the identification of these linkages, as well as of disproportionate effects across subgroups…"				
HH-07	**Section 3.0** *"Information received from interested persons and groups will be documented with a description of how the information was considered within the Human Health and Community Safety Assessment. An example of how this will be documented is included in Table 1. (…) In addition to engagement data, it is expected Indigenous Knowledge will be integrated into the Human Health and Community Safety Assessment, where applicable. (…) Indigenous Knowledge collected through means other than engagement (Indigenous Knowledge program and Socio-economic Primary Data Collection program) will be integrated into the reporting with relevant contextual information."*	**Sections 5** "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the *Public Partnership Plan…"* **Section 6** "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the *Indigenous Engagement and Partnership Plan…*" **Section 7.4** "…The spatial and temporal boundaries determined and established for the impact assessment will vary depending on the valued component and are considered separately for each valued component, including valued components related to the environmental, health, social and economic conditions of Indigenous peoples, or other potential effects and impacts referred to above. The spatial and temporal boundaries to be used in the impact assessment are outlined and discussed through the tailoring process, and include comments and input from federal and provincial government departments and agencies, local government, Indigenous groups, the public and other interested parties. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups..." **Section 9** "…The scope and content of the human health baseline will reflect the specific project context, taking into account input of public and Indigenous groups, and should include indicators that are meaningful for the effects analysis. The information provided must:… - describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; - …Relevant social determinants of health should be selected based on community input, if possible, to reflect the setting and circumstances of the impacted communities..."	Provide further details on when and how input will be collected from the public and Indigenous groups to meet the requirements of Sections 5, 6 and 7.4 of the Guidelines. Describe the methodologies to be implemented to meet the expectations of Sections 9, 16 and 16.2 of the Guidelines that: - Specify types of engagement activities (surveys, questionnaires, community sessions, chief and council sessions, workshops, etc.). - Describe how Gender Based Analysis plus (GBA+) has been/will be applied to the consideration of engagement activities. - Identify any specific methods targeted to specific subgroups. - Specify participants in engagement activities (reflecting the Indigenous groups listed in the Indigenous Engagement and Partnership Plan and reflecting public representation listed in the Public Participation Plan), including rationale for how the selection of participants meets the objectives of the study and demonstrates accessibility considerations (e.g. language requirements) and GBA+. - Describe the approach the proponent intends to take to encourage or attract participation, including how opportunities to participate will be planned and advertised. - Describe how Indigenous knowledge will be used to inform types of engagement activities and participant selection. - If sample questionnaires, interview questions, or other data collection tools exist, identify them in an appendix to the study plan, and provide clear links to how they relate to physical and cultural heritage. - Identify past public or Indigenous engagement activities that have taken place and are being used to inform this study plan.	Section 7.1.2.1 provides information on the planned primary data collection activities in relation to the social determinants of health including the use of interviews, focus groups and other discussions with community members. The Study Plan includes a commitment to collect disaggregated qualitative data by identity factors when volunteered to support the Human Health and Community Safety Assessment. Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report. Table 4-1 provides a list of the Indigenous communities that will be engaged with as part of the engagement program to support the IS / EA Report. To attract Indigenous community participants to the Human Health and Community Safety primary data collection program, Community Consultation Coordinators will be leveraged to advertise data collection activities, encourage participation, identify barriers to participation and identify key socio-community knowledge holders. Community Consultation Coordinators will also play a key role in the identification of community-specific identity factors to be considered in the Human Health and Community Safety Assessment. Sample questionnaires and interview questions have not yet been prepared. For a description of engagement activities undertaken to date, please refer to the separate IS / EA Report Consultation Plan. This document will be considered in the completion of the assessment and has been listed as a preliminary data source in Appendix A.	**Section 4.3 and 7.1.2.1, Table 4-2**	Required action was partially addressed. See comment GC-06.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
		Section 16 "…Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided…" **Section 16.2** "With respect to Social Determinants of Health, the Impact Statement must: … - Describe how community and Indigenous knowledge was used in assessing human health effects…"	Refer to the following resource when engaging on the Human Health and Community Safety Assessment: Stakeholder Participation Working Group of the 2010 HIA of the Americas Workshop (2012). Guidance and Best Practices for Stakeholder Participation in Health Impact Assessments. Available at: https://humanimpact.org/wp-content/uploads/2012/03/HIA-Best-Practices-2012.pdf			
HH-08	**Section 3.0** "*Information received from interested persons and groups will be documented with a description of how the information was considered within the Human Health and Community Safety Assessment. An example of how this will be documented is included in Table 1.*"	**Section 6.3** "…The Impact Statement must include, at a minimum:… - the engagement activities undertaken with each Indigenous group, including the date, means and results of engagement… - a description of the efforts to discuss and validate with Indigenous groups how the information they provided was applied to the selection of valued components, indicators, effects assessment, mitigation measures and follow-up programs, and conclusions….." **Section 9** "…The information provided must: - be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP); - describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; - provide disaggregated data and gender statistics..."	Provide further information on methods and tools for engagement, and on how ethical guidelines (like the OCAP) will be respected during the engagement with Indigenous groups and the public on human health effects for the Project. Provide further information on how diverse subgroups will be engaged, such as specific methods and tools to seek input. Update the study plan to ensure that the approach to be taken in recording the information received during engagement activities meets the requirements outlined in Section 6.3 of the Guidelines.	Section 7.1.2.1 provides information on the planned primary data collection activities in relation to the social determinants of health including the use of interviews, focus groups and other discussions with community members. Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report. The IS / EA Report Consultation Plan is to be referred to for commitments to OCAP. The IS / EA Report Consultation Plan should be referred to for a description of how engagement activities will be recorded. Regarding primary data collection activities to support the Human Health and Community Safety Assessment, attempts to engage with targeted individuals and the results of those engagements will be documented in the IS / EA Report.	**Section 4.3 and 7.1.2.1**	Required action was partially addressed. See comment GC-06 above.
HH 09	**Section 3** *"In addition to engagement data, it is expected Indigenous Knowledge will be integrated into the Human Health and Community Safety Assessment, where applicable. Due to sensitivities regarding this data, it is not expected a table similar to Table 1 will be provided. Instead, Indigenous Knowledge*	**Section 6.2** "…In the Impact Statement, the proponent is required to describe the type of confidential information provided by each Indigenous group without compromising stipulations in the confidentiality agreements and state how that information impacted the project design, baseline data, effects assessment or mitigation measures. The proponent is required to provide evidence to the Agency in the form of a letter from the Indigenous group that provided confidential information confirming that:	Provide further details to indicate how primary data collection for the Project will align with the OCAP principles as required in Section 9 of the Guidelines. Provide further details on how input received from Indigenous groups will be tracked, considered, and reported in the Impact Statement as required in Section 6 of the Guidelines.	Primary data collection activities will be consistent with OCAP principles as they apply to the protection of personal information.	**Section 7.1.2.1**	Required action was partially addressed. See comments GC-03 and GC-06above.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	collected through means other than engagement (Indigenous Knowledge program and Socio-economic Primary Data Collection program) will be integrated into the reporting with relevant contextual information provided at a level of detail consistent with the confidentiality requested by participants." **Section 4** *"(…) Overall, data collection will be completed in support of the following objectives (…). While these objectives are important, the most consequential objective of the data collection will be to provide protection and respect for privacy and of personal information."*	• the Indigenous group that provided confidential information is satisfied with the way the Impact Statement was informed; • the Indigenous group that provided confidential information is satisfied with the way the issue was solved or addressed…" **Section 9** "…The information provided must: be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP)…"				
HH -10	**Section 3, Table 1**	**Section 5.2** "…The Impact Statement must include, at a minimum:… - the engagement activities undertaken by the proponent, including the methods used, where and when engagement activities were held, the persons, organizations and diverse groups engaged, and results of engagement…"	Update the information provided in Table 1 of the study plan to ensure that the method proposed to track information meets the requirements outlined in Section 5.2 of the Guidelines.	The study plan includes a commitment to collect disaggregated qualitative data by identity factors (when volunteered) to support the Human Health and Community Safety Assessment. Section 4.3 provides a commitment to consider gender and other identity factors in engagement activities for the purposes of data collection to support the IS / EA Report.	**Section 4.3**	Required action was partially addressed. See comments GC-01 and GC-06. Established methodologies and protocols are available for scientific data collection that allow survey's results and outcomes to be reported without compromising the privacy and confidentiality of participants. In the Impact Statement, include a definition of what "when volunteered" meant for the data collection and provide a clear rationale for those variables that were not collected because not volunteered by participants.
