CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
PROJECT NUMBER: 19M-01347-03

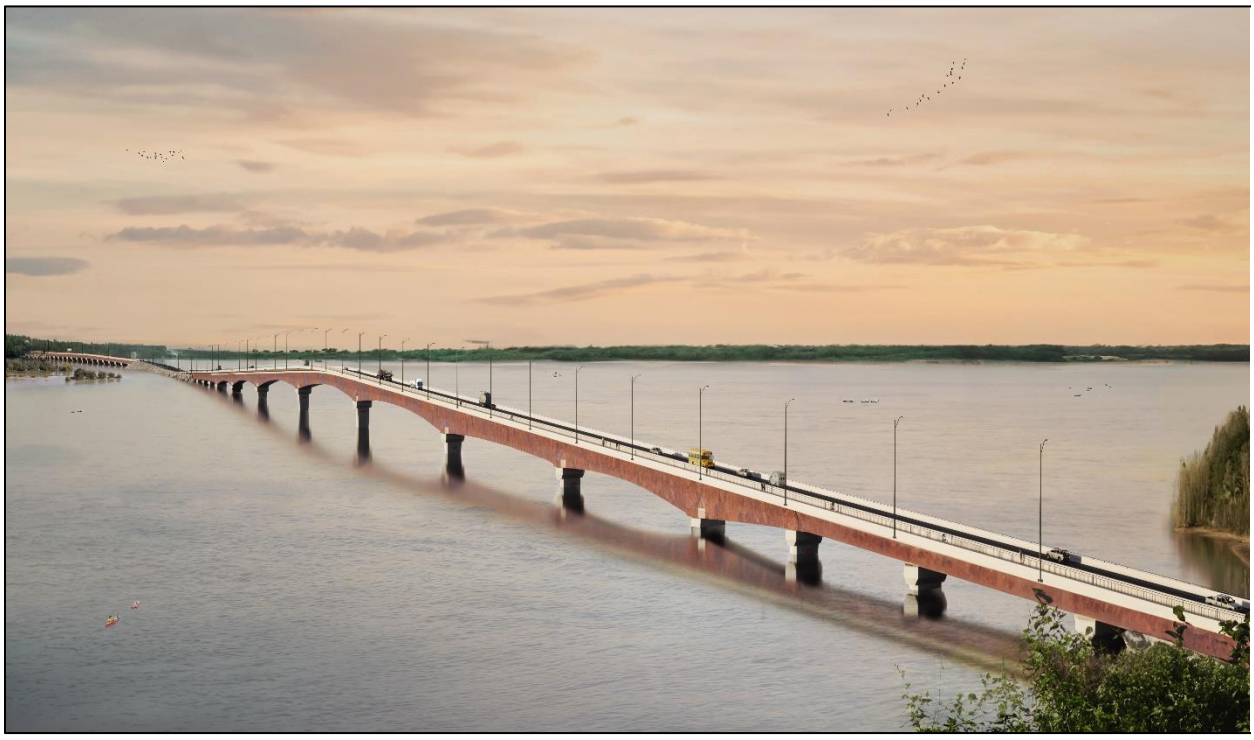
GEORGINA ISLAND FIXED LINK

A PROJECT FOR SEVEN GENERATIONS

Detailed Project Description of a Designated Project

DECEMBER 2025

FINAL – REV 0



GEORGINA ISLAND FIXED LINK

DETAILED PROJECT DESCRIPTION OF A DESIGNATED PROJECT

CHIPPEWAS OF GEORGINA ISLAND FIRST NATION

FINAL – REV 0

PROJECT NO.: 19M-01347-03
CLIENT REF: GIFN
DATE: DECEMBER 2025

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TABLE OF CONTENTS

Part A.	**Updated General Information**	**1**
1.	Project Name	4
2.	Proponent Information	4
Part B.	**Planning Phase Results**	**5**
3.	Summary of Engagement	5
3.1	Engagement Principles	5
3.2	Public Engagement	6
3.3	Community Interest Groups Engagement	10
3.4	Regulatory Agencies Engagement	16
3.5	Elected Officials Engagement	29
3.6	Impact Assessment Act Engagement	31
3.7	Future Engagement with Regulatory Agencies and the Public	32
4.	Summary of Indigenous Engagement	34
4.1	GIFN Community Engagement	35
4.2	Summary of GIFN Community Engagement	39
4.3	Williams Treaties First Nations	41
4.4	Métis Nation of Ontario	43
4.5	Huron Wendat Nation	43
4.6	Engagement with Other Indigenous Communities and Organizations	44
4.7	Future Engagement with Indigenous Communities	45
5.	Relevant Plans or Studies	46
5.1	Regional Assessments	47
5.2	Provincial, Municipal and Local Studies, Plans, and Guides	47
5.3	Project-specific Studies and Plans	55
5.4	Completed and Future Studies	59
5.5	Nearby Assessments	69
6.	Section 95 Strategic Assessments	72

Part C.	**Project Information**	**73**
7.	Purpose and Need for the Project	73
7.1	Purpose of the Project	73
7.2	Need for the Project	75
8.	Project Designation Per the Physical Activities Regulations	77
9.	Project Components and Activities	79
9.1	Overview of the Project Components	79
9.2	Pre-Construction Design Considerations	82
9.3	Construction Activities	83
9.4	Operations and Maintenance Activities	87
9.5	Decommissioning	88
10.	Maximum Production Capacity	88
11.	Anticipated Project Schedule	89
12.	Project Alternatives	89
12.1	Alternative Means	89
12.2	Alternatives to the Project	111
12.3	Ferry Alternative Report	119
12.4	Community Referendum Vote (2025)	119
Part D.	**Location Information and Context**	**120**
13.	Project Location	120
13.1	Proposed Geographic Coordinates	120
13.2	Site Maps	121
13.3	Legal Land Description	121
13.4	Proximity to Residences and Affected Communities	125
13.5	Proximity to Indigenous Lands	128
13.6	Proximity to Federal Lands	128
14.	Description of the Physical and Biological Environment	129
14.1	Bedrock and Soils	129

