Comments on Marten Falls Community Access Road Project (Project) revised Groundwater and Geochemistry Study Plan and Physiography, Geology, Terrain and Soils Study Plan – October 1, 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 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					
#	**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 Sections 5 and 6 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 physiography, geology, terrain and soils and groundwater and geochemistry 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. Describe what engagement with all the Indigenous groups listed in the Indigenous	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 Physiography, Geology, Terrain and Soils Study Plan and the Groundwater and Geochemistry Study Plan including engagement relative to the schedule for baseline work, and spatial and temporal boundaries determinations, and particularly in relation to collection of

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		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).			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 physiography, geology, terrain and soils and groundwater and geochemistry 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, technical,	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	**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"	As required in Section 7 of the Guidelines, demonstrate how a Local Study Area of approximately one kilometre from the centerline would be appropriate to assess effects on groundwater and geochemistry. It is unclear if the proposed groundwater survey locations are representative of drinking water sources used by Indigenous groups and whether Indigenous input was incorporated in the development of the proposed study methods/locations. As required in Section 7 of the Guidelines, provide details to demonstrate that the physiography, geology, terrain and soils and the groundwater and geochemistry Regional Study Areas 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. Note that the Regional Study Area must encompass the spatial boundary of cumulative effects. As required in Section 7.4.1 of the Guidelines, provide information regarding how the following were/will be taken into account in

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		social, health, economic and cultural considerations; and the size, nature and location of past, present and foreseeable future projects and activities.	Treaty Rights of Indigenous peoples to be shared in greater detail.		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. 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-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+ 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, 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, 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-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	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	**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.

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		baseline information and the effects assessment.	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** "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**	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 Groundwater Study Plan – June 05, 2020						
#	**Draft Study Plan Section**	**Tailored Impact Statement Guidelines Section[2]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Federal Review Team comments on Response**
GW-01	**Table 3-1: Groundwater Study Areas** Local Study Area (LSA): 2.0 km Regional Study Area (RSA): 5.0 km Rationale: Potential effects (s) to groundwater are considered to be localized and limited to the alignment and area immediately surrounding the alignment within the zone of influence (ZOI) that may be affected by Project construction activities. **4.1 Desktop Assessment** "…The desktop review will focus on published information obtained from Marten Falls First Nation… The report will include detailed information on registered water well locations and depths (including borehole logs, if available) and a figure showing domestic and public water well locations within two kilometres of the Project works." **4.2.1 Study Area Reconnaissance & Determination of Key Groundwater Monitoring Locations** "The groundwater baseline study will include … • Areas within two kilometres of the developed Marten Falls First Nation communities, particularly with potential dewatering and other effects to existing structures, infrastructure and/or local well supplies; • Areas within close proximity (two kilometres) to other existing groundwater users (e.g. registered and unregistered water supply wells); **4.2.1.1 Water Well Locations** "…A door-to-door water well survey will be completed within	**Section 6** "…The proponent must engage with all Indigenous groups that may be impacted by the Project. The *Indigenous Engagement and Partnership Plan*, issued by the Agency, is available to assist the proponent in further developing or refining their engagement strategy and supporting ongoing trust and relationship-building. In addition to the requirements set out in section 6.1, 6.2 and 6.3, the proponent must provide Indigenous groups with an opportunity to: • provide Indigenous knowledge during baseline data collection; • comment on the list of valued components and indicators;…" **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…" **Section 8.6** "…The Impact Statement must:… • identify all springs and any other potable surface water resources within the local and regional project areas and describe their current use, potential for future use, and whether their consumption has Indigenous cultural importance;	Provide details to demonstrate the approach that will be used to identify all domestic, communal, or municipal water wells within the local and regional project areas as per the Guidelines. Clarify the inconsistency between the geographic extent of the Regional Study Area mentioned in the Desktop Assessment report and the geographic extent of the Regional Study Area shown in Table 3-1. Describe in the study plan how Indigenous groups will have opportunities to provide Indigenous knowledge on the groundwater study plan and validate the baseline data collected. All Indigenous groups listed in the IEPP must be provided opportunities to: • provide Indigenous knowledge during baseline data collection; • comment on the list of valued components and indicators; • inform the effects assessment and review its conclusions; and • inform the development of mitigation measures and follow-up programs.	Section 4 was updated to clarify that government agencies, first nation communities and any interested persons will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. The LSA was refined and edits to the text were made in Section 6.2. Revised text to include springs in Section 7.2.1.1 and Section 8.2.2. Any spring water samples will be samples for the same parameters and at the same frequency as groundwater. Sections 7.2.1.1 and 8.2.2 were updated to include water levels and hydrostratigraphic units. Section 7.1 and 7.2.1.1 outline the approach used to identify all domestic, communal, or municipal water wells / springs within the local and regional project area.	**Section 4** **Section 6.2** **Section 7.1** **Section 7.2.1.1** **Section 8.2.2**	This comment has been partially addressed. See also comments GC-01 and GC-02 above.