HH -11	**Section 4.1.1** *"This includes the collection of Indigenous and local knowledge of the socio-economic environment, disaggregated qualitative data by identity factors when volunteered and other information relevant to understanding the current state of human health and safety conditions in the Project area."*	**Section 5.2** "…The Impact Statement must include, at a minimum:… - a description of efforts made by the proponent to engage diverse populations, including groups identified by gender, age or other community relevant factors (e.g., recreational hunters) to support the collection of information needed to complete the GBA+…" **Section 6.3** "…The Impact Statement must include, at a minimum:… - a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community	Provide more detail on how data collection will be ethical and respectful of confidentiality, including how the ownership, control, access and possession of data will be managed. Update the study plan to include a description of how diverse populations will be engaged to collect information necessary to support the GBA+. Provide details on the approach to assess differential effects that may affect diverse subgroups. This may require research on similar projects or communities using existing data sources and literature if information not volunteered by community members. Consent	Indigenous Knowledge and data obtained through engagement activities will be utilized in the assessment. Data will be disaggregated based on relevant identity factors including sex and age. Gender will not be considered unless publicly available or volunteered by respondents in the primary data collection program. This information will inform relevant intersectional analysis. Privacy and confidentiality will supersede all data requirements including disaggregation. Information from primary sources will only be reported with the informed consent of subjects. Section 4.3 provides a commitment to engage with various sub-groups.	**Sections 2.1 and 4.3**	Required action was partially addressed. The study plan commits to disaggregating data by sex and age but not by gender. Describe in the Impact Statement how data gaps or limitations (such as, but not limited to, potential gaps in the variable: Gender) were addressed with primary data collection or with secondary source information, such as academic research and qualitative and quantitative data on gendered divisions of labour, family, and community responsibility. Established methodologies and protocols are available for scientific data collection that allow survey's results and outcomes to

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	Study Plan (2020)	Guidelines Section[2]	Required Action for Proponent	Proponent Response	Study Plan (2021)	Agency response
		relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+;…" **Section 9** "…The information provided must: - be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP); - describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups; - provide disaggregated data and gender statistics; - conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; describe any relevant indicators, and how they are reflective of community input…" **Section 16** "…The proponent must describe how community and Indigenous knowledge was used to collect baseline data and assess health effects and disaggregate the source of community or Indigenous knowledge, as well as social, economic, and health data, by representation by sex, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+. In assessing effects to valued components listed below, the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the Project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders)…"	forms with information on how information will be protected should be provided in an annex.			be reported without compromising the privacy and confidentiality of participants. Describe in the Impact Statement how data were anonymized and provide a clear rationale for those variables where anonymization was not a viable option to protect privacy and confidentiality of participants. See also comment GC-06.
HH-12	**Section 4.1.1** *"Data collection will focus on the communities most likely to be impacted by the Project including Marten Falls and Aroland First Nations. Based on the nature of the socio-community, primary data will also be collected in the regional service centre of the Municipality of Greenstone. These communities are*	**Section 5** "…The Agency expects the proponent to engage with, at a minimum, the members of the public listed in the *Public Partnership Plan*." **Section 6** "…The Agency requires the proponent to engage with, at a minimum, the communities listed in the *Indigenous Engagement and Partnership Plan*…" **Section 7.4**	Update the study plan to provide further details on defining the spatial boundaries of the Project to justify whether other communities, with members who are involved in land use activities within the project area, are or are not considered. Update the study plan to define how temporal boundaries of the impact assessment will be established for the Project. Demonstrate that all Indigenous groups listed in the IEPP will have an opportunity to comment	Section 6.2 has been updated to provide further details on the spatial boundaries of the Human Health and Community Safety Assessment. All communities identified in Table 4-1 will be engaged with to determine their interest and / or concern with respect to potential health and safety effects of the Project. As noted in the Study Plan, the Proponent remains open to receiving information from other communities on their activities and how interlinkages between the Project and those communities may result in Human Health and Community Safety effects. To be included in the Community Health LSA, a	**Section 6.2**	Required action was partially addressed. See comments GC-01 and GC-02 above. Include in the Impact Statement a human health effects assessment for each Indigenous group listed in the IEPP that may experience health-related impacts by the Project and/or that have expressed health-related concerns arising from the Project (direct, indirect, real or perceived) to

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	Study Plan (2020)	Guidelines Section[2]	Required Action for Proponent	Proponent Response	Study Plan (2021)	Agency response
	likely to experience the most Project-related change due to the location of the Project and its resulting access." **Section 5.1.2** *"The proponent remains open to receiving information from other communities on their activities within the Project Study Area (PSA) and how interlinkages between the Project and those communities may result in human health and community safety effects. To be included in the community health LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint; from changing access to the Marten Falls community due to the Project; or due to Project effects on the environment that impact the human health and community safety environment."* *"Based on the information provided, the proponent will evaluate the individual communities that warrant inclusion in the local or regional study areas."* *"Members in other communities who are involved in land use activities within the Project area are being assessed and considered under the Indigenous Knowledge Assessment, and Land and Resource Use Assessment."* **Table 2:** *"The communities of Marten Falls First Nation; Aroland First Nation; and Municipality of Greenstone. These communities are likely to have observable*	"…The spatial and temporal boundaries to be used in the impact assessment are outlined and discussed through the tailoring process, and include comments and input from federal and provincial government departments and agencies, local government, Indigenous groups, the public and other interested parties. The proponent should engage with Indigenous groups when defining spatial and temporal boundaries for valued components, especially for those that are identified by Indigenous groups. The proponent should validate with the Agency the spatial and temporal boundaries for each valued component." **Section 7.4.1** "…Spatial boundaries are defined taking into account the appropriate scale and spatial extent of potential effects and impacts of the Project; community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; and physical, ecological, technical, social, health, economic and cultural considerations…"	on the list of criteria and indicators in the study plan and indicate whether the screened out groups have a direct community-level socio-community interest in the project footprint, prior to being screened out of the socio-community Local Study Area. Update the study plan to provide details on the engagement activities with other communities than those currently considered in the community health local study area. As per Section 5 of the Guidelines, the Agency expects the proponent to engage with, at a minimum, the members of the public listed in the Public Partnership Plan. (This is important to confirm the assumptions made prior to finalizing the community health local study area as described in Section 4.1.1 of the study plan.)	community must demonstrate direct community-level health or socio-economic interest in the Project footprint; from changing access to the MFFN community due to the Project, or due to potential direct and indirect Project effects on the environment that impact the Human Health and Community Safety. For information regarding the larger engagement program, please refer to the IS / EA Report Consultation Plan.		meet the requirements of Sections 6, 7 and 13 of the Guidelines.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	changes in health due to construction and/or the increased access to lands and communities associated with the Project. Increased access to services may place additional strain on the regional service centre." *"However, much of the social determinants of health analysis will focus on communities, particularly those in the local study area."*					