14.2	Natural Environment	138
14.3	Hydrogeology	207
14.4	Drainage	213
14.5	Atmospheric Environment	214
14.6	Acoustic Environment	214
14.7	Coastal Environment	216
15.	Description of Health, Social, and Economic Context	244
15.1	Future Studies	244
15.2	Health	244
15.3	Social	248
15.4	Transportation and Traffic	256
15.5	Navigation	266
15.6	Land Use	267
15.7	Cultural Heritage Resources	270
15.8	Economic Context	279
Part E.	**Federal, Provincial, Territorial, Indigenous or Municipal Involvement and Effects**	**285**
16.	Potential Federal Financial Support	285
17.	Federal Lands that may be used for the Project	286
18.	Permits, Licenses, and Approvals	286
Part F.	**Potential Effects of the Project**	**293**
	GIFN Environmental Principles	293
19.	Change to the Environment under Federal Legislation	295
19.1	Fish and Aquatic Habitat Protected under the Fisheries Act	295
19.2	Aquatic Species at Risk Protected under the Species at Risk Act	302
19.3	Migratory Birds Protected under the Migratory Birds Convention act, 1994	303
20.	Changes to Environment on Federal Lands and Elsewhere	306
20.1	Bedrock and Soils	306

20.2	Natural Environment	308
20.3	Groundwater / Hydrogeology	316
20.4	Stormwater / Drainage	317
20.5	Atmospheric Environment	326
20.6	Acoustic Environment	327
20.7	Coastal Environment	329
20.8	Transportation and Traffic	345
20.9	Navigation	349
21.	Changes to Indigenous Physical and Cultural Heritage, Traditional Land Use, or Archaeology	353
21.1	Cultural Heritage Resources	353
21.2	Traditional Land Use	362
22.	Changes to Indigenous Health, Social or Economic Conditions	364
22.1	Health Conditions	364
22.2	Social Conditions	367
22.3	Economic Conditions	370
23.	Greenhouse Gas Emissions	376
23.1	Construction	376
23.2	Operation	377
24.	Types of Waste and Emissions	381
References	.....	**385**

TABLES

Table B-1 Summary of Public Engagement Events 9
Table B-2 Summary of Community Interest Group Consultation Events 14
Table B-4 Summary of Engagement Activities with DFO 17
Table B-5 Summary of Engagement Activities with Transport Canada 18
Table B-6 Summary of Engagement Activities with ECCC 19
Table B-7 Summary of Engagement Activities with MECP 20
Table B-8 Summary of Engagement Activities with MNR 22
Table B-9 Summary of Engagement Activities with NHIC 23
Table B-10 Summary of Engagement Activities with LSRCA 24
Table B-11 Summary of Engagement Activities with MTO 25
Table B-12 Summary of Engagement Activities with MCM 27
Table B-13 Key Comments on Transportation Impact Study Requirements 28
Table B-14 Summary of Engagement Activities with York Region, Town of Georgina, YRT and STSYR 29
Table B-15 Summary of Engagement Activities with Elected Officials 31
Table B-16 Public, Community Interest Groups and Regulatory Agency - Future Engagement 33
Table B-17 Summary of GIFN Community Engagement Events 39
Table B-18 Summary of Non-GIFN Indigenous Engagement 44
Table B-19 Indigenous Communities - Future Engagement 46
Table B-20 Fixed Link Project Completed, Ongoing, and Future Technical and Environmental Studies 60
Table C-1 Proposed Construction Activities 84
Table C-2 Fixed Link Project Schedule Summary 89
Table C-3 Summary of the Various Alternative Means Assessments for the Project 90
Table C-4 Refined Alternative Alignments Evaluation 102
Table C-5 Alternative Design Evaluation 108
Table C-6 Evaluation of Potential Alternatives to the Project 115
Table D-1 Legal Land Description 125
Table D-2 Terrestrial Field Investigations Completed by Cambium in 2022 and 2023 152
Table D-3 Vascular Plant Species Documented within the Study Area 160
Table D-4 Avifauna Results Summary 165
Table D-5 Amphibian Observations Summary 169
Table D-6 Summary of Bat Acoustic Monitoring Results 172
Table D-7 Significant Wildlife Habitat Summary 175
Table D-8 Summary of SAR and SAR Habitat Confirmed in the Study Area 194
Table D-9 Well Water Record Summary (500 m radius) 209
Table D-10 Sound Level Ranges (Averaged over 1 Hour) 216

Table D-11 Sound Level Ranges (Averaged over 15 Hours for Daytime and 9 Hours for Nighttime) 216
Table D-12 Lakebed Sediment Composition 229
Table D-13 Lake Shoreline Sediment Composition 230
Table D-14 Extreme Wind Speeds at Barrie ORO Station (Omnidirectional) 233
Table D-15 Extreme Wind Speeds at Barrie ORO Station 233
Table D-16 Extreme Significant Wave Heights and Associated Peak Period for Location 1 241
Table D-17 Extreme Significant Wave Heights and Associated Peak Period for Location 2 242
Table D-18 Country Food Sources on Georgina Island 246
Table D-19 Population of County/Districts/Municipalities Near GIFN (Statistics Canada, 2022a) 248
Table D-20 Regional Dwellings Totals 249
Table D-21: Regional Household Median Income 249
Table D-22 GIFN Registered Population 250
Table D-23 Population by Sex for GIFN 250
Table D-24 Population by Age for GIFN 251
Table D-25 Level of Education for GIFN 253
Table D-26 Total Ferry Passenger Trips (2009 to 2019) 259
Table D-27 Identified BHRs and CHLs with Known or Potential CHVI 276
Table D-28 Labour Force Status for GIFN 279
Table D-29 Income by Sex for GIFN 280
Table D-30 Total Income Groups in 2015 for GIFN 281
Table D-31 GIFN Ventures Past and Present 283
Table E-1 Obtained Permits, Licenses, and Approvals 288
Table E-2 Anticipated Permits, Licenses, and Approvals 289
Table F-1 De-Icing Strategies 322
Table F-2 Modeling Scenarios 330
Table F-3 Current Velocities During the Windiest and Calmest Months at Different Construction Conditions 335
Table F-4 Impacts and Preliminary Mitigation Strategies for BHRs and CHLs 359
Table F-5: Changes to Indigenous Physical and Cultural Heritage, Traditional Land Use and Archaeology 362
Table F-6 Values Used in GHG Savings Estimation for the Project 377
Table F-7 GHG Emission Calculations – Comparative Values 379
Table F-8 Summary of Waste Sources 381
Table F-9 Summary of Emissions Sources 384