[2] Refer to complete sections of the Guidelines for more context

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	Marten Falls and any outpost camps within two kilometres of the proposed CAR, associated borrow source areas, associated roads and construction lay down areas to identify unregistered water supply wells and to verify the locations of registered wells."	• describe the surface water quality baseline characterization program, including sampling site selection, monitoring duration and frequency, sampling protocol, and analytical protocol, including quality assurance and quality control measures;… identify all domestic, communal, or municipal water wells within the local and regional project areas, including their screened hydrostratigraphic unit and piezometric level; describe their current use, potential for future use, and whether their consumption has any Indigenous cultural importance;…"				
GW-02	**Section 4.1 Desktop Assessment** The desktop assessment will include the following tasks: A review of previous studies pertaining to the Project or conducted within the RSA that may provide additional hydrogeological, geological, hydrological, geochemical or biological data relevant to the Project. A desktop review of available reports and other pertinent information from within the RSA, if any; **Section 7 Conformance with Federal and Provincial Guidance** "The desktop assessment and/or the baseline groundwater report will provide detailed descriptions of specific data sources and data collection methods associated with groundwater."	**Section 7.1** "…Ensure baseline data is representative of project site conditions. If surrogate data from reference sites are used rather than site-specific surveys, the proponent should demonstrate that the data are representative of project site conditions..." **Section 7.2** "…The Impact Statement must provide detailed 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…. If using existing data sources, the Impact Statement must provide justification to show that the data sources are relevant in spatial and temporal coverage to the Project…"	Provide details to demonstrate that existing data sources are relevant in spatial and temporal coverage to the Project.	Revised text in Section 7.1. Site Specific baseline data will be collected. Surrogate data from other sites will not be used in place of site-specific baseline data for the Project area, but may be used to supplement site specific data if the data are from nearby sites within the region.	**Section 7.1.1**	This comment has been addressed.
GW-03	***5.2.2 Data Analysis and Reporting*** ***"***Upon completion of the two-year groundwater monitoring program, water quality and quantity data will be analyzed and the findings	**Section 9** "…To understand the community and Indigenous context and baseline health profile, the proponent must:…	Clarify whether any water wells that may be used as drinking water sources will be identified as drinking water sources in the baseline study and how water quality data will be	The drinking water sources (groundwater or surface water) will be identified during the desktop assessment and / or the field water well /spring surveys. Any water wells that have potential to provide drinking water will be treated as drinking water sources.	**Section 7.2.1.1** **Section 8.2.2**	This comment has been addressed.

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	will be presented in a hydrogeology baseline report… The hydrogeology baseline report will include:… • Plan maps showing: o The Project location and key features (i.e. the selected CAR, aggregate borrow source area, access roads, camp and laydown areas, the Marten Falls First Nation community and registered and unregister water wells); o Project study areas, encompassing the spatial boundaries of the Project, including any associated project components and the anticipated boundaries of the Project effects that may potentially effected local communities, municipalities and Indigenous groups; o Bedrock and surficial geology, including major structural features (e.g. faults); o Groundwater monitoring locations and inferred groundwater flow directions" • Groundwater quality results will be compared to applicable guidelines and standards for aquatic life and drinking water uses, including the Canadian drinking water quality guidelines, Ontario drinking water quality guidelines and the Ontario Groundwater Standards;"	• describe drinking water sources which may be effected by the Project, including surface and/or groundwater (permanent, seasonal, periodic or temporary), their distance from project activities and approximate wellhead capture zones;…" **Section 16.1** "…With respect to biophysical determinants of health, the Impact Statement must:… • 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 of the following criteria; Canadian Drinking Water Quality Guidelines (CDWQG), Ontario Drinking Water Quality Standards (ODWQS), or Ontario Soil, Groundwater and Sediment Standards (SGSS);…"	used for the health effects assessment. Provide detail to demonstrate that the potable groundwater contaminant levels will be compared to the most stringent guideline values, as per Section 16.1 of the Guidelines.	Water quality results will be compared against all applicable criteria for all suitable uses (drinking water, aquatic life, wildlife, etc.). Exceedances from all criteria will be flagged in the baseline and future reports, which includes the most stringent criteria.		
GW-04	***5.2.2 Data Analysis and Reporting*** ***"***The hydrogeology baseline report will include: • ***Tables summarizing data such as:*** • Water well owners, water levels, reported yield and uses (domestic,	**Section 14.2** "…With respect to potential project effects on the physical hydrogeological system, the Impact Statement must: • provide a project-specific water use assessment identifying and describing the quantity and quality of water resources	Update the study plan to ensure that measured or inferred available drawdown with water well information are included, as required in Section 14.2 of the Guidelines.	Revised updated section 8.2.2 to specifically include "inferred available drawdown".		This comment has been addressed.

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	communal, municipal, commercial/industrial);"	potentially affected by the Project, including: o any withdrawal of groundwater or surface water; o changes to the groundwater recharge/discharge areas; o temporal and spatial changes in groundwater quantity, quality and flow (e.g., long-term changes in water levels), including how these changes may relate to domestic, communal or municipal water supply wells; o the flow or volume of water available in the water bodies; and how any waste waters or dewatering water would be managed and where it would be discharged..."				
GW-05	***6.2 Methods for Predicting Future Conditions*** ***"No modelling is proposed as part of the study plan for groundwater. There will be some analytical calculations and analysis software packages (e.g., AQTESOLV) required for the estimation of K values."***	**Section 14.2** "…With respect to potential project effects on the physical hydrogeological system, the Impact Statement must: • provide a project-specific water use assessment identifying and describing the quantity and quality of water resources potentially affected by the Project, including: o any withdrawal of groundwater or surface water; o changes to the groundwater recharge/discharge areas; o temporal and spatial changes in groundwater quantity, quality and flow (e.g., long-term changes in water levels), including how these changes may relate to domestic, communal or municipal water supply wells; o the flow or volume of water available in the water bodies; • how any waste waters or dewatering water would be	Provide details about the methods that will be used to quantify the magnitude of the effects to groundwater quantity in a manner that meets the requirements of the Guidelines.	Analytical calculations and analysis software packages (e.g., AQTESOLVE) will be utilized for the estimation of hydraulic conductivity (K) values. Numerical models will use field derived aquifer properties to estimate CAR construction related zones of influence / drawdown cones to assess for potential interference for ecological systems or drinking water sources. In addition, a water balance model approach will be utilized to evaluate the impact of groundwater extraction on valued ecosystem components (receptors). The need for a more comprehensive groundwater model will be elevated following completion of project design.		This comment has been addressed.