HH-13	**Section 4.1.2** *"If the problem formulation step of the Human Health Risk Assessment (HHRA) identifies that a HHRA related to country food consumption is required, a tissue sampling program will be developed. This program will involve working with Indigenous communities to collect appropriate tissue samples from commonly harvested game species. It is anticipated that tissue sampling would focus on chemicals identified as being of concern in the Guidelines (e.g. arsenic, chromium, mercury and methylmercury)."*	**Section 9** "…To understand the community and Indigenous context and baseline health profile, the proponent must:… - provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities. For game animals, the proponent is expected to work with local Indigenous groups to gather tissues-samples, as appropriate; - describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value; - if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities; and…" **Section 16.1** "With respect to biophysical determinants of health, the Impact Statement must:… - describe and quantify the health risk from exposure to COPCs (e.g., arsenic, chromium, mercury) via consumption of country foods and differential risk for vulnerable subgroups;…"	a) Update the study plan to provide further information on tissue sampling for all relevant country food types/species (e.g., plants, fish, birds and wildlife) that are identified through Indigenous engagement activities or a dietary/consumption survey. b) Update the study plan to provide further information on COPCs from project-associated emissions, and transport pathways of the COPCs into country foods (e.g., atmospheric deposition). For instance, dust, diesel particulate matter (DPM) and polycyclic aromatic hydrocarbons (PAHs) from construction activities and road traffic could deposit onto soil/vegetation on which country foods grow/occur, or which other country foods (game/higher trophic level species) may consume.	See Section 7.1.2.2 for more information regarding tissue sampling. See Section 7.2.1 regarding the problem formulation step that is proposed that will examine potential COPCs of the Project.	**Sections 7.1.2.2 and 7.2.1**	a) Required action was partially addressed. Section 7.1.2.2 of the Human Health study plan refers only to tissue sampling for game species. Provide in the Impact Statement a tissue sampling program that includes the representative country food types/species (e.g., plants, fish, birds and wildlife) of Indigenous interest, as informed by Indigenous engagement activities or appropriately justified surrogate data, to meet the requirements of Section 9 of the Guidelines. b) Required action was not addressed. Include in the Impact Statement further information on COPCs from project-associated emissions, and transport pathways of the COPCs into country foods (e.g., atmospheric deposition), in order to meet the requirements of Section 16.1 of the Guidelines. For instance, dust, diesel particulate matter (DPM) and polycyclic aromatic hydrocarbons (PAHs) from construction activities and road traffic could deposit onto soil/vegetation on which country foods grow/occur, or which other country foods (game/higher trophic level species) may consume.
HH-14	**Section 5.1.2:** "To be included in the community health LSA, a community must demonstrate direct community-level socio-economic interest in the Project footprint; from changing access to the	**Section 6** "…the proponent must provide Indigenous groups with an opportunity to:… - comment on the list of valued components and indicators;…" **Section 9**	Update the study plan to demonstrate that the Indigenous groups have been provided an opportunity to comment on the list of criteria and indicators in the human health and community safety study plan prior to the determination that the Indigenous groups will require detailed or less detailed community profiles.	The list of VCs and indicators have not yet been circulated to Indigenous Communities for review and comment. They are considered to be draft and will be made available to interested communities once the IA / EA has commenced. The study plan includes references to the consideration of Indigenous Knowledge in the Human Health and Community Safety	Section 5 Table 9-2	Required action was partially addressed. See comments GC-02 and GC-04.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	Study Plan (2020)	Guidelines Section[2]	Required Action for Proponent	Proponent Response	Study Plan (2021)	Agency response
	Marten Falls community due to the Project; or due to Project effects on the environment that impact the human health and community safety environment. Community-level socio-economic impacts can be defined as changes to the indicators (Section 5.2) that can reasonably be expected to potentially exceed a negligible magnitude (Section 6.2)." "Detailed community health profiles will be developed for communities listed in the community health LSA. The community health RSA will be profiled in less detail with key interactions and thematic information provided. Statistics collected on the RSAs will focus on larger regional areas such as unorganized regional districts. While many Indigenous communities are located within the regional study area, these communities will not be profiled individually given their relation to the Project is predominantly focused on cumulative effects from future developments." "Members in other communities who are involved in land use activities within the Project area are being assessed and considered under the Indigenous Knowledge Assessment, and Land and Resource Use Assessment."	"…To understand the community and Indigenous context and baseline health profile, the proponent must: - complete a community health profile that describes the overall health of the community across standard health indicators including any specific community identified health concerns (real or perceived) that may be impacted by the Project;…"	Update the study plan to clarify and cross-reference information collected through the land and resource use and Indigenous knowledge data collection that will be considered in the human health and community safety study. Revise the study plan to clarify what human health and community safety assessment will be considered under the Indigenous Knowledge Assessment and the Lands and Resource Use Assessment for those communities who are involved in land use activities within the project area.	Assessment (See Section 5). Table 9-2 outlines which other assessment results will be considered in the assessment of Human Health and Community Safety effects		

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
HH -15	**Section 5.2, Table 3** *"Human Health and Community Safety Criteria and Indicators* *Criteria: Public safety* *Indicators: Project-related Accidents; Vehicular Accidents; Violence and Harassment"*	**Section 16.2** "With respect to Social Determinants of Health, the Impact Statement must:… - describe effects on the safety of women and girls from project activities including worker accommodation, and as a result of new roads in remote areas;…"	Revise the study plan to provide more information around the 'Violence and Harassment' indicator to describe how it will address the safety risks to Indigenous women and girls.	The Violence and Harassment indicator has been expanded to consider this impact and includes the following statement: "Also to address potential safety risks to Indigenous women from users of the road during the operations period (e.g., human trafficking)."	Table 9-2	Required action was not addressed. While Table 9-2 of the study plan now mentions potential risks to Indigenous women as a rationale for selection of Violence/Harassment as a valued component, the study plan provides no information on how the indicator will be defined nor what change (i.e., which variables) will the indicator measure. As required by Section 6 of the Guidelines, provide all Indigenous groups listed on the IEPP an opportunity to comment on the proposed valued components and indicators. This should include the Violence/Harassment valued component and indicators proposed to assess effects to the safety of women and girls from project activities. At a minimum, the description of the indicators should clearly outline what change will be measured and which variables will be used. Include in the Impact Statement an assessment of potential effects on the safety of women and girls from project activities including workers' accommodation, and as a result of new roads in remote areas, to meet the requirements of Section 16.2 of the Guidelines. See also GC-02.