FIGURES

Figure B-1 Lake Simcoe Protection Act Watershed Boundary (MECP, 2020) 49
Figure B-2 Sibbald Point Provincial Park Boundary (MECP, 2021a) 51
Figure B-3 Greenbelt Plan Boundaries (MNRF, 2022a) 54
Figure C-1 Airboat (”Scoot”) 74
Figure C-2 Georgina Island Ice Roads 74
Figure C-3 Proposed GIFL Project 78
Figure C-4 Segmental Bridge Conceptual Design Arrangement Options 81
Figure C-5 Preliminary Alternative Route Options for the Project (2008) (Neegan Burnside Ltd., 2008) 93
Figure C-6 Initial Alternative Alignments for the Preferred Route (2021) 96
Figure C-7 Refined Alternative Alignments for the Preferred Route (2022) 99
Figure C-8 Conceptual Design for Option 3B (2024) 110
Figure D-1 GIFN Land Ownership – All Island and Mainland Properties 123
Figure D-2 GIFN Land Ownership – Georgina Island 124
Figure D-3 Existing Human Receptors within Study Area 127
Figure D-4 Layout of MASW Surveys Performed Along the Refined Alternative Alignments 131
Figure D-5 Surficial Geology of the Project Study Area 132
Figure D-6 Black River Road Part 1, Phase I ESA Site (Cambium Aboriginal Inc., 2019d) 136
Figure D-7 Black River Road Parts 2, 3 & 4, Phase I ESAs Sites (Cambium Aboriginal Inc., 2020) 137
Figure D-8 Study Area and Designated Natural Areas 139
Figure D-9 Study Area Properties and Landscape Context (Cambium Inc., 2023) 156
Figure D-10 Ecological Land Classification – Georgina Island (Cambium Inc., 2023) 161
Figure D-11 Ecological Land Classification - Sand Islands (Cambium Inc., 2023) 162
Figure D-12 Ecological Land Classification - Bayvista Property (Cambium Inc., 2023) 163
Figure D-13 Ecological Land Classification - West Property (Cambium Inc., 2023) 164
Figure D-14 Significant Wildlife Habitat – Georgina Island (Cambium Inc., 2023) 185
Figure D-15 Candidate Significant Wildlife Habitat -Georgina Island (Cambium Inc., 2023) 186
Figure D-16 Confirmed Significant Wildlife Habitat - Sands Island (Cambium Inc., 2023) 187
Figure D-17 Candidate Significant Wildlife Habitat - Sands Island (Cambium Inc., 2023) 188
Figure D-18 Confirmed Significant Wildlife Habitat - Bayvista (Cambium Inc., 2023) 189
Figure D-19 Candidate Significant Wildlife Habitat - Bayvista (Cambium Inc., 2023) 190
Figure D-20 Confirmed Significant Wildlife Habitat – West Property (Cambium Inc., 2023) 191
Figure D-21 Candidate Significant Wildlife Habitat - West Property (Cambium Inc., 2023) 192
Figure D-22 SAR Habitat – Island Properties (Cambium Inc., 2023) 199
Figure D-23 SAR Habitat - Bayvista Property (Cambium Inc., 2023) 200
Figure D-24 SAR Habitat - West Property (Cambium Inc., 2023) 201
Figure D-25 Areas of Concern – Island Properties (Cambium Inc., 2023) 203

Figure D-26 Areas of Concern – Bayvista Property (Cambium Inc., 2023) 204
Figure D-27 Areas of Concern – West Property (Cambium Inc., 2023) 205
Figure D-28 Areas of Concern – Overview (Cambium Inc., 2023) 206
Figure D-29 MECP Water Well Records 210
Figure D-30 Water Well Site Plan – Georgina Island 212
Figure D-31 Existing Drainage Areas 213
Figure D-32 Acoustic Monitoring Stations 215
Figure D-33 Trent–Severn Waterway (LSRCA) 217
Figure D-34 Lake Simcoe Daily Water Level at Jackson Point 218
Figure D-35 Lake Simcoe Daily Water Level Statistics at Jackson Point 219
Figure D-36 DEM of Lake Simcoe (CD) 220
Figure D-37 DEM of Lake Simcoe in the Study Area (CD) 221
Figure D-38 Freeze-up Dates Between 1852 and 2022. Data Courtesy of the GIFN 222
Figure D-39 Thaw Dates Between 1853 and 2012. Data Courtesy of the GIFN 223
Figure D-40 Ice Period Duration Between 1853 and 2021. Data Courtesy of the GIFN 223
Figure D-41 Ice Conditions on Lake Simcoe – January 2, 2020. Sentinel-2 Imagery 224
Figure D-42 Ice Conditions on Lake Simcoe – 2019-2022. Sentinel-2 Imagery 225
Figure D-43 Ice Buildup in the GIFN Community in March 2021 226
Figure D-44 Ice Conditions on Lake Simcoe – April 22, 2018. Sentinel-2 Imagery 227
Figure D-45 Sediment Sampling Locations 228
Figure D-46 Locations of Wind Data: Barrie ORO Station and CFSv2 Model Data Point Location 231
Figure D-47 Time Series of Wind Speed at Barrie ORO Station 232
Figure D-48 Wind Rose – Barrie ORO Data 232
Figure D-49 ADCP Deployment Location 235
Figure D-50 Measured Depth-Averaged Velocities and Direction 237
Figure D-51 ADCP measured velocity magnitude and direction 238
Figure D-52 ADCP Measured Significant Wave Height, Direction and Period (black) with Associated Wind Speed (red) 239
Figure D-53 Wave Rose from ADCP 240
Figure D-54 Wave Hindcast Locations 241
Figure D-55 Georgina Island Recreational Resources 255
Figure D-56 Georgina Island Ice Roads Landing Locations 257
Figure D-57 Georgina Island Ice Roads Network 258
Figure D-59: Existing YRT Transit Service (YRT, 2002a) 261
Figure D-60: Mobility on Request Sutton-Pefferlaw (YRT, 2002b) 261
Figure D-61 Locations for Traffic Data Collection (Google Earth, 2022) 262
Figure D-62 Existing LOS 263
Figure D-63 2051 Regional Road Cycling Network Near the Study Area (York Region, 2022b) 265
Figure D-64 2051 Regional Trail Network (York Region, 2022b) 265