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		managed and where it would be discharged..."				
GW-06	***6.3 Magnitude of Effect*** **Table 6-2: Groundwater Quality Magnitude Definition** **"Negligible** Definition: There is little to no variation predicted in measurable parameters and is within the range of natural variation. Rationale: Monitoring wells show no discernable change to water quality, therefore no effect on ecological life or potable use. **Low** Definition: There is a small variation predicted in measurable parameters, that are outside the range of natural variation and below the applicable water quality criteria or within 20% of existing condition values**.** Rationale: Temporary effect or permanent change to water quality is discernable but remains protective of ecological life and potable water sources. **Medium** Definition: There is a modest variation predicted in measurable parameters, that is significantly different from existing conditions and is below the applicable water quality criteria or is between 20% to 50% of existing condition values. Rationale: Temporary effect or permanent change to water quality is significant but remains protective of ecological life and potable water sources. **High** Definition: There is a large variation predicted in measurable parameters, exceeds applicable water quality criteria, or is greater than 50% of existing condition values. Rationale: Temporary effect or permanent change to water	**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. This includes criteria such as whether the effects are high or low in magnitude, the geographical extent, timing, frequency, duration and reversibility of the effects, taking into account any important contextual factors. Where the potential for human health effects exist due to exposure to a particular contaminant at any level (e.g., non-threshold air pollutants, including particulate matter and nitrogen dioxide, and water pollutants, such as but not limited to arsenic and lead) mitigation measures should aim to reduce the residual effects to as low as reasonably achievable. 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 the residual effects using criteria most appropriate for the effect; • 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,	Update the study plan to include, in the definitions for magnitude, criteria that are relevant to the protection of human health. Describe the approach that will be used to ensure that these criteria are appropriate for the human health impact assessment.	The percentage division values for water quality and quantity were selected using professional judgement. Water quality and quantity undergo natural seasonal fluctuations, therefore it is extremely challenging to state whether changes are natural or Project induced at less than 20% change. Once baseline data are collected, we will have a better idea of the range of natural seasonal variation and can adjust the approach as needed. The CDWQG's do state concentrations for a few parameters (arsenic, lead, haloaceteic acids, and vinyl chloride) should be ALARA (as low as reasonably achievable). That being said, they still undergo natural seasonal variation and it is extremely challenging to state whether changes are natural or Project induced at less than 20% change.	**Table 9-4 Groundwater Quantity Magnitude Definition** **Table 9-5 Groundwater Quality Magnitude Definition**	This comment was not addressed. The magnitude of residual effects continues to be determined partly based on the percentage deviation (e.g., between 20% and 50%) from the baseline condition (Table 9-5, pdf p.58 and 59). These threshold values appear to be arbitrary and are not justified for use in the evaluation of non-threshold contaminants. In addition, it appears that if baseline levels are already above the water quality criteria, then the magnitude of residual effects will be determined based solely on variation from baseline conditions. An explanation is still not provided on how the proposed judgement criteria are developed or whether they are adequate to protect human health. Update the study plan to provide clarification on how the proposed definitions for the magnitude of residual effects criteria are relevant to the protection of the health of project-impacted groundwater consumers. Consider aligning the residual effects magnitude definitions for groundwater quality with those for surface water quality.

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	quality is discernable and can potentially impair ecological or potable uses of water."	technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of effects;…"				
GW-07	**Section 7 Conformance with Federal and Provincial Guidance** "…. will be included in future reporting (effects assessment), but will not be included as part of the baseline works."	**Section 14.2**	Provide more detail on the methodology of the effects assessment, and how the requirements described in Section 14.2 of the Guidelines will be met. Provide detail on how engagement with Indigenous groups and the public will inform the effects assessment, as well as the selection of mitigation and follow up program measures.	Additional wording added.	**Section 4** **Section 9**	This comment was partially addressed. See general comments GC-01, GC-02 and GC-07 above.

New comments based on the Groundwater and Geochemistry Study Plan submitted on June, 2021.				
#	**Study Plan Section**	**Tailored Impact Statement Guidelines Section**	**Context**	**Required Action for the Proponent**
GW-08	**Footnote 7, 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 7 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 7 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."*
GW-09	**Section 10 Assumptions** "Existing condition values for groundwater quantity will be based on the seasonal range of groundwater levels collected three times per year (spring, summer and fall) over a period of two (2) years at all monitoring stations."		NRCan recommends that existing condition values for groundwater quantity be based on the seasonal range of groundwater levels collected **continuously at instrumented monitoring stations, and** three times per year (spring, summer and fall) at the **remaining** monitoring stations, over a period of two years.	

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GE-01	**Section 3: Spatial Boundaries: Study Areas** "The PSA 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. The LSA currently being considered within the scope of the ongoing regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4."	**Section 7.4.1** "…The Impact Statement must describe the spatial boundaries, including project, local and regional study areas, for each valued component included in assessing the potential adverse and positive environmental, health, social and economic effects of the Project and provide a rationale for each boundary… For valued components establish three study area spatial boundaries to assess impacts to each valued component: Project Study Area: defined as the project footprint for each alternative route; …"	Update the study plan to clarify the spatial boundaries of the study areas, in particular of the Project Study Area, for all route alternatives under consideration. Update the study plan to provide a map showing the study areas for all route alternatives under consideration.	A map of the study areas in included.	Table 6-Section 6.2	This comment has been addressed.
GE-02	**Figure 3-1**	**Editorial**	Update the legend of the map provided in Figure 3-1 to indicate what all various coloured areas represent. Several colors used in the map are not featured in the legend.	The study area plan map is updated.	Figure 6-2 Section 6.2	This comment has been addressed. However, the original Figure 3-1 also showed auger and borehole sampling locations taken to date. This information has been removed in Figure 6-2 in the revised study plan. Ensure that maps that identify all sampling locations used for each field study are provided to the Federal Review Team for validation in the study plans or in the work plans in advance of conducting field studies.
GE-03	**Section 4: Baseline Study Design** "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 IAAC's Tailored Impact Statement (TISG) for this Project"	**Section 8.4** "…The Impact Statement must: … - describe the geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components, including the presence and distribution of eskers and permafrost, if applicable; … - provide maps depicting soil depth by horizon and soil order within the project site area to support soil salvage and reclamation efforts, and to outline potential for soil erosion; … - describe the historical land use and the potential for contamination of soils and sediments and describe any known or suspected soil contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the Project; and - identify ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants; …	Update the study plan to provide information to demonstrate the proposed approaches and methods to be used to meet the requirements of Section 8.4 of the Guidelines.	The Study Plan is updated to include the relevant requirements of Section 8.4 of the Guidelines.	Section 7.1 Section 8.1	This comment was partially addressed. While more information was provided in the revised study plan, the following aspects of Section 8.4 of the Guidelines still appear to be missing: - describe the historical land use and the potential for contamination of soils and sediments and describe any known or suspected soil contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the Project; - identify ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants - describe permafrost conditions including distribution of frozen and unfrozen ground, if applicable; and describe the potential for thaw settlement and terrain instability associated with ground thawing in permafrost areas, if applicable." Ensure that the Impact Statement includes the information required by Section 8.4 of the Guidelines.