HH -16	**Section 5.2** *"At this time, criteria and indicators have been developed considering engagement undertaken to date with Indigenous communities, the nature of the project, and knowledge of the northern Ontario community health environment. Criteria and indicators may be further refined through future engagement activities and the collection of Indigenous knowledge."* **Table 3: Human Health and Community Safety Criteria and Indicators** *Criteria: Public safety* *Indicators: Project-related Accidents; Vehicular*	**Section 16** "…Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided... … In addition to the references listed in sections 7.2 and 9, the following sources offer examples of data tools or data sources that include indicators potentially relevant to reporting on the determinants of health: - PHAC, Health Inequalities Data Tool: (https://health-infobase.canada.ca/health-inequalities/indicat); - Statistics Canada: (https://www150.statcan.gc.ca/n1/daily-quotidien/160412/dq160412a-eng.htm); - Canadian Institute for Health Information (CIHI): (http://www.cihiconferences.ca/indicators/epub/tables_e.html#comm_health);	Provide an explanation for which best practices or other relevant guidance were used to identify, prioritize and select the proposed criteria and indicators. Provide a clear description in the study plan of how all Indigenous groups listed in the IEPP will have opportunities to provide Indigenous knowledge, including the validation of the baseline data collected. This should include a description of the proposed methods for data collection, management of confidentiality, and information storage. This should also include a methodology for tracking information that has been approved by the group, to demonstrate that guidance outlined in Section 6.2 of the Guidelines has been incorporated into this study plan. Provide a rationale for the proposed expression of change for the "project-related accidents"	Section 9.2 outlines factors that were considered in the selection of the VCs and indicators. It is also noted that the VCs and Indicators are draft and subject to further input from interested persons. Specific comments on the indicators identified or suggestions for other indicators by the Agency is welcome. See previous responses regarding commitment to engage with interested communities, as well as Section 4 of the Study Plan and the IS / EA Report Consultation Plan for more information on engagement. Section 7.2 includes a statement that commits to validating that information received has been accurately documented. The Project-related Accidents indicator is focused on construction and operations and maintenance activities. It is distinct from the indicator that will examine Road Use Accidents.	Sections 4, 7.2, 9.2, Table 9-2	Required action was partially addressed. Safety considerations during non-vehicular use of the road were included for Indigenous women only. Other vulnerable sub-groups (e.g., children, elders) may also be exposed to increased safety risks. In the Impact Statement, expand the"Violence and Harassment" indicator to include potential safety risks to all vulnerable sub-groups (e.g., children). Include in the Impact Statement a description of vulnerable female sub-groups (e.g. Indigenous women, younger women, girls, etc.), that are often disproportionately affected by health and safety risks, including intimidation and discrimination. The Impact Statement should describe the risks and negative impacts that could be experienced by groups that are not specifically involved in the Project.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	Accidents; Violence and Harassment	- First Nations Information Governance Centre: (https://fnigc.ca/rhs3report); - Positive Mental Health Indicators Framework (PHAC): (https://health-infobase.canada.ca/positive-mental-health/); and - Past health impact assessments (https://www.pewtrusts.org/en/projects/health-impact-project)..." **Section 16.2** "With respect to Social Determinants of Health, the Impact Statement must:… describe effects on the safety of women and girls from project activities including worker accommodation, and as a result of new roads in remote areas;…"	indicator with respect to injuries to community members. Provide further information on whether non-vehicular use of the road (e.g., hitchhiking, walking) will be considered in the assessment, and how this will be considered in the indicators and expressions of change. The proportion of residents who own a vehicle or driver's license could be an indicator of how the road will be used, disaggregated by GBA+ factors. Provide further information on whether and how the Public Safety indicators will specifically address concerns for the safety of Indigenous women and girls.	More information on this indicator can be found in Table 9-2. The Road Use Accidents indicator will consider the potential for accidents to all road users, including pedestrians and hitchhikers. More information on this indicator can be found in Table 9-2.		In the Impact Statement, include relevant mitigation measures. If temporary infrastructure is required, such infrastructure should include washroom facilities that are safe spaces for all workers.
HH-17	**Section 6.2** **Table 4: Social and Environmental Determinants of Health Magnitude Definitions** *Definitions: An effect that [may or may not be/ is small but/ is clearly] discernible and [within/beyond] the human health and community safety variability defined by baseline conditions. The effect is [within/beyond] the capacity of the health system to respond and/ or [will not/ will] alter the current health structures.* *Rationales: [negligible/low/medium/high] effects [are small and may not be/ are] noticeable. These effects [do not/may or may not/do] represent a change in day-to-day life at a community level and [can/ cannot] be responded to within the current health system resulting in systemic change.*	**Section 16.2** "…The variation of effects during different project phases and times of year should be described as well as potential project-related effects on the community health profile (e.g., changes to existing communal activities, support networks and cultural/spiritual practices that may contribute to community resilience…" **Section 21** "…Proponents must describe the extent to which residual effects are adverse. Where relevant, or where best practice or evidence-based thresholds exist, effects should be described using criteria to quantify adverse effects... In addition, effects should be characterized using language most appropriate for the effect (for example, impacts on the exercise of Aboriginal and Treaty rights and social effects may be described differently from biophysical effects)… The Impact Statement must:… - characterize residual effects for human health using human health-related criteria most appropriate for the carcinogenic and non-carcinogenic health effects of non-threshold contaminants;… - provide the rationale for the choice of criteria used to determine the extent to which the predicted effects are adverse. The information provided must be clear and sufficient to enable the Agency, review panel, technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of effects;…"	Provide clear definitions for quantitative and qualitative criteria that will be used to measure the expression of change for each indicator in Section 6.2 of the study plan, in order to demonstrate that the requirements of Sections 16.2 and 21 of the Guidelines would be met. Quantitative indicators (preferably comprising evidence-based thresholds) should be used for the assessment of residual effects on biophysical determinants of health (e.g., federal and provincial environmental quality standards and guidelines) and human health risks (e.g., Hazard Quotient and Incremental Lifetime Cancer Risk). Clarify how a discernable effect will be identified and used to determine the magnitude of residual effects. Where possible, include quantitative indicators and evidence-based thresholds / definitions relevant to the proposed indicators in Section 6.2 of the study plan, in order to demonstrate that the requirements of Sections 16.2 and 21 of the Guidelines would be met. Provide a definition of the "*health system and structures"*, including location with respect to potentially affected communities, and links to other health practices or community support services that contribute to resilience.	Please see Section 7.2.1 regarding the proposed approach to problem formulation in regard to environmental determinants of health. Should a HHRA study be determined to be warranted, more specific thresholds can be developed. Social determinants of health effects will be described qualitatively in a manner consistent with the magnitude definitions in Section 9.6. Quantification will be pursued where possible but may not be feasible for social factors related to Human Health and Community Safety. However, the magnitude of effect will be noted with respect to different sub-groups and relevant identity factors, where applicable. This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A. This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A.	Section 7.2.1	Required action was partially addressed. The human health study plan does not provide clear definitions for quantitative and qualitative criteria, including quantitative indicators used for the assessment of biophysical determinants of health and human health risks, and "*discernable effects*", which are used to measure the magnitude of residual project impacts. Include in the Impact Statement clear definitions for quantitative and qualitative criteria to measure the magnitude of residual project impacts on human health, which should be based on engagement with potentially affected communities and relevant health authorities. The human health study plan does not provide a definition for "health system" in the Human Health and Community Safety Magnitude Definition (Table 9-5; 54) or in Appendix B. Provide further information on the definition of "health system", referenced in Table 9-5, including the location relative to potentially affected Indigenous groups, local communities, and links to other health practices or community support services that contribute to resilience.
			Refer to the following resources for best practices on developing assessment criteria: International Finance Corporation. 2009. Introduction to Health Impact Assessment. Available at: https://www.ifc.org/wps/wcm/connect/e7f68206-7227-4882-81ad-	This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A.	Table 9-2, Appendix A	

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
			904cd6387bb7/HealthImpact.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-e7f68206-7227-4882-81ad-904cd6387bb7-igeABQN			
			Public Health Expertise and Reference Centre. 2014. Social Impact Assessment in the Environmental Sector: health network support guide. Available at: https://www.inspq.qc.ca/en/publications/1800	This suggested resource will be reviewed in the confirmation of the VCs and indicators, and has been listed as a preliminary data source in Appendix A.	Table 9-2, Appendix A	
HH-18	**Section 6.1.1** *"Construction of future expenditure related to new human health and community safety facilities, services and/or infrastructure due to Project effects."*	**Section 9** "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… o access to health services;…"	Provide further information on access to health services as well as potential increase in burden to existing community health centres (i.e. nursing stations), due to project construction activities.	As outlined in Table 9-2, the indicator Access to Health Services is included and will also consider demand changes to health services during the construction period.	Table 9-2	Required action was addressed.