Figure D-65 Recommended Vessel Track (NAVIONICS, 2022) 266
Figure D-66 GIFN Land Use Plan – Georgina Island 269
Figure D-67 Marine Archeological Potential 271
Figure D-68 Stage 1 Terrestrial Archaeological Potential 274
Figure D-69 Identified BHRs and CHLs with Known or Potential CHVI 278
Figure D-70 GIFN Employment by Industry (Statistics Canada, 2022a) 280
Figure F-1 Oil-Grit-Separator 321
Figure F-2 Filter Treatment Station 321
Figure F-3 Typical Bioswale Design 325
Figure F-4 Vegetated Filter Strips 325
Figure F-5 Current Velocity due to 100-Year High Flow Event of West-Northwesterly Wind at Different Construction Conditions 332
Figure F-6 Current Velocity due to 100-Year High Flow Event of Easterly Winds at Different Construction Conditions 333
Figure F-7 Observation Point Where the Largest Change in Current Velocity is Observed 334
Figure F-8 Significant Wave Height and Wave Direction due to 100-Year High Flow Event of Easterly Wind at Different Construction Conditions 337
Figure F-9 Significant Wave Height and Wave Direction due to 100-Year High Flow Event West-Northwesterly wind at Different Construction Conditions 338
Figure F-10 Significant Wave Height Difference between Pre- and Post-Construction due to 100-year Easterly Wind 339
Figure F-11 Significant Wave Height Difference between Pre- and Post-Construction due to 100-Year West-Northwesterly Wind 340
Figure F-12 Cumulative Erosion and Sedimentation for Different Construction Conditions after 1-Year Low Level Water 342
Figure F-13 Cumulative Erosion and Sedimentation for Different Construction Conditions after 25-Year Low Level Water 343
Figure F-14 Recommended Lane Configuration 347
Figure F-15 2051 Total LOS 348
Figure F-16 Cross Section View of a Typical Recreational Boat Channel (Oregon State Marine Board, 2011) 350
Figure F-17 Air Draught Relation Ship (Takahashi, 2007) 351
Figure F-18 Recommendations for Further Marine Archeological Assessment 356

APPENDICES

Appendix A: Proposed Fixed Link Study – Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008)
Appendix B: Fixed Link Socio-Economic Study
Appendix C: Response to Summary of Issues
Appendix D: Proposed Project Schedule
Appendix E: Fixed Link Engagement Plan
Appendix F: Record of Consultation
Appendix G: Health Impact Assessment of Transportation Options to and from Georgina Island
Appendix H: Preliminary Draft Conceptual Design Drawing
Appendix I: GIFL Environment Principles
Appendix J: GIFL Climate Change Adaptation Plan
Appendix K: The Georgina, Fox, and Sand Islands Subwatershed Plan
Appendix L: GIFL Project Plan
Appendix M: Phase I ESAs
Appendix N: Transportation Impact Study
Appendix O1: Cultural Heritage Report and Adendum
Appendix O2: Cultural Heritage Evaluation Report
Appendix P: GIFL Climate Resiliency Plan Summary
Appendix Q1: Marine Desktop Archaeological Assessment
Appendix Q2: Marine Archaeological Impact Assessment
Appendix R: Stage 1 Terrestrial Archaeological Assessment
Appendix S: GIFL Procurement Principles
Appenidx T1: Aquatic Existing Condtions Report
Appendix T2: Aquatic Existing Condtions Report for the Preferred Alignment
Appendix T3: Terrestral Existing Conditions Report
Appendix U: Air Quality Impact Assessment
Appendix V: Noise Impact Assessment Report
Appendix W: Preliminary Hydrogeological Study
Appendix X: MASW Survey Results
Appendix Y: Coastal Engineering Report

LIST OF ABBREVIATIONS

Abbreviation	Definition
2SLGBTQQIA+	Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, Asexual, and Additional Sexual Orientations and Gender Identities
AAQC	Ambient Air Quality Criteria
ACO	Artificial Cover Object
ADC	Air Draught Clearance
ADCP	Acoustic Doppler Current Profiler
AFDD	Accumulated Freezing Degree Days
AMS	Annual Maximum Series
ANSI	Areas of Natural and Scientific Interest
ASL	Above Sea Level
ATR	Automatic Traffic Record
BBS	Breeding Bird Surveys
BEAHR	Building Environmental Aboriginal Human Resource
BHR	Built Heritage Resources
BMPP	Best Management Practices Plan
CAAQS	Canadian Ambient Air Quality Standards
CAC	Criteria Air Contaminant
CCME	Canadian Council of Ministers of the Environment
CD	Chart Datum
CEGEP	Collège D'enseignement General et Professionnel
CEP	Community Energy Plan
CHBDC	Canadian Highway Bridge Design Code
CHER	Cultural Heritage Evaluation Report

Abbreviation	Definition
CHL	Cultural Heritage Landscape
CHS	Canadian Hydrographic Service
CHVI	Cultural Heritage Value or Interest
CIB	Canada Infrastructure Bank
CIPS	Cambium Indigenous Professional Services
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CP	Certificate of Possession
CSP	Corrugated Steel Pipe
CWS	Canadian Wildlife Services
DDC	Drone Delivery Canada Corporation
DEM	Digital Elevation Model
DFO	Fisheries and Oceans Canada
DPD	Detailed Project Description
DPM	Diesel, Particulate Matter
EA	Environmental Assessment
EASR	Environmental Activity and Sector Registry
EC	Electrical Conductivity
ECA	Environmental Compliance Approval
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
END	Endangered
EPA	*Environmental Protection Act, 1990*
ESA	Environmental Site Assessment

Abbreviation	Definition
ESC	Erosion and Sediment Control
FM	Flexible Mesh
GBA Plus	Gender-Based Analysis Plus
GCM	General Circulation Model
GHG	Greenhouse Gas
GIFL	Georgina Island Fixed Link
GIFN	[Chippewas of] Georgina Island First Nation
GIS	Geographic Information System
GPS	Global Positioning System
GTA	Greater Toronto Area
GWP	Global Warming Potential
HADD	Harmful Alteration, Disruption or Destruction of Fish Habitat
HCB	Hydroxymethyl Carbon Black
HIA	Health Impact Assessment
IA	Impact Assessment
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
IDF	Intensity-Duration-Frequency
IGF	Information Gathering Form
IPD	Initial Project Description
IPZ	Intake Protection Zones
ISC	Indigenous Services Canada
IWMP	Integrated Watershed Management Plan
LID	Low Impact Development