[3] Refer to complete sections of the Guidelines for more context

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		- provide written description and maps of the current location of eskers and other post-glacial deposits on a map; - describe permafrost conditions including distribution of frozen and unfrozen ground, if applicable; and - describe the potential for thaw settlement and terrain instability associated with ground thawing in permafrost areas, if applicable…"				
GE-04	**Section 4.1: Desktop Assessment** "Due to the large Project area, the study will be largely based on previous investigations and published existing data / information in the area." **Section 7: Conformance with Federal and Provincial Guidance** "The summary report will provide detailed descriptions of specific data sources and data collection methods associated with physiology, geology, geochemistry, terrain and soils."	**Section 7.1** "…Ensure baseline data is representative of project site conditions. If surrogate data from reference sites are used rather than site-specific surveys, the proponent should demonstrate that the data are representative of project site conditions…" **Section 7.2** "…The Impact Statement must provide detailed 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..."	Demonstrate that the reports are representative of all of the terrain units and settings encountered by the Project. Provide details about the published existing data and information that will be used to characterize the baseline conditions, as required in Section 7.2 of the Guidelines. If surrogate data sources from reference sites are used rather than site-specific surveys, provide detail to demonstrate that the data are representative of project site conditions and clarify how potential gaps in the spatial coverage of the data will be addressed. Ensure that a clear map showing all proposed route alternatives, along with the borehole and auger data used for each alternative, is provided in the Impact Statement. Ensure that in composite the existing and new data meet the requirements of the Guidelines.	The Study Plan is updated to indicate if any surrogate data are referenced, justification for utilizing these data (i.e., spatial and temporal relevance with respect to the Project RSA), detailed descriptions, and specific data sources will be provided in the baseline report. Note that site-specific data will also be collected, as described below. The Project will not be solely relying on surrogate data from reference sites. The map showing the proposed routes is included (Figure 6-2).	Section 7.1 Figure 6-2	This comment was addressed.
GE-05	**Section 4.3.1: Geochemistry (ML/ARD)** "We have assumed that half of the samples will be collected at surface (bedrock outcrop hand samples) and the remainder will be collected from geotechnical drill core. The depth of the drill core samples will be shallower than the proposed depths of quarry / blasting operations to make certain that samples are representative of blast / fill material"	**Section 3.2.2.** "…The Impact Statement must describe the anticipated activities during the operation phase of the Project, including: … - characterization and management of borrow material, including overburden, and aggregate (storage, handling and transport of the volumes generated, mineralogical characterization, potential for metal leaching and acid rock drainage);…" **Section 8.3**	Provide details to demonstrate that the samples collected at each location will be compositionally and spatially representative of material to be disturbed.	The Study Plan is updated to describe that approximately 25% of the samples will be collected near surface (<0.4 m below grade) and bedrock outcrop hand samples. Care will be taken to collect fresh outcrop samples and not exposed/weathered bedrock samples. The remainder of the samples will be collected from geotechnical drill core. The depth of the drill core	Section 7.4.2	This comment was addressed.

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		"…The Impact Statement must: … provide a characterization of the geochemical composition of all expected construction materials (i.e., eskers, quarries, etc.), in order to predict metal leaching and acid rock drainage including oxidation of primary sulphides and secondary soluble sulphate minerals..."		samples will be shallower than the proposed depths of quarry / blasting operations to make certain that samples are representative of blast / fill material.		
GE-06	**Section 4.3.1: Geochemistry (ML/ARD)** "Mineralogy and Rietveld X-ray Diffraction: To determine the mineralogical composition of the rock samples."	**Section 8.3** "…The Impact Statement must: … - provide a characterization of the geochemical composition of all expected construction materials (i.e., eskers, quarries, etc.), in order to predict metal leaching and acid rock drainage including oxidation of primary sulphides and secondary soluble sulphate minerals..." **Section 14.2** "…If the proponent undertakes quarrying activities to extract aggregate material that may results in effects on groundwater and surface water levels (i.e., quarrying below the water table), the Impact Statement must: … describe the methods used to predict acid rock drainage and/or metal leaching for construction materials, including sample collection and laboratory testing;…"	Revise the study plan to provide details to demonstrate that using QEMSCAN rather than Rietveld XRD will be considered, as it has a much lower detection limit for sulphide minerals.	Based on the level of this study at this time, XRD is considered sufficient and will allow for more samples to be collected due to the relative cost per analysis (~$250 for XRD and ~$1000 for QEMSCAN). In the future, we can use QEMSCAN for targeted locations as specified/requested by the professional geochemist. No changes to the text were made.	N/A	Natural Resources Canada has indicated that the costs for QEMSCAN have dropped significantly and should be comparable to XRD, should the proponent wish to explore this methodology further.
GE-07	**4.3.2 Soil Sampling** (…) Soil samples will be submitted for analysis of the following parameters: • Total metals (including mercury, arsenic and chromium); • Alkalinity; • pH; • Total organic carbon; • Anions (chloride, bromide, fluoride and sulphate); • Nutrients (nitrate, nitrite); • Volatile organic compounds (VOCs); • Poly-aromatic hydrocarbons (PAHs); and/or • Radionuclide parameters. **Table 6.1: Physiography, Geology, Geochemistry, Terrain, and Soils indicators** Indicator: Physiography, Terrain and Soils	**Section 9** "…The proponent should refer to Health Canada guidance documents such that best practices are followed in the collection of baseline information to assess real and perceived project-related impacts to human health due to changes in air quality, noise, drinking and recreational water quality, country foods and/or multiple pathways of exposure to contaminants. The proponent should provide a detailed rationale/explanation for any deviation from recommended baseline characterization approaches and methods, including from Health Canada's guidance, or when determining such characterization is not warranted." **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; …	Provide details to demonstrate the methods used to screen the proposed COPCs into the soil quality assessment and to explain the rationale for the proposed methods. Describe interconnections and clarify how predicted changes in soil contaminant levels will be incorporated in the exposure pathway analysis for the human health effect assessment proposed in the human health and community safety study plan. Consult Section 7 of Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment.	As Project emissions of concern will be determined primarily based on the outcomes of the Air Quality Study, it is not possible at this time to screen soils for COPCs. If Air Quality Study outcomes suggest a potential for significant deposition of air emissions of concern onto local soils, then the soil contact pathway will be considered for evaluation in a HHRA. This may necessitate a need for a surface soil survey in the areas predicted to receive the greatest potential deposition of air emissions, to generate baseline soil concentrations of the emissions of concern. Soil data may not be used at all in an assessment of country food consumption, should that exposure pathway be deemed necessary to assess in a	Section 7.3.3 provides rational for the list of soil parameters that will be analyzed for during the baseline studies.	This comment was partially addressed. It is unclear how 'significance' of air contaminants deposition onto soils will be determined in the Air Quality study, how areas expected to receive the greatest potential of deposition of air emissions will be determined and how baseline soil samples will be taken. Include in the Impact Statement additional information to clarify which criteria will be used to assess significance of air contaminants deposition onto soils as a pre-requisite for a human health risk assessment.