HH-19	**Section 6.1.2** *"Selection of Exposure Scenarios: This task reviews and considers outcomes of study area characterization, exposure pathway and route selection, and COPC identification steps of problem formulation, as well as consideration of applicable regulatory HHRA guidance. The exposure scenarios in a HHRA must reflect the means by which human receptors are most likely to come into contact with chemicals in study area environmental media and/or locally harvested food items, as a function of study area access and use patterns. Outcomes of community engagement and key IA component studies will be used to refine the development of exposure scenarios."* *"In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the*	**Section 9** "…The information provided must: - describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups;…" "…To understand the community and Indigenous context and baseline health profile, the proponent must:… describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys);…"	a) Provide a characterization of local Indigenous people's consumption of country foods as part of the baseline assessment, as per Section 9 of the Guidelines. b) Provide a description of how site-specific information on the consumption of country foods will be acquired to establish the baseline conditions and form the HHRA's problem formulation step. Alternatively, consider making use of surrogate data from reference sites. Refer to the following sources to acquire country food consumption data: - University of Ottawa, Université de Montréal, and Assembly of First Nations. 2014. First Nations Food, Nutrition & Environment Study, Results from Ontario 2011 – 2012. Available at: http://www.fnfnes.ca/docs/FNFNES_Ontario_Regional_Report_ENGLISH_2019-10-16.pdf. - Health Canada. 2018. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Country Foods. - Health Canada. 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment.	As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection programs will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting. The data sources references will be considered and are listed as preliminary data sources in Appendix A	Table 9-2, Appendix A	a) Required action was not addressed. The human health study plan states that community specific data will only be collected if an HHRA is required, but does not specify what data will be used to characterize exposure pathways in the problem formulation step. Characterize Indigenous groups' consumption of country foods as part of the baseline data report and seek the Federal Review Team's confirmation of the assumptions, the parameters and the data that will be used in the analysis related to the Human Health Risk Assessment. Promptly inform the Federal Review Team of the Proponent's determination of whether the Human Health Risk Assessment is warranted for the Project, including the findings that support the determination, prior to development of the Impact Statement. If the outcome of the HHRA problem formulation step indicates that a Human Health Risk Assessment is required, provide a baseline data report including an overview of what data will be used to characterize exposure pathways. b) Required action was addressed.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities. Such a survey could also determine the harvesting locations of country food items, which would inform whether or not the project is likely to influence country food contamination at a given harvesting location."					
HH -20	**Section 6.1.2** *"If the problem formulation determines that a HHRA is required, then a HHRA study would be conducted according to current Health Canada guidance documents and recommended approaches. In that event, IAAC would be consulted for input (…) If the problem formulation determines that a HHRA study is not warranted in relation to the project, rationale will be provided."* *"Compiling of Issues of Concern: Based on the outcomes of community engagement programs, human health-related issues of concern would be compiled and tabulated. The documented issues would be considered in the subsequent tasks of problem formulation with respect to whether or not and how they could be evaluated using HHRA tools and methods."* *"It is possible that a HHRA study may be deemed unnecessary for technical reasons (such as lack of exposure pathways or lack of chemicals of concern in study area media), but still be conducted to enable addressing public or other*	**Section 16.1** "With respect to biophysical determinants of health, the Impact Statement must: … in situations where project related air, water or noise emissions meet local, provincial, territorial or federal guidelines, and yet public concerns were raised regarding human health effects, provide a description of the public concerns and how they were or are to be addressed;…"		The documentation for the Human Health and Community Safety Assessment will include all issues raised related to this discipline as well as the responses to these issues, including how applicable and relevant issues and concerns were assessed.	IS / EA Report Consultation Plan Record of Consultation and Engagement	Required action was partially addressed. See comments GC-02, GC-03, GC-05 and GC-08. In the human health workplan, clarify when and how Indigenous groups listed in the IEPP will be provided with an opportunity to comment on the outcome of the Proponent's determination of whether the Human Health Risk Assessment is warranted for the Project. If a Human Health Risk Assessment is deemed not necessary, describe how human health concerns from Indigenous groups and the public concerns will be addressed.
			Update the study plan to demonstrate that the record of engagement will include descriptions of how issues raised by Indigenous groups and the public regarding the human health risk assessment have been considered in the Impact Statement and how they were addressed throughout the impact assessment, including situations where project related air, water or noise emissions are predicted to meet local, provincial, territorial or federal guidelines. If a human health risk assessment is not deemed capable of effectively addressing human health related issue(s) raised by public, Indigenous groups or other stakeholders, the proponent should consider additional measures (e.g., ambient monitoring of air, water, country foods). - Refer to the following sources to support the monitoring of potentially impacted environmental media: as per Health Canada's guidance documents:Section 6.8 of Health Canada's 2016 Guidance for Evaluating Human Health Impacts in Environmental Assessment: AIR QUALITY. - Section 6.1.4 of Health Canada's 2016 Guidance for Evaluating Human Health Impacts in Environmental Assessment:	Issues related to air and water quality will be covered by other disciplines, including the Atmospheric Environment Study Plan and Surface Water Study Plan. As noted in Table 9-2, the results from these other assessments will be considered in the Human Health and Community Safety Assessment.	Table 9-2 Atmospheric Environment Study Plan Surface Water Study Plans	

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	stakeholder concerns raised about human health issues. This would only occur though if HHRA tools and methods are capable of addressing the issue(s) effectively. The HHRA problem formulation step would inventory and list all documented public and other stakeholder concerns that relate to project human health effects, and these concerns would be considered for all problem formulation tasks."		DRINKING AND RECREATIONAL WATER QUALITY. - Section 5.4 of Health Canada's 2018 Guidance for Evaluating Human Health Impacts in Environmental Assessments: COUNTRY FOODS.			
HH -21	**Section 6.1.2** *"In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step),the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities. Such a survey could also determine the harvesting locations of country food items, which would inform whether or not the project is likely to influence country food contamination at a given harvesting location."*	**Section 9** "…The information provided must:… - describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups;… To understand the community and Indigenous context and baseline health profile, the proponent must:… describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys);…"	Provide, as part of the baseline human health assessment, further information about the plan to collect data regarding country foods consumed by each Indigenous group, including the country foods that are harvested and consumed, and consumed at what rates, frequencies, and quantities. Refer to the First Nations Food, Nutrition and Environment Study to obtain suggested sources for consumption data, available at www.FNFNES.ca	As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection programs will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting.	Table 9-2	Required action was addressed.