Abbreviation	Definition
LIO	Land Information Ontario
LOS	Level of Service
LSPP	Lake Simcoe Protection Plan
LSRCA	Lake Simcoe Region Conservation Authority
MASW	Multichannel Analysis of Surface Waves
MBCA	*Migratory Birds Convention Act, 1994*
MCM	Ministry of Citizenship and Multiculturalism
MECP	Ministry of the Environment, Conservation and Parks
MNO	Métis Nation of Ontario
MNR	Ministry of Natural Resources
MOR	Mobility On-Request
MOU	Memorandum of Understanding
MOVES3	Motor Vehicle Emission Simulator
MP	Member of Parliament
MPP	Member of Provincial Parliament
MTO	Ontario Ministry of Transportation
MUP	Multi-Use Path
NAR	Not at Risk
NEP	Niagara Escarpment Plan
NFP	Not-For-Profit
NHIC	Natural Heritage Information Centre
NOAA	National Oceanic and Atmospheric Administration
NONNA	Non-Navigational
NRCAN	Natural Resources Canada

Abbreviation	Definition
NVMP	Noise and Vibration Management Plan
OBBA	Ontario Breeding Birds Atlas
OCCIAR	Ontario Centre for Climate Impacts and Adaptation Resources
OGS	Oil-Grit-Separator
OP	Official Plan
OPSS	Ontario Provincial Standard Specification
ORAA	Ontario Reptile and Amphibian Atlas
ORMCP	Oak Ridges Moraine Conservation Plan
OTM	Ontario Traffic Manual
OWES	Ontario Wetland Evaluation System
PAHs	Polycyclic Aromatic Hydrocarbons
PHCs	Petroleum Hydrocarbons
PPE	Personal Protection Equipment
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PTTW	Permit to Take Water
RCP	Representative Concentration Pathway
RFI	Request for Information
RfR	Request for Review
RLSC	Rescue Lake Simcoe Coalition
ROW	Right-of-Way
RTO	Regional Tourism Organization
SACC	Strategic Assessment of Climate Change
SAR	Species at Risk

Abbreviation	Definition
SARA	*Species at Risk Act*
SARB	Species at Risk Branch
SC	Special Concern
SLS	Serviceability Limit State
SPT	Standard Penetration Test
STSYR	Student Transportation Services of York Region
SUV	Sport Utility Vehicles
SWH	Significant Wildlife Habitat
SWM	Storm Water Management
TBS	Turtle Basking Surveys
TC	Transport Canada
THR	Threatened
TIAO	Tourism Industry Association of Ontario
TIS	Transportation Impact Study
TMC	Turning Movement Counts
TMP	Transportation Master Plan
TNS	Turtle Nesting Surveys
TOR	Terms of Reference
TP	Total Phosphorus
TSS	Total Suspended Solids
TSW	Trent–Severn Waterway
ULS	Ultimate Limit State
VES	Visual Encounter Surveys
VKT	Vehicle-Kilometer Travelled

Abbreviation	Definition
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds
VPR	Voluntary Project Review
WSP	WSP Canada Inc.
WTFN	Williams Treaty First Nations
YOY	Young-of-Year
YRT	York Region Transit

UNITS OF MEASURE

Abbreviation	Description
%	percent
°C	degree Celsius
cm	centimetre
CO_2eq	carbon dioxide equivalent
dBA	A-weighted decibel
DBH	diameter at breast height
ha	hectare
km	kilometre
km^2	square kilometre
km/h	kilometres per hour
L	litre
m	metre
m^3	cubic metre
m/s	metres per second
MPa	megapascal
psi	pounds per square inch

PART A. UPDATED GENERAL INFORMATION

Introduction

The Chippewas of Georgina Island First Nation (GIFN) is proposing the Georgina Island Fixed Link (GIFL), consisting a bridge-causeway-low-level bridge Fixed Link structure with an overall length of 2.6 kilometres (km), to provide a safe and permanent connection between the community on Georgina Island, which is in Lake Simcoe, and the mainland road system of the Town of Georgina, Ontario (the Project). The proposed Project will provide two-way access from the southwest shore of Georgina Island to the mainland, and is designed to minimize environmental impact while remaining cost-effective.

From north (Georgina Island) to south (mainland), the Fixed Link includes approximately 110 metres (m) of causeway, 731 m of low-level bridge, 494 m of causeway, and 1,250 m of high-level bridge. To ensure that the Fixed Link is a part of the transportation network on the mainland, approximately 800 m of new roadway will be needed to connect the Fixed Link to Black River Road.

For generations, GIFN leadership have identified the need for a Fixed Link to provide the community with safe passage from Georgina Island to the mainland. GIFN leadership have envisioned a Fixed Link to provide the community with 24/7, all season, safe and reliable passage to and from Georgina Island and the mainland.

The Project is a proposed, permanent land-based access route from the mainland to the shoreline of Georgina Island to reduce reliance on seasonal, unreliable and at times unsafe passage, particularly during difficult seasonal conditions, and solve current issues inherent in the transportation system of today. This project will eliminate the need for risky crossings for community members and provide safe, reliable Island accessibility across all seasons and all-weather conditions.

Currently, Georgina Island has no permanent connection to the mainland. In the spring, summer and autumn months, the island is accessible by water, primarily via the Aazhaawe Ferry or personal vessels. In the winter, the island is accessible by ferry, but only when the water crossing is possible. Otherwise, an airboat (i.e., “the Scoot”), which is a 12-passenger air-propelled vehicle, is used to transport people and goods over the ice (see **Section 7** of the DPD). If the ice is thick enough across the Lake Simcoe, driving vehicles, personal vehicles, ATVs or snowmobiles are also possible, though with unpredictable ice thickness becoming more frequent, safety risks associated with driving are a growing concern.

The Project is proposed to resolve several issues the GIFN community members face trying to safely connect to the mainland. The primary issue is lack of a permanent and safe way to cross the lake, particularly during winter months. While community members have sustained the inconvenience for some time, the primary concerns remain the lack of dependable access to emergency medical services, the unreliable transportation system on the whole, and the socio-economic barriers faced as a result of the current transportation system.

Current methods to access the island are not reliable and have caused threats to the health and safety of GIFN community members and other island inhabitants (i.e., non-GIFN cottagers). In more than one case, the lack of safe crossing method has resulted in loss of life. Compounding

this is the issue that the dated ferry system is nearing the end of its service life by 2027 (i.e., in approximately three years), and there is a lack of safe and viable alternative transportation option to replace it (**Appendix G**). Thus, the community is looking to implement a viable solution with a sense of urgency.

As a result of ongoing dialogue with the community and technical professionals, and recognizing the importance of preserving our natural environment, the GIFN Chief and Council have decided to revise and adopt a new Fixed Link structure, which further protects the ecological integrity of Lake Simcoe and its surrounding ecosystems. This updated structure aligns even more closely with the GIFN Environmental Principles (**Appendix I**).