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	Expression of Change: Degradation of physical or chemical characteristics of permafrost, terrain or topography (e.g., natural hazards) and soils. Rationale for selection: Important for geotechnical stability of civil infrastructure (e.g., roads), protection of human health, and protection of aquatic and terrestrial habitat associated with natural hazards (e.g., slope failures).	if a Human Health Risk Assessment is required, the assessment must identify all potential contaminant exposure pathways for contaminants of concern to adequately characterize potential biophysical risks to human health. A multimedia Human Health Risk Assessment may need to be considered and conducted for any contaminant of potential concern with an identified risk and multiple pathways;…"		HHRA. Ideally, country food item tissue data would provide the concentrations of COPCs in the harvested food items of interest. Soil data are only relevant towards estimating COPC levels in country food items if the foods are harvested from the same locations that are expected to incur soil impacts due to air emissions, and are only relevant for food items that are in direct contact with soil (such as plants, berries). Soil data are typically irrelevant to any assessment of fish or game animal country food items (due to reasons such as animal home ranges and foraging behaviours, locations where harvesting occurs relative to areas where soil impacts are predicted). The noted HC guidance will be consulted should there be a need to assess human exposure pathways related to soil and/or country foods.		
GE-08	**Section 4.3.2: Soil Sampling** "As part of the ML/ARD sampling program, a single soil sampling event will be conducted to collect baseline soil quality data from proposed borrow source areas and disturbed areas…. For the purposes of this study, it is assumed that two samples from 30 individual locations (60 samples total) will be sufficient to assess baseline soil conditions within the Project disturbance footprint, but outside the CAR ROW. Samples will typically be collected on the downgradient side of the ROW within the upper 1 m using a shovel or hand auger"	**Section 4.4** "…The determination of alternative means must be conducted in accordance with the Impact Assessment Agency of Canada's policy and guidance documents[4]…" **Section 8.4** "…The Impact Statement must: describe the landforms, soils and sediments within the local and regional project areas, including sediment stratigraphy; surficial geology maps and cross-sections of appropriate scale;…"	Provide details to demonstrate that landforms, soils and sediments within both the local and regional study areas, including sediment stratigraphy; surficial geology maps and cross-sections of appropriate scale, will be described in the Impact Statement. Provide details to demonstrate that a description of the 60 (total) samples planned to be collected (i.e. type of material such as clay, silt, sand, etc.) will be included in the Impact Statement. Ensure that all route alternatives under consideration, as well as	The baseline studies will provide details on landforms (e.g., eskers), soils and sediments within both the local and regional study areas. Surficial geology maps will be field-truthed at sampling locations. Cross-sections will not be completed at the baseline stage, but will be included at key locations in future reporting (e.g., Impact Statement). For the purposes of this study, it is assumed that two samples from 30 individual locations (60 samples total)	Section 7.4.3 Section 8.1	This comment was partially addressed. Ensure that all route alternatives under consideration, as well as the location of all other project components, particularly the aggregates sources (short-term and long-term), are determined prior to the baseline data collection and are scoped in the study plan. If a preferred alternative has not been identified before baseline studies start, then baseline data collection must be carried out for all route alternatives under consideration.

[4] https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-need-for-purpose-of-alternatives-to-and-alternative-means.html

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			the location of all other project components, particularly the aggregates sources (short-term and long-term), are determined prior to the baseline data collection and are scoped in the study plan. If a preferred alternative has not been identified before baseline studies start, then baseline data collection must be carried out for all route alternatives under consideration. Update the study plan to provide a map with the proposed location of the 30 sampling sites for the baseline data collection. Provide sufficient detail to demonstrate how the 30 locations represent all alternative project components.	will be sufficient to assess baseline soil conditions within the Project disturbance footprint, but outside the CAR ROW. Multiple samples will be collected from each lithology at spatially separated locations to allow for a more robust and representative dataset. Samples will typically be collected on the downgradient side of the ROW within the upper 1 m using a shovel or hand auger. If multiple landforms / surface soils are present at any station, additional soil samples will be collected to ensure multiple samples of each soil type are collected. The scope and budget of the analytical program will be refined following completions of the desktop study. Prior to field work, a plan map showing the regionally mapped surficial geology units and the proposed sampling locations will be created to ensure that samples are collected from all surficial geological units.		
GE-09	**Section 4.3.2: Soil Sampling** “samples will be submitted for analysis of the following parameters: Total metals (including mercury, arsenic and chromium); Alkalinity; pH; Total organic carbon; Anions (chloride, bromide, fluoride and sulphate); Nutrients (nitrate, nitrite); Volatile organic compounds (VOCs); • Poly-aromatic hydrocarbons (PAHs); and/or Radionuclide parameters. The above suite of analytical parameters will be used to establish baseline soil quality and identify contaminants of potential concern associated with Project work, including placement of fill material	**Section 8.4** “The Impact Statement must: … describe the suitability of topsoil and overburden for use in the reclamation of disturbed areas including an assessment of the acid generating potential of overburden to be used;…”	Update the study plan to describe considerations to using the same ABA test methods proposed in Section 4.3.1 of the study plan as part of the assessment of the acid generating potential of the soil and overburden.	Soil sampling proposed for geochemical testing to support the development of a geochemical characterization of soil and overburden is discussed in the Groundwater and Geochemistry Study Plan. These samples will be focused on proposed quarry and pit areas. The soil samples collected as part of Section 7.4.3 in this Study Plan are intended to characterize generic soil quality and will be spatially distributed across the proposed CAR. Locations will not be focused on proposed quarry / pit areas. However,	Section 7.4.2 Section 7.4.3	This comment was addressed.