HH -22	**Section 6.1.2** *"A more comprehensive HHRA, if necessary, would also be expected to consider all human receptor age classes (i.e., infant, toddler, child, adolescent, adult) for both males and females. Potential exposure pathways that would likely be considered in a more comprehensive HHRA include:* ● *soil ingestion/dermal contact*	**Section 16.1** "With respect to biophysical determinants of health, the Impact Statement must:… - provide a detailed rationale/explanation if a determination is made that an assessment of any COPCs (e.g., arsenic, chromium, mercury) or exposure pathways should be excluded and/or screened out of the assessment and if the proponent decides to deviate from the suggested assessment approaches and methods or determines that such assessment is not warranted;… - food security: describe effects to availability, use and consumption of country foods	Provide more information on how human receptor age classes will be considered, as per Sections 16.1 and 16.2 of the Guidelines, for the determination of whether a human health risk assessment is required.	In the collection of primary data, age will be considered. Targeted engagement with different age groups (e.g., youth and elders) will be undertaken. As noted in Section 9.6, where appropriate, information regarding residual effects will be disaggregated by sex, gender, age and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups.	Section 9.6	Required action was addressed.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	● *drinking water ingestion* ● *outdoor air and dusts inhalation* ● *country foods ingestion* *In the event that country food ingestion warrants evaluation in a HHRA (if determined by completion of the HHRA problem formulation step), the assessment of country foods would require consideration of a dietary survey that could be administered among the local Indigenous communities to determine which country foods are harvested and consumed, and at what rates, frequencies, and quantities."*	(traditional foods) and health impacts of this effect; and …" **Section 16.2** "With respect to Social Determinants of Health, the Impact Statement must:… **-** describe and quantify specific thresholds and document if different thresholds were considered for vulnerable populations, including by sex and age; provide rationale and justification if specific thresholds not used;…"				
HH-23	**Section 6.2, Table 4** *"An effect that may or may not be discernible but is within the human health and community safety variability defined by baseline conditions. The effect is within the capacity of the health system to respond and/ or will not alter the current health structures."* *"An effect that is clearly discernable and beyond the human health and community safety variability defined by baseline conditions. The effect is beyond the capacity of the health system to respond and/ or will alter the current economic structures."*	**Section 16.2** "… The variation of effects during different project phases and times of year should be described as well as potential project-related effects on the community health profile (e.g., changes to existing communal activities, support networks and cultural/spiritual practices that may contribute to community resilience…" **Section 21** "After considering the consequences of technically and economically feasible mitigation measures, the Impact Statement must describe any residual environmental, health, social or economic effects of the Project and whether those effects would occur in the local or regional study area. This includes consideration of both positive and negative effects of the Project and input received from the public, Indigenous groups, lifecycle regulators, jurisdictions, federal authorities and other interested parties. If an Indigenous group identifies that there are residual effects to rights or interests, those effects should be carried through for residual effects analysis. Where appropriate, information regarding residual effects should be disaggregated by sex, gender, age and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups as per the GBA+… Characterizing effects should be based largely on the level of concern expressed through engaging with the affected Indigenous groups and community members…"	Revise the study plan to provide definitions of magnitude that follow the guidance provided in the Guidelines. Update the study plan to provide clarity on how 'discernable' effects will be defined and how the input and level of concern of Indigenous groups and the public will be taken into consideration. Update the study plan to clarify why the indicator 'health system capacity' is proposed as an indicator of magnitude and not of effect to human health.	Definitions of magnitude of effect have been edited to be more consistent with the TISG. The reference to "health system capacity" relates to the capacity of the health system to mitigate possible effects. This has been clarified in Table 9-4.	Table 9-4	Required action was partially addressed. While definitions of magnitude of effect were improved, the revised study plan does not provide any information about how input from Indigenous groups and members of the public will inform the definitions of magnitude of effect. Include in the human health work plan, a description of how the level of concern expressed by potentially impacted Indigenous groups was/will be taken into consideration in the effects assessment, as required by the Guidelines. See comments GC-02, GC-03, and GC-04.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
HH-24	**Section 7, Table 5, ID 6:** *'Gender will not be considered unless publicly available or volunteered by respondents to the primary program."*	**Section 6.3** "…The Impact Statement must include, at a minimum:… - a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+;…" **Section 7.1** "…The application of GBA+ to baseline conditions for diverse subgroups is necessary to support the GBA+ of effects. GBA+ uses standard social science quantitative and qualitative data collection and analysis methods to describe baseline conditions across diverse subgroups…" **Section 9** "…The information provided must:… conduct intersectional gender analysis to examine differences in the status of diverse subgroups (e.g., women, youth, and elders) and their differential access to resources, opportunities and services; describe any relevant indicators, and how they are reflective of community input;…"	Provide details on how the proponent plans to assess effects that may affect diverse subgroups to meet the requirements of the Guidelines. Describe how the proponent will engage diverse populations to collect information necessary to support the GBA+.	Section 4.3 outlines the proposed approach to the consideration of identify and GBA+. If primary data are not available from all communities in the LSA to support the GBA+ analysis, then information from secondary sources would be considered to complete the assessment to the best of our ability. Ideally, sufficient primary data is provided to support the GBA+ analysis can be obtained. If this information is not provided by the communities then an approach to complete the GBA+ assessment without these data will be developed with input from the Agency.	Section 4.3	Required action was partially addressed. See comments GC-02, GC-04, GC-05 and GC-06. The Impact Statement must include a human health and community safety baseline community profile for <u>each</u> Indigenous group listed in the Indigenous Engagement and Partnership Plan and for each local community listed in the Public Participation Plan, to meet the requirements of Section 9 of the Guidelines. The baseline community profiles should be used to inform the effects assessment required by Sections 16, 16.1 and 16.2 of the Guidelines.
			The proponent should seek to solicit information necessary to support the GBA+, and if unsuccessful, efforts made should be described in the Impact Statement. Section 6.3 of the Guidelines state that the Impact Statement must include, at a minimum, a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+. Refer to Agency guidance for more information on the GBA+ approach: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html	Noted. See above response.	Section 4.3	
HH-25	**Section 7, Table 5, ID 8:** *"Data collection, information sources, study areas and assessment methods have been designed respective of the guidance included here. This will include drawing on other impact assessments (bio-physical and socio-economic), data sources provided by IAAC, and relevant primary and*	**Section 9** "…In preparing the report on baseline community health profile, the proponent must identify the environmental and social area of influence of the Project. To understand the community and Indigenous context and baseline health profile, the proponent must: - provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities…	Update the study plan with the description of the approach proposed to understand which country foods are consumed by Indigenous groups and local communities, as required by Section 9 of the Guidelines. Provide further information on the assessment of food security, availability and use. Provide a description of the approach to collect baseline contaminant concentrations in country food tissues.	As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection program will be co-ordinated with the program to collect Indigenous Knowledge. See Appendix B of the Aboriginal & Treaty Rights study plan for sample questions related to country food	Table 9-2 Section 7.1.2.2 Appendix A	Required action was not addressed. The study plan does not provide enough information to determine whether the requirements concerning food security of the Guidelines will be met. In addition, the questionnaire described in Appendix B of the Aboriginal Treaty Rights Study Plan relating to country foods is limited and analysis may be difficult. A list of commonly consumed foods, including

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
	secondary data sources including the socio-economic primary data program and Indigenous knowledge program."	- describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value. Specify which species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys); - if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities; and - describe the status of food security and food sovereignty within the Indigenous groups and local communities."	Refer to the First Nations Food, Nutrition and Environment Study to access existing study/data sources for baseline consumption of country foods, and food security, available at www.FNFNES.ca	harvesting. The specific details on the program to collect the information are to be developed. Refer to section 7.1.2.2 regarding tissue sampling. The referenced study will be reviewed and considered and has been included in the preliminary list of data sources in Appendix A.		specie/types should be developed along with the questionnaire.[3] As required by Section 6 of the Guidelines, provide all Indigenous groups listed on the IEPP an opportunity to comment on the proposed approach to assess potential impacts of the Project to food security and effects to country foods (traditional foods) availability. This should include an opportunity to provide feedback on the questionnaire and share information on commonly consumed foods. See also GC-02.
HH-26	**Section 7, Table 5, ID 8:** *"Data collection, information sources, study areas and assessment methods have been designed respective of the guidance included here. This will include drawing on other impact assessments (bio-physical and socio-economic), data sources provided by IAAC, and relevant primary and secondary data sources including the socio-economic primary data program and Indigenous knowledge program."* **Section 7, Table 5, ID 21:** *"Completion of a consolidated checklist applicable to the Project may be considered by the proponent, if provided by Health Canada."*	**Section 9** "…To understand the community and Indigenous context and baseline health profile, the proponent must:… - provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels…. - describe drinking water sources which may be effected by the Project… - provide baseline contaminant concentrations in drinking water and in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities… - describe the consumption of country foods (traditional foods) outside of the commercial food chain… - if a Human Health Risk Assessment is required, provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities;…" **Section 16.2** "…It is requested that the proponent complete the checklists provided in the Health Canada guidance documents so as to assist Health Canada and other participants verify that the main components of the assessment are completed and to identify the locations of this information. Completing the checklists is especially useful when the analyses on	a) Provide further clarification in the concordance table to indicate explicitly how the Section 9 requirements of the Guidelines will be addressed in the human health and community safety study plan. b) Provide further information to indicate whether the checklists from Health Canada guidance documents will be included in the Impact Statement. Refer to the following Health Canada guidance document checklists: Air Quality, Noise, Drinking and Recreational Water Quality, Country Foods, and Human Health Risk Assessment	The referenced Health Canada guidance documents will be referenced and considered in the assessment.	Appendix A	a) Required action was not addressed. Include in the Impact Statement a clear description of how the Section 9 requirements of the Guidelines were addressed. b) Required action was not addressed. Ensure that the checklists from Health Canada guidance documents are completed and included in the Impact Statement.[4]

[3] Refer to www.FNFNES.ca for sample food survey questionnaire.