The original structure introduced in the Initial Project Description (IPD) featured a causeway, bridge, and then second causeway and was aimed at balancing cost and functionality with minimal environmental impact. The newly proposed structures described in this Detailed Project Description (DPD) will be a bridge, causeway, then low-level bridge. This proposed Fixed Link will better strengthen our environmental safeguards, in line with the community's preference for a Fixed Link that prioritizes ecological health more robustly.

Key Milestones in the Federal Impact Assessment Process

Project planning began in 2020, and a draft version of the IPD was provided to the Impact Assessment Agency of Canada (IAAC) on September 20, 2021, for feedback and guidance. On October 28, 2021, IAAC provided GIFN with feedback collected from various federal and provincial agencies on the draft IPD. The comments on the draft IPD identified required and recommended information, which warranted responses from GIFN as part of the finalization of the IPD. The required information was such that the GIFN was obliged to provide in the final IPD in order for the document to be deemed complete, as per the requirements outlined in Schedule 1 of the *Information and Management of Time Limits Regulations*, or in the DPD, depending on the level of effort and timing required to complete the requested work. Recommended information was information that IAAC highly suggested be included in the final IPD, or be deferred to the DPD if necessary, in order to support further regulatory review and decision-making.

As a result of IAAC's feedback on the draft IPD, new information was incorporated into the document where available, and a finalized version of the IPD was submitted to IAAC in early April 2022. Following a conformity review of the IPD against the requirements of the *Information and Management of Time Limits Regulations*, IAAC accepted the IPD on April 26, 2022; thus, beginning the 180-day time limit for the Planning phase of the federal impact assessment (IA) process. IAAC then held a 34-day public comment period from April 26, 2022, to May 29, 2022, to collect input from Indigenous groups and stakeholders including the interested public, federal authorities, provincial ministries and municipalities, on the IPD and any issues that they considered relevant to the Project.

IAAC received a total of 83 comments during this period. The majority of comments touched on key themes such as requesting information about the alternatives to the Project, expressing concern about potential environmental impacts, expressing concern about access to the island and the safety of the GIFN community, and requesting clarification about the proposed mitigation measures.

On June 8, 2022, IAAC issued a Summary of Issues document to GIFN, which reflected a summary of the comments it received during the comment period relating to the IA process of the Project. A total of 44 issues were included in the Summary of Issues document for the Project. The Summary of Issues document highlights the information needed by IAAC to support its decision about whether an IA is required under section 16 of the *Impact Assessment Act* (IAA) and — if an assessment is required — to inform IAAC's Planning phase documents and the assessment through the federal IA process.

On June 29, 2022, IAAC suspended the 180-day time limit for the Planning phase at the proponent's request in order for GIFN to undertake additional studies to sufficiently address the Summary of Issues document, and to provide confidence to IAAC in the Project's design and mitigation measures in order to support IAAC's section 16 decision about whether further assessment under the IAA is required for the Project.

Since that time, GIFN has actively engaged with IAAC and other stakeholders, the results of which have been considered to develop this version of the DPD. See **Sections 3 and 4** of this DPD for further information about GIFN's engagement with regulatory agencies on the Project.

As a result of the comments on the IPD, as well as the feedback during the development of the draft DPD, several new environmental studies were completed between 2022-2024, and a number of additional ongoing studies will inform the Detailed Design stage and eventual permitting processes required for the Project.

Updated Information Compared to IPD

In comparison to the IPD, this DPD has been updated to include information about:

- The studies, findings, and consultation and engagement undertaken following the public comment period on the IPD;
- Updated design of the Fixed Link from a causeway-bridge-causeway structure to a bridge-causeway-low-level bridge structure;
- The Responses to the Summary of Issues; and
- The requirements for a DPD in Schedule 2 of the *Information and Management of Time Limits Regulations* (Government of Canada, 2019).

1. PROJECT NAME

The Project's name, type or sector and proposed location.	
Project Name:	Georgina Island Fixed Link
Type/Sector:	Transportation (Bridge and Causeway)
Proposed Location:	Georgina Island First Nation, Ontario
Municipal Location:	Town of Georgina, Regional Municipality of York (Lower Tier / Upper Tier)

2. PROPONENT INFORMATION

The proponent's name and contact information and the name and contact information to the primary representative for the purpose of the description of the project.

GIFN Communication Protocol:

Mail/e-mail:	All correspondence to be sent to the **Proponent Contact** Copy the **Primary Representative Contact**
Telephone:	Direct all inquiries to the Proponent Contact

Proponent:

Chief Donna Big Canoe

Chippewas of Georgina Island First Nation

Proponent Contact	Primary Representative Contact
Farzin Shahid-Noorai Project Director WSP Canada Inc. (WSP) 150 Commerce Valley Drive West Thornhill, Ontario L3T 7Z3 Canada Phone : (416) 433-8393 E-mail: farzin.shahid-noorai@wsp.com	**Michael S. Jacobs** Project Manager Fixed Link Secretariat c/o Cambium Indigenous Professional Services (CIPS) 1109 Mississauga Street Curve Lake First Nation, ON, K0L 1P0 Phone: (705) 872-7244 E-mail: m.jacobs@indigenousaware.com

PART B. PLANNING PHASE RESULTS

3. SUMMARY OF ENGAGEMENT

A summary of and the results of any engagement undertaken with any jurisdictions or other party, including a description of how the proponent intends to address the issues raised in the summary referred to in subsection 14(1) of the Act (Summary of Issues).

GIFN continues to work collaboratively with area stakeholders and the agencies that have relevant jurisdiction or expertise within the Project study area (refer to **Section 13** for a description of the study area). GIFN continues to build on positive experiences and established relationships to engage stakeholders to progress the development of the proposed Project in a manner that is in the best interest of the GIFN community, the mainland public, and other relevant stakeholders.

Engagement on the proposed Project commenced in the fall of 2020. Due to the Government of Ontario's gathering restrictions implemented in response to the COVID-19 pandemic, engagement activities during 2020 and 2021 were conducted remotely by video or teleconference, by email correspondence, and by distributing information packages to stakeholders. As gathering restrictions related to COVID-19 were gradually lifted in 2022, engagement activities were conducted both virtually and in-person through to 2024, in addition to regular email correspondence with stakeholders, social media posts and publication of information on the Project's website: https://www.gifixedlink.com/.

Additional engagement with GIFN community members occurred in 2025, although engagement with other groups were limited due to an election for Chief and Council held on March 31 2025.