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	(general parameters, anions, metals and radionuclides), blasting residual (nutrients), acid rock drainage and buffering capabilities (metals and alkalinity), metal leaching (metals and general parameters), hydrocarbons and solvents (VOCs and PAHs) and permeant infrastructure, such as bridges, piles and culverts (metals). Radionuclide parameters will only be collected once from each area."			there will be some areas where soil sampling for both generic and geochemistry analysis will be conducted.		
GE-10	**Section 6: Effects Assessment Scoping**	**Section 14.3** "…The Impact Statement must: … - describe any changes to permafrost conditions as a result of the Project; - describe any changes to eskers and similar geological features as a result of the Project; - describe any contaminants of concern (e.g., arsenic, chromium, mercury) potentially associated with the Project (including from spills or accidental discharges) that may affect soil, sediment, wetlands, and surface and ground water (including substances used during summer and winter maintenance activities); … - describe the historical land use and the potential for contamination of soils and sediments and potential for loss of soil fertility. Describe any known or suspected soil contamination within the study area that could be re-suspended, released or otherwise disturbed as a result of the Project; …"	Provide detail in the study plan to describe the approaches and methods to be used to meet the requirements identified in Section 14.3 of the Guidelines.	Available high-resolution imagery and regional surficial geological, terrain polygon, permafrost maps will be searched for and reviewed as part of the desktop study and ground-truthed during the field program (during soil and rock sampling). A review of the provincially known / registered contaminated sites database will be conducted to determine proximal contaminated sites with potential pre-existing soil quality issues. The baseline report will include the descriptions of the findings and present the location of key geological features and known contaminated sites.	Section 7.1 Section 8.1	This comment was partially addressed. The revised Physiography, Geology, Terrain and Soils Study Plan provides a description of the contaminants of concerns potentially associated with the Project. However, changes to permafrost conditions (aside from its general degradation), and changes to eskers as a result of the Project are not described. Furthermore, the revised study plan does not describe how historical land use and its potential for contamination of soil will be studied/determined. Ensure that the Impact Statement includes the information required by Section 14.3 of the Guidelines**.**
GE-11	**Section 6.1: Indicators and Expression of Change** **Table 6-1 Physiography, Geology, Geochemistry, Terrain and Soils Indictors** [Indicator – Physiography, Terrain and Soils] "Expression of Change Degradation of physical or chemical characteristics of permafrost, terrain or topography (e.g., natural hazards) and soils. Rationale for Selection	**Section 8.3** "…The Impact Statement must: … • identify any geological hazards that exist in the areas planned for the project facilities and infrastructure, including: o history of seismic activity in the area, including induced earthquakes, and secondary effects such as the risk of, landslides and liquefaction; o evidence of active faults; o isostatic rise or subsidence; and o history of landslides, slope erosion and the potential for ground and rock instability/landslides, and subsidence during and following project	Revise the study plan to provide details to demonstrate that all requirements in Section 8.3 of the Guidelines related to the identification of geological hazards will be met. Provide details to demonstrate how areas of ground instability will be identified, as required in Section 8.4 of the Guidelines.	As part of the desktop study, an online search for information regarding the earthquake and natural disaster history for the Project area will be conducted. This information will be used to identify potential geological hazards that exist in the areas planned for the Project facilities and infrastructure. Added a field study section (Section 7.4.4) the outlines the steps taken if any	Section 7.1 Section 7.4.4	This comment was addressed.

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	Important for geotechnical stability of civil infrastructure (e.g., roads), protection of human health, and protection of aquatic and terrestrial habitat associated with natural hazards (e.g., slope failures)."	activities..." **Section 8.4** "…The Impact Statement must: … identify any areas of ground instability; …"		geological hazards are identified during the desktop assessment. In summary, the areas will be flagged to the Geotechnical and Project design teams so additional assessment and field truthing can be conducted, as required, based on the professional judgement of the geotechnical team. Any field study's will be completed under other disciplines (e.g., geotechnical). The Project design team will use this information when selecting and designing the preferred CAR alignment with the overall goal of minimizing road alignment through areas with known or suspect geological hazards.		
GE-12	**Section 6.3: Magnitude of Effect Table 6-3 Geochemistry Magnitude Definition** **"**Laboratory testing indicates that all rock types disturbed by the Project is non-ML, where non-ML is defined as: Predicted water quality results (dissolved metals) do not exceed applicable water quality standards or are similar to proximal baseline surface water quality results."	**Section 8.3** "…The Impact Statement must: describe the bedrock geology and lithological units, including a summary table of geologic descriptions, mineralization styles (if applicable) supported by geological maps and cross-sections at appropriate scale (normally 1:50 000). Provide in the table an inferred risk rating (i.e., low, medium, high) for acid rock drainage and metal leaching potential based on the desk-top review of bedrock geology and mineralization;…"	Update the study plan to clarify what is meant by "predicted water quality results". Provide details to demonstrate how the requirement in Section 8.3 of the Guidelines related to inferred risk rating for ARD and ML will be met.	Baseline geochemistry has been moved to the Groundwater and Geochemistry Study Plan. The Groundwater and Geochemistry Study Plan is updated to change the wording to shake flask extraction. We agree that caution should be used when comparing laboratory shake flask extraction results with water quality standards. However, future studies will consider geochemical modelling, laboratory kinetic testing and field-scale testing to mimic site conditions.	Section 7.4.2 of the Groundwater and Geochemistry Study Plan	This comment was addressed.
GE-13	**Section 6.3 Magnitude of Effect** "The residual effects will therefore be described in terms of the magnitude, geographic extent, timing, duration, frequency, social and ecological context, likelihood, and whether effects are reversible or irreversible. For magnitude, VC-specific definitions are required and are proposed below in Table 6-2 for Physiography, Geology, Geochemistry, Terrain and Soils. Tables 6-3 and 6-4 provide details	**Section 14.2** …"If the proponent undertakes quarrying activities to extract aggregate material that may results in effects on groundwater and surface water levels (i.e., quarrying below the water table), the Impact Statement must: … • With respect to potential effects on water quality resulting from acid rock drainage and/or metal leaching, the Impact Statement must: provide estimates of the potential for aggregate extraction	Update the study plan to provide details to demonstrate that the geochemical characterization program summary report will identify if an ARD/ML monitoring and mitigation plan will be proposed, and if so, will provide a description of its scope and a timeline for its development and appropriate implementation.	Geochemistry has been moved to the Groundwater and Geochemistry Study Plan. The Groundwater and Geochemistry Study Plan has been updated accordingly.	Section 7.4.2 of the Groundwater and Geochemistry Study Plan	This comment was addressed.