[4] Refer to the following Health Canada guidance document checklists: Air Quality, Noise, Drinking and Recreational Water Quality, Country Foods, and Human Health Risk Assessment

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
		a topic are found in multiple sections of the Impact Statement documentation..."				
HH -27	**Section 7, Table 5, ID 11:** *"Assessment of the effects of the Project on human health must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices to determine perceived risk.* *Real and perceived risk, as identified through engagement, will be considered in the assessment."*	**Section 16** "…The assessment must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices and as reflected in these guidelines, to determine perceived risk..."	Provide further information on how the Impact Statement will consider the perception of risk related to food and water.	When engaging with communities as part of the primary data collection program, individual perceptions of risk regarding the project will be explored. The use of surveys and questionnaires will be considered when exploring issues and concerns related to risk perception of the project, including the perceived risk associated with road use.	Section 7.1.2.1 Section 7.1.2.1	Required action was addressed.
HH -28	**Section 2:** "*Health determinants related to social structures and equity factors will primarily be documented in other reports."* **Section 6.1.1:** *"The Social Determinants of Health Assessment will assess Project and cumulative impacts using the same methodologies and frameworks as the larger Project Impact Assessment."* "*The Social Determinants of Health Assessment is informed by academic literature, best practices in social impact assessment and previous similar EAs. The methodology to complete the Social Determinants of Health Assessment will include gathering local knowledge and utilising consultation processes to analyse the concerns of interested and affected communities related to the criteria and indicators as per Section 5.2. (…) Data used in the Social Determinants of Health Assessment will be disaggregated (where	**Section 10** "…Baseline information must be sufficiently disaggregated and analysed to understand the differences in norms, roles and relations for diverse subgroups; the different level of power they hold; their differing needs, constraints and opportunities; and the impact of these differences in their lives, including consideration of disproportionate effects to surrounding communities…**"** **Section 16** "…Interconnections between human health and other valued components and interactions between effects must be described, particularly where proponents suggest a potential impact occurring indirectly as the result of the proposed Project. Given that changes to any given health determinant may result in an impact to one or more health outcomes, it is important to include interactions within and across the higher-level health determinants (i.e., Level 2, pertaining to material circumstances/resources and psychosocial factors, and Level 3, pertaining to structural factors and equity factors) in order to identify the pathways of health effects that are most likely to be affected by project-related changes to the determinant(s) of health… The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Applying a "determinants of health approach" in the assessment of human health effects will support the identification of these	a) Update the study plan to provide clarification on the methodology that will be used to assess the possible impact of the proposed project on the social determinants of health. Health Canada supports a detailed human impact assessment, as indicated in the Guidelines, be used in determining whether positive and/or adverse impacts to the determinants of health are expected to result from a project. Appendix 1 of the Guidelines includes a number of resources and guidance to support a human impact assessment. b) Provide a preliminary list of determinants of health relevant to the Project. Resources and examples of potentially relevant indicators are provided in the Guidelines. c) Describe how the assessment will identify interactions within and across health determinants and the linkages between effects. Effect pathways (causal models) can be used to outline how the Project could directly and indirectly affect specific health issues. This approach will help prioritize the health effects for further assessment. A matrix with supporting explanation can be a useful way to organize a qualitative analysis and to convey results in a manner that is easy to understand. Describe how data will be disaggregated and analyzed to show differences in norms, roles, and relations, needs, effects, etc.	Sections 7.1.2.1 and 7.2 provide an expanded description of the approach to the social determinants of health. References have been added to potential pathways which will be confirmed during the IA / EA process.	Section 7.1.2.1 Section 7.2	a) Required action was partially addressed. Ensure that the required action is fully addressed in the Impact Statement. b) Required action was addressed, however, some adjustments to the list of health determinants would increase relevance. For example, "biology" represents the final link between a project and health outcomes in effect pathways, while "genetic endowment" is not necessary or applicable since it cannot be affected by the Project. It is recommended that "genetic endowment" be removed from the list of potentially relevant social determinants of health. c) Required action was partially addressed. (i) The examples provided in Section 7.2.1 of the study plan do not fully describe pathways of health effects. Individual-level factors are missing to link project components and activities (i. e., level-3 structural determinants) to the health impacts. Ensure that factors pertaining to health-related behaviours and mental well-being, which have biological implications underlying health risks, are integrated in the health impact assessment. Ensure that the Impact Statement assesses both positive and negative

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	Study Plan (2020)	Guidelines Section[2]	Required Action for Proponent	Proponent Response	Study Plan (2021)	Agency response
	possible) and analysed to understand differences in norms, roles, and relations for diverse subgroups; the different level of power their hold; their differing needs, constraints and opportunities, and the effects of these differences in their lives related to social determinants of health criteria and indicators." **Section 7, Table 5, ID 12:** "*The approach proposed is holistic and considers relevant disciplines."* **Section 7, Table 5, ID 13 and ID 17:** "*Interactions between effects will be considered as part of the holistic approach."*	linkages, as well as of disproportionate effects across subgroups... A detailed health impact assessment inclusive of other reasonably foreseeable future projects would be appropriate to capture potential positive and adverse effects on social factors and economic factors (and where applicable cultural factors) in addition to the biophysical environmental factors. A health impact assessment may be able to assess the positive and negative consequences (i.e., differential) of effects on the environment and human health of those Indigenous groups whose territories are lost or removed along the road alignment..."				health effects to all potentially impacted Indigenous groups listed in the IEPP. (ii) Some adjustments to the valued components being covered under the Human Health and Community Safety assessment are recommended to enhance clarity and ease cross-referencing with the other assessments: - The Diet valued component category appears to cross-reference to an Aboriginal and Treaty Rights and Interests valued component (i.e., food supply). - There is no category that focuses on the individual level (i.e., biological and behavioral factors), which immediately underlie health outcomes. - It is recommended to change the health indicator "Substance Abuse" to the more appropriate term "Substance Use". In the Impact Statement, provide clear descriptions of pathways of effect that connect potentially positive or negative project-related effects on environmental, economic, social and/or cultural factors at the community level (level-2 health determinants) to changes to any health-related behaviour and/or state of mental well-being at the individual level. (iii) It is recommended to specify that "Public Health" is the category used to group key indicators from the Social and Economy valued components, including relevant cultural valued components. Public Safety can remain a separate valued component from the social category. It is recommended to replace the "Social and Economic Structures" indicator under the Public Health valued component, with those currently listed in the "Rationale for Selection" column. Moreover, consider that the indicator "Food Supply" under the valued component "Diet" could also be a social indicator under the Public Health valued component.

Response to Previous Comments from the Impact Assessment Agency of Canada on the Marten Falls Community Access Draft Human Health and Community Safety Study Plan						
#	**Study Plan (2020)**	**Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Study Plan (2021)**	**Agency response**
						(iv) Indicate in the Impact Statement that the Mental Health valued component, which reflects psychosocial factors at the community level (e.g., improved social connections), would also draw information from all other assessments found to have an effect on community residents' mental well-being in order to capture cumulative effects. (v) It is recommended to add a "Health-related Behaviour" valued component, which would include as indicators at the individual level: "Substance Use" and "Food Consumption".