The following summarizes the GIFN's engagement principles, the engagement undertaken to date, and the planned future activities throughout the planning and implementation of the Project.

3.1 Engagement Principles

As described in the Fixed Link Engagement Plan (**Appendix E**), GIFN will maintain a set of principles that define core values underpinning interactions with stakeholders.

These principles are as follows:

- GIFN is committed to understanding, engaging, and identifying stakeholders early in the Project development process;
- GIFN will engage appropriate stakeholders with Integrity by completing engagements in a manner that fosters mutual respect and trust;
- GIFN will engage with Respect ensuring the rights, cultural beliefs, values, and interests of stakeholders are recognized;
- GIFN will remain Transparent throughout engagements by ensuring concerns are responded to in a timely, open, and effective manner; and
- GIFN will encourage Inclusiveness by encouraging and supporting broad participation by appropriate stakeholders.

The end result of the application of the engagement principles is to foster trust through meaningful dialogue that respects and upholds the core beliefs, values, and opinions of the GIFN and its membership.

In order to build trust, engagements were managed in a consistent, uniform manner to establish a brand of information dissemination and stakeholder interaction that the GIFN community can predict, understand, and rely upon.

3.2 Public Engagement

The following section provides an overview of the public engagement process for the Project and its outcomes to date. It includes summaries of past public engagement activities, along with a description of public engagement initiatives that are scheduled to occur throughout the lifecycle of the Project.

GIFN hosted one public engagement session during the development of the IPD for the Project, and three engagement sessions during the development of the DPD.

During the IPD stage, a one-hour Zoom presentation was conducted on **October 5, 2021,** marking the first public engagement session for the GIFL Project. This session introduced the project to the community, detailing its development history from a First Nation perspective through to the submission of the Draft IPD to the IAAC. The event attracted 136 registrations via Eventbrite, with 61 participants attending live on Zoom.

Community questions and discussions during the session covered various topics, including:

- **Effects on water and boating access:** The project team emphasized that maintaining boat access is a priority and will be addressed in future studies. Concerns about clearance for boats and potential silting effects were noted.
- **Project cost and timeline:** The estimated cost of the Fixed Link was presented as $450 million, with an anticipated two-year construction timeline. The team acknowledged the need for further design and engineering studies to refine these estimates.
- **Ferry as an alternative:** While alternatives like a greener icebreaker ferry were discussed, the project team explained that the Fixed Link is the only solution identified to meet the pressing health and safety needs of the GIFN community. A Health Impact Assessment (HIA) supported this conclusion.
- **Economic and employment impacts:** Participants inquired about potential economic developments and the future of ferry-related jobs. The team clarified that the project prioritizes safety and does not aim to encourage large-scale developments . Employment impacts will be explored further, with opportunities expected to arise in other sectors.
- **Tolls and traffic management:** Although tolls were mentioned as a possibility, no formal evaluation has been conducted. Traffic studies will be undertaken to manage potential increases on both the island and mainland.
- **Other considerations:** Participants raised concerns about replacing the ferry, the project's impact on island infrastructure, and the fairness of tolling residents and cottagers.

The session was well-received, with participants expressing gratitude for the comprehensive presentation and communication. Many acknowledged the safety improvements the project would bring, highlighting its importance for the community's well-being.

Action items included posting the presentation recording online, addressing issues with Eventbrite-Zoom integration, and notifying stakeholders when the federal consultation process opens. The chat log also captured general support, with attendees commending the project team for their efforts and openness.

As part of the DPD development, the second public engagement session for the GIFL Project was held on **June 23, 2023,** at the Peter Gzowski Library in Jackson's Point, Ontario. Approximately 55 registrants responded to session promotions, with 30 attendees participating in person.

This session aimed to update the community on the project's progress, including pre-feasibility planning and collaboration with the IAAC. The meeting also featured insights from bridge and tunnel engineering experts and provided an opportunity for attendees to ask questions, express opinions, and raise concerns. Key discussion topics included:

- **Cost and funding:** The project will be financed through a combination of funds from GIFN, the Canada Infrastructure Bank (CIB), and federal government grants.
- **Environmental impacts on Lake Simcoe:** The IA process will address concerns such as potential effects on water flow, weed growth, and shoreline stability.
- **Light and noise pollution:** The project will adhere to federally mandated building codes and local by-laws to mitigate potential disturbances.
- **Design considerations:** While the Fixed Link remains the most feasible option, alternatives such as upgrades to the ferry or a tunnel were reviewed. The ferry was deemed insufficient due to weather-dependent reliability issues, and a tunnel was ruled out due to feasibility and cost concerns.

The session reaffirmed the project team's commitment to addressing community concerns, maintaining transparency, and adhering to rigorous environmental and technical standards throughout the planning and development phases.

The third public engagement session for the GIFL Project was held on **January 24, 2024**, at the Kin Community Centre in Georgina, Ontario. This session was in the format of a 'Town Hall' and to support the development phase for the DPD and attracted approximately 85 attendees out of 130 registered participants. The event provided a platform for detailed technical presentations and public feedback. Engagement highlights include:

- **Technical Presentations:** Experts in environmental planning, coastal and bridge engineering, and ecology presented findings from various technical studies. These included discussions on the project's design, environmental impacts, and mitigation strategies.
- **Impact Assessment and Permitting:** The project team clarified that the GIFL Project is in the planning phase of the federal IA process and that permits from other regulatory authorities will be addressed later in the process.

- **Environmental Considerations:** Concerns regarding sediment buildup, runoff, and shoreline impacts were addressed. The team shared that sediment buildup would be localized and that runoff would be managed through a maintenance plan, including de-icing alternatives and water quality monitoring.
- **Mitigation Measures:** The project team emphasized the implementation of erosion control measures, water quality monitoring, and environmental protection strategies to address project impacts.
- **Project Alternatives:** Inquiries about upgrading the ferry or constructing a tunnel were discussed. The team reiterated that a new ferry would not meet the community's needs, and a tunnel was deemed unviable due to cost and technical constraints.

The session emphasized transparency and community involvement, with the project team encouraging further feedback through the IAAC) process. These efforts align with the project's goal of fostering understanding and ensuring responsible development.

The fourth public engagement session for the GIFL Project was held virtually on **December 11, 2024**, with 114 registrations and approximately 79 participants. This session focused on addressing community concerns, sharing updates, and gathering feedback as part of the ongoing engagement process during the development of the DPD. Key topics raised by the community included:

- **Environmental impacts:** Concerns regarding sediment build-up, salt management, and invasive species attaching to bridge piers were discussed. The project team highlighted ongoing studies, including the coastal engineering report and aquatic existing conditions studies, to address these concerns. Proposed mitigation measures include alternative de-icing methods, erosion control, and water quality monitoring.
- **Wildlife considerations:** Participants inquired about impacts on migratory birds, fish, and turtles, as well as strategies to avoid habitat destruction. The project team emphasized compliance with federal and provincial environmental regulations and plans for species-at-risk mitigation.
- **Design and operational updates:** Revised bridge renderings were presented, illustrating design changes to address concerns about water flow and sedimentation. Questions about lighting and its impact on dark skies, as well as pedestrian and cycling infrastructure, were also discussed.
- **Ferry alternatives and financial assessment:** The project team provided updates on the independent ferry alternatives assessment, emphasizing its inclusion in decision-making and financial modelling. Participants expressed interest in ice-breaking ferries as an alternative, and the project team acknowledged that such options had been studied but were not preferred due to operational and long-term costs.
- **IA and permitting:** The project team clarified the federal IA process timeline and outlined required permits from other regulatory authorities. Participants sought assurances of transparency and opportunities for further input.
- **Community concerns:** Questions about the maintenance of bridge access, operational expenses, and potential tolls were addressed. The team reiterated the First Nation's commitment to environmental stewardship and sustainable management practices.

The GIFL Secretariat continues to offer multiple lines of communication, including:

- A dedicated project website.
- An email subscription list for updates.
- Updates to subscribed social media followers.
- A direct email address for inquiries.

These avenues, combined with the formal inputs provided through the IA process, aim to ensure inclusive and effective community engagement.

See **Appendix F** for meeting notes with the members of the public.

A summary of the open public engagement meetings to date is provided in **Table B-1**.

Table B-1 Summary of Public Engagement Events

Event	Date	Attendance	Topics Presented
Regional Citizens – Open Meeting	October 5, 2021	61 participants	Inform the greater Lake Simcoe community about the Project through a First Nation lens, covering its timeline from conception to the submission of the Draft IPD to the Impact Assessment Agency of Canada (IAAC).
Regional Citizens – Open Meeting	June 23, 2023	30 in person participants	The session provided an overview of the federal IA process, pre-feasibility planning, and technical work completed to date on the Project. Key updates included project progress, collaboration with the IAAC, and technical insights on funding, environmental impacts, light/noise pollution, and design considerations. Future public engagement opportunities were also outlined.
Regional Citizens – Public Information & Engagement Session	January 24, 2024	85 participants	The session provided detailed technical presentations on project design, environmental impacts, sediment and runoff management, mitigation measures, and alternatives such as the ferry and tunnel. It also offered a comprehensive

Event	Date	Attendance	Topics Presented
			overview of completed technical reports on existing conditions and potential impacts, while giving community members an opportunity to ask questions and share feedback.
GIFL Virtual Community Engagement Session	December 11, 2024	85 participants	Project updates, findings from the coastal engineering report, ferry alternatives evaluation, updated project timeline, details on the IA process, and question and answer (Q&A) period addressing community questions and concerns.

3.3 Community Interest Groups Engagement

3.3.1 Rescue Lake Simcoe Coalition

On April 22, 2021, CIPS introduced the Project to a representative of the Rescue Lake Simcoe Coalition (RLSC) to discuss details of the Project, aspects of interest, processes for formal engagement and subsequent steps. RLSC suggested the Project promotes reconciliation and protection of the environment as a whole. During this conversation it was concluded that GIFN will formally engage the RLSC and other parties that have Lake Simcoe protection goals. RLSC offered to promote meetings to inform its members of any relevant engagements to assist the community. With some technical details provided during this conversation, RLSC expressed interest in learning more about potential impacts and design aspects of the Project with specific interest on impacts to Lake Simcoe and the Lake Simcoe Watershed. CIPS iterated that engagement would be ongoing with RLSC to find acceptable mitigation measures and to ensure project changes will protect the lake.

The RLSC was invited to the June 23, 2023, public Open Meeting and also spoke with the Project Manager for the Fixed Link Secretariat, providing recommendations for additional stakeholder engagement and the use of the town hall format. This supported the planning of the Regional Citizens – Public Information and Engagement Session on January 24, 2024.

3.3.2 Lake Simcoe South Shore Residents Association (LSSSRA)

The LSSSRA is a not-for-profit (NFP) association that was created to address the community concerns about the proposed GIFL.

In May 2022, the LSSSRA's lawyers submitted comments to IAAC on behalf of the LSSSRA in response to the IPD (Willms & Shier Environmental Lawyers LL, 2022). The comments indicated that, given the size, location and potential effects of the GIFL, as well as the significant amount of information that is still required to be obtained or updated, the LSSSRA's position was that a comprehensive and complete IA is required, followed by the Minister referring the GIFL to a panel review.

In October 2023, the LSSSRA provided both IAAC and the GIFN with a discussion paper entitled Protect Lake Simcoe, outlining its concerns and recommendations in relation to the GIFL Project (LSSSRA, 2023). The concerns focussed on four themes:

- environmental impact on Lake Simcoe and the surrounding area, particularly as a result of the fill for the causeway, fish and marine wildlife and their habitat, water quality as a result of operations, and tree clearing on the mainland;
- safety concerns relating to operation during winter storms, night boaters, and young people recreationally jumping off the bridge;
- cost of the Project and financial burden to taxpayers; and
- project size and scale for the area.

In the discussion paper, the LSSSRA recommended the Government of Canada and the CIB give serious consideration to alternatives to the proposal, such as operating an electric ice capable ferry, electrifying and retrofitting the existing ferry, operating two ferries, using an air-cushion vehicle, and using the existing ferry. The LSSSRA also recommended the IAAC conduct a full IA of the project.

In email correspondence with the GIFN on October 31, 2023, the LSSSRA expressed its view that an electric ice-capable ferry is a viable alternative that is more environmentally friendly, safe, and fiscally responsible than the bridge and causeways. It also indicated that IAAC has encouraged to meet directly with the proponent to discuss its discussion paper submission.

Arrangements were then made for a virtual meeting to be held between CIPS and the LSSSRA on November 29, 2023. The discussion included an overview of the LSSSRA Discussion Paper, status updates for the Project studies and timeline for uploading to the Project website, the status of the design work being undertaken and a clear interest from the LSSSRA to see the results, and the