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#	**Draft Study Plan Section**	**Tailored Impact Statement Guidelines Section[3]**	**Required Action for Proponent**	**Proponent Response**	**Final Study Plan Section Reference**	**Federal Review Team comments on Response**
	of the definitions of geochemistry magnitude and soils magnitude, respectively.“	activities (i.e., eskers and quarries) and rock exposed in permanent rock cuts to be sources of acid rock drainage or metal leaching; … • provide an acid rock drainage assessment and mitigation plan that describes the confirmatory monitoring of construction materials and potential mitigation strategies to prevent or control acid rock drainage and metal leaching during construction, operation, decommissioning and abandonment; and describe contingency plans, monitoring during operation, decommissioning and abandonment, and maintenance plans…”				
GE-14	**Table 6-4: Soils Magnitude Definition** **Negligible** “Definition: There is little to no variation predicted in soil concentrations which remain within the range of natural variability. Rationale: Soil quality shows no discernable change, therefore no effect on ecological life or human health (e.g., potable water use, physical contact). **Low** Definition: There is a small variation predicted in soil concentrations that is less than double current concentrations, but concentrations remain below applicable soil quality criteria. Rationale: Temporary effect or permanent change to soil quality is minor and remains protective of ecological life and human health. **Medium** Definition: There is a moderate variation predicted in soil concentrations that is less than five (5) times current concentrations, but concentrations are below the	**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. This includes criteria such as whether the effects are high or low in magnitude, the geographical extent, timing, frequency, duration and reversibility of the effects, taking into account any important contextual factors. Where the potential for human health effects exist due to exposure to a particular contaminant at any level (e.g., non-threshold air pollutants, including particulate matter and nitrogen dioxide, and water pollutants, such as but not limited to arsenic and lead) mitigation measures should aim to reduce the residual effects to as low as reasonably achievable... The Impact Statement must: • characterize the residual effects using criteria most appropriate for the effect; • 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;…	Update the study plan to include in the definitions for magnitude criteria that are relevant to the protection of human health. Describe the approach that will be used to ensure that these criteria are appropriate for the human health impact assessment. Health Canada encourages the proponent to use all available technologies to reduce their emissions as low as reasonably achievable (ALARA) and beyond those required to achieve applicable thresholds (i.e., Canadian Council of Ministers of the Environment’s (CCME[5]) Soil Quality Guidelines for the Protection of Environmental and Human Health and Ontario Soil, Groundwater and Sediment Standards[6]) in order to reduce the burden of soil and sediment pollution.	The Study Plan is updated.	Table 9-5 Table 9-6 Section 9.6	This comment was not addressed. The definitions for the magnitude of residual effects criteria remain unchanged (Table 9-5), despite the new statement that “professional judgement and / or risk assessment may be required to assess impacts where no provincial or federal soil standard exists or when non-threshold parameters such as arsenic, chromium and lead are involved”. The chosen thresholds of increase above baseline conditions still appear arbitrary and no evidence is provided to support the rationale that the definitions are relevant to the protection of human health. Update the study plan to clarify how the thresholds of increase from baseline conditions were derived for residual effects magnitude criteria definitions, and how they are relevant to the protection of human health. Health Canada recommends the use of all available technologies to reduce their emissions as low as reasonably achievable (ALARA) and beyond those required to achieve applicable thresholds (i.e., Canadian Council of Ministers of the Environment’s (CCME[7]) Soil Quality Guidelines for the Protection of Environmental and Human Health and Ontario Soil, Groundwater and Sediment Standards[8]) in order to reduce the burden of soil and sediment pollution.

[5] CCME, 2014. Soil Quality Guidelines for the Protection of Environmental and Human Health. Available at : http://st-ts.ccme.ca/en/index.html?chems=all&chapters=4&pdf=1
[6] Ontario Soil, Groundwater and Sediment Standards. Available at: https://www.ontario.ca/page/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental-protection-act.

[7] CCME, 2014. Soil Quality Guidelines for the Protection of Environmental and Human Health. Available at : http://st-ts.ccme.ca/en/index.html?chems=all&chapters=4&pdf=1
[8] Ontario Soil, Groundwater and Sediment Standards. Available at: https://www.ontario.ca/page/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental-protection-act.

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#	Draft Study Plan Section	Tailored Impact Statement Guidelines Section[3]	Required Action for Proponent	Proponent Response	Final Study Plan Section Reference	Federal Review Team comments on Response
	applicable soil quality criteria **or** less than 10 times current concentrations. Rationale: Temporary effect or permanent change to soil quality is moderate but remains protective of ecological life and human health. **High** Definition: There is a large variation predicted in measurable parameters, concentrations exceed applicable soil quality criteria and are greater than 10 times current concentrations. Rationale: Temporary effect or permanent change to soil quality can potentially impair ecological life or human health." **Table 6-3: Geochemistry Magnitude Definition** "(…) Minor incremental effects to surface water, groundwater and/or drinking water quality are anticipated to be discernable, but water quality remains protective of ecological life and human health for all time periods and life stages."	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;…"				