HH -29	**Section 7, Table 5, ID 18:** *"Describe food security effects to country foods and health impact of these effects."*	**Section 9** "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… • food security, access to country foods (traditional foods);…"	Update the study plan to provide information on how baseline studies will collect information on access to country foods and on the potential impact of project construction on the availability of country foods (traditional foods) and on food security.	As outlined in Table 9-2, the indicators Food Consumption and Food Supply under the Diet VC are included. As part of the primary data collection program, information on the use of country foods will be collected from communities in the LSA and the potential for Project-related impacts will be assessed. These data collection program will be coordinated with the Indigenous Knowledge Program. See Appendix B of the Aboriginal and Treaty Rights and Interests Study Plan for sample questions related to country food harvesting. The specific details on the program to collect the information are to be developed.	Section 7.1.2.1, Table 9-2	Required action was partially addressed. See comment HH-25 above.
HH -30	**Section 7, Table 5, ID 24:** *"Will the baseline studies consider mental health and well-being in Neskantaga and other affected communities?"* **Section 7, Table 5, ID 25:** *"How will Marten Falls demonstrate that the Project will improve mental health and wellbeing in the context of mitigating the ongoing crises? What kinds of evidence will Marten Falls rely on to demonstrate this?*	**Section 9** "…Examples of social determinants of health that may be relevant to the Project are provided for consideration:… - community mental health and well being (including feelings of isolation, remoteness, concern for future generations, and other elements that have been raised in the wake of youth suicides in rural and remote FN communities);…"	Update the study plan to provide further information on how baseline studies may consider the mental health and well-being of potentially affected communities, and how the Project may positively or adversely affect mental health and well-being, particularly in the context of the ongoing crises affecting other communities.	An indicator specific to the potential for changes to Mental Health has been added to Table 9.2. Section 7.2 has also been added to specifically reference the consideration of potential changes to mental health as a result of the Project.	Section 7.2, Table 9-2	Required action was partially addressed. Although the human health and community safety study plan recognizes the Project's potential impact on the mental-well being of potentially impacted Indigenous groups and local communities, the study plan does not describe how these issues will be assessed. Include in the Impact Statement an effects assessment of the Project's potential impact on the mental-well being of potentially impacted Indigenous groups and local communities.

New comments based on the revised Human Health and Community Safety Study Plan submitted in 2021.				
	Study Plan Section	**Guidelines Section**	**Context**	**Required Action for the Proponent**
HH-31	**Section 2.1.2** "…If applicable, a process for handling confidential health information will be developed. This process will conform to Ownership, Control, Access, Possession (OCAP) (First Nations Information Governance Centre 2020) requirements and will also aim to preserve the confidentiality of individual persons providing information to the Project…"	**Section 9** "…The information provided must: • - be sufficient to provide a comprehensive understanding of the current community health status, while respecting the need to protect personal information and standards for the management of Indigenous data (i.e., OCAP[48]);…"	While OCAP ensures that information about a community is shared with the community and the community has authority/control over and ownership of this information, each individual has a right to privacy and owns their personal information.	During the data collection, a commitment to have any individual health information anonymized (de-identified) should be made. It is not enough to state that the Proponent will "*aim to preserve the confidentiality*", as depersonalization of personal health information is a common survey standard to be met.
HH-32	**Section 7.1.2.1** "…The main determinants of health include: 1. Income and social status 2. Employment and working conditions 3. Education and literacy 4. Childhood experiences 5. Physical environments 6. Social supports and coping skills 7. Healthy behaviours 8. Access to health services 9. Biology and genetic endowment 10. Gender 11. Culture 12. Race / Racism…"	**Section 9** "…Examples of social determinants of health that may be relevant to the Project are provided for consideration: • housing availability, housing affordability, and home ownership, disaggregated by sex and gender; • access to health services; • crowdedness in housing, disaggregated by sex and gender; • income (average), poverty and income inequality, disaggregated by sex and gender; • food security, access to country foods (traditional foods); • education levels (number of residents completed high school, college or higher), disaggregated by sex and gender; • proportion of youth who complete high school in the community or from an urban setting, disaggregated by sex and gender; • community mental health and well being (including feelings of isolation, remoteness, concern for future generations, and other elements that have been raised in the wake of youth suicides in rural and remote FN communities);…" **Section 16.2** "…Specific priority indicators must be determined or validated by community members but may include, for example: o Level-1 health determinants related to behavioural factors (e.g., potential indicators related to diet/nutrition, alcohol and drug use); o Level-2 health determinants related to access to health, educational, social and other community services (e.g., potential indicator related to availability of health- care service providers) [see Section 17]; o Level-2 health determinants related to material circumstances (e.g., potential indicators related to living conditions, food availability) [see Section 18];…"	For Indigenous groups, other factors should be considered among the social determinants of health. For example, as indicated in Section 9 of the Guidelines, food security/access to country foods and colonization/marginalization.	In the Impact Statement, include food security/access to country foods, as well as effects of colonization/marginalization as valued components or indicators within Table 9-2 in order to ensure that all social determinants of health are considered as part of the assessment.
HH-33	**Section 9.1 - Table 9-2:** "…Food Consumption: (..) project may improve access to food supply.… …Food Supply: (..) may result in changes to consumption…"	**Section 9** "…To understand the community and Indigenous context and baseline health profile, the proponent must: … • describe any context-specific definitions of health and well-being, including from the perspective of the relevant Indigenous cultures, including community and spiritual wellbeing;…"	**Table 9-2** in the Study Plan provides indicators for food consumption and food supply; however the rationale for both seem to be reversed.	Review Table 9-2 to ensure that the rationale is associated with the right indicator.

New comments based on the revised Human Health and Community Safety Study Plan submitted in 2021.				
	Study Plan Section	**Guidelines Section**	**Context**	**Required Action for the Proponent**
HH-34	**Footnote 8, Section 9.2** "In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project."	**Editorial comment**	The statement in the footnote 8 in Section 9.2 "*In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs."* is inaccurate, as the Regional Assessment in the Ring of Fire area has not yet begun.	Replace the text in footnote 8 with "*In February 2020, the Minister of Environment and Climate Change determined that a regional assessment will be conducted in an area centred on the Ring of Fire mineral deposits in northern Ontario. Relevant information available in relation to the Regional Assessment in the Ring of Fire area would be considered in the impact assessment of the Project."*
HH-35		**Section 7.3** "…For each of the valued components that will be assessed in the Impact Statement, the proponent must create a study plan and a work plan to be validated by the Agency. Upon receipt of a study plan, the Agency may request that the proponent present and discuss the study plan at technical meetings, which will be scheduled during the impact statement phase."	In order to meet the requirements of Section 7.3 of the Guidelines, a work plan or work plans for the valued components to be assessed in the Impact Statement must be submitted to the Agency for validation. Since this human health and community safety study plan does not include content for a work plan, notably this plan does not outline when baseline data will be collected for each Indigenous group (i.e., scheduling, sequencing), the submission of a work plan is an outstanding requirement of the Guidelines.	Provide a work plan that outlines how the human health and community safety study plan will be executed in the field, including when baseline data will be collected. The work plan should include scheduling and sequencing of engagement activities relative to proposed baseline work, engagement on the study plan, spatial and temporal boundaries determinations, and particularly in relation to collection of Indigenous knowledge.
HH-36	**Table 11-3: Study Plan Federal and Provincial Concordance – Requirement Deviations**		Proposed amendments and/or deviations from the Guidelines will not be reviewed or approved during the study plans review process. The Agency will provide guidance on the process to propose amendments and/or deviations to the Guidelines to the project team.	