New comments based on the Physiography, Geology, Terrain and Soils Study Plan submitted in June, 2021.				
#	**Study Plan Section**	**Tailored Impact Statement Guidelines Section**	**Context**	**Required Action for the Proponent**
GE-15	**Section 7.2 Summary of Previous Field Studies** **“**In 2019, KGS completed a preliminary geotechnical investigation along Alternatives 1 and 4. The field investigations were focused on geological features which could be potential pits and quarries along the CAR.”	**Section 3** “…The Impact Statement must describe all project components including but not limited to: • borrow pits, gravel or aggregate pits and quarries (footprint, geographic location, ownership, and development plans including pit phases and lifespan), including their location in relation to upland habitats and the presence of rare, limited and/or significant habitat (e.g., federal, provincial, or Indigenous protected and conserved areas, ANSIs (Areas of Natural and Scientific Interest), Ramsar sites, critical habitat identified under the Species at Risk Act, etc.; • waste rock, overburden, topsoil, gravel and rock storage and stock piles (footprint, locations, volumes, development plans and design criteria); • aggregate extraction and production (crushing/screening) facilities (footprint, technology, location)…” **Section 7.2** “…The Impact Statement must provide detailed 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…”	Potential location and description of project components, including but not limited to borrow pits, gravel or aggregate pits, quarries and access roads is not provided in the study plan.	Update the study plan or the work plan to provide a map of the 2019 KGS sampling location and identify “the geological features which could be potential pits and quarries along the CAR”. See general comment GC-07 above. Update the study plan to 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 the location of project components, including but not limited to road alternative, borrow pits, gravel or aggregate pits, quarries, camps and access roads.
GE-16	**Section 7.4.2 Soil Quality Sampling** “Prior to field work, a plan map showing the regionally mapped surficial geology units and the proposed sampling locations will be created to help ensure that samples are collected from all surficial geological units and proposed key areas, such as quarries and camps.”	**Section 7.2** “…The Impact Statement must provide detailed 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…”	Similar to comment GE-15, the potential locations of “proposed key areas, such as quarries and camps” is not clearly presented in the study plan and the map provided in the Physiography, Terrain and Soils and Vegetation and Peatlands Field Logistics Work Plan does not identify proposed key areas.	Prior to field work, share with the Federal Review Team the map with the proposed sampling locations and proposed key areas, such as quarries and camps.
GE-17	**Section 9.2 Valued Components and Indicators** **Table 9-2: Physiography, Terrain and Soils Indicators**	**Section 7.1** “…The information describing the existing baseline conditions may be provided as a stand-alone chapter in the Impact Statement or integrated into clearly defined sections for relevant valued components, including effects assessment of each valued component and valued component interactions, identification of mitigation measures, residual effects analysis and cumulative effects assessment...” **Section 8.4** **(**entire section)	Table 9-2: Physiography, Terrain and Soils Indicators in Section 9.2 of the Study Plan only includes one valued component with one indicator to cover all requirements of Section 8.4 of the Guidelines. It unclear how all the requirements of Section 8.4 of the Guidelines will be met. Section 8.4 of the Guidelines requires the determination of the presence and distribution of eskers, however, eskers are not mentioned as valued components and no indicator is proposed for the assessment.	Update the study plan to include appropriate valued components and indicators to meet all requirements of Section 8.4 of the Guidelines, including but not limited to the distribution of eskers within the Local Study Area.
GE-18	**Section 9.4 Methods for Predicting Future Conditions** “Modelling is a common approach to predicting future conditions for many disciplines / components of an IA / EA. However, modelling		Section 9.4 of the Physiography, Terrain and Soils Study Plan states that “Modelling is a common approach to predicting future conditions for many disciplines / components of an IA / EA. However, modelling is not	Update the study plan to clarify how future conditions will be predicted to assess potential effects of the Project on Physiography, Geology, Terrain and Soils.

New comments based on the Physiography, Geology, Terrain and Soils Study Plan submitted in June, 2021.				
#	**Study Plan Section**	**Tailored Impact Statement Guidelines Section**	**Context**	**Required Action for the Proponent**
	is not planned for the Physiography, Terrain and Soils baseline report or effects assessment." • Total metals, including: − Aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorus, potassium, selenium, silicon, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium and zinc − Mercury and methylmercury • Alkalinity; • pH; • Total organic carbon; • Anions (chloride, bromide, fluoride and sulphate); • Nutrients (nitrate, nitrite); • Volatile organic compounds (VOCs); • Poly-aromatic hydrocarbons (PAHs); and / or • Radionuclide parameters."		planned for the Physiography, Geology, Terrain and Soils baseline report or effects assessment" and does not provide any further information.	
GE-19	**Section 7.4.2: Soil Quality Sampling** "Soil samples will be submitted for analysis of the following parameters:	**Section 8.4** "…The Impact Statement must describe the historical land use and the potential for contamination of soils and sediments and describe any known or suspected soil contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the Project…"	The study plan indicates that as part of the sampling program, baseline soil quality data will be collected from proposed pit and quarry areas and disturbed areas along the CAR. Sampling locations will be focused on landforms of interest and areas undergoing terrain investigations, including areas near watercourses. Soil samples will be submitted for analysis of the parameters listed in Section 7.4.2 and the scope of the analytical program will be refined following completion of the desktop study. The study plan does not indicate whether the list of parameters to be sampled will be expanded to any parameters of concern in addition to those listed in Section 7.4.2 that may be identified during the desktop review of historical land use and potential soil contamination.	Expand the list of soil parameters to be sampled to include any additional parameters not listed in Section 7.4.2 that may be identified during the desktop assessment of historical land use and other existing studies, including the registered contaminated sites database. Include in the Impact Statement a description of the outcome of the desktop assessment of historical land use and indicate whether expanding the list of soil parameters was required.
GE-20	**Section 9.6.1 Magnitude** "Professional judgement and / or risk assessment may be required to assess impacts where no provincial or federal soil standard exists or when non-threshold parameters such as arsenic, chromium and lead are involved."	**Section 8.4** "…The Impact Statement must describe the historical land use and the potential for contamination of soils and sediments and describe any known or suspected soil contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the Project…"	There are the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for arsenic, total and hexavalent chromium, and lead. It is therefore unclear under what circumstances professional judgement or risk assessment may be required to assess impacts.	Update the study plan to clarify and validate with the Federal Review Team the circumstances under which the relevant provincial and federal soil standards would not be applied and professional judgement or risk assessment may be required to assess impacts.
GE-21	**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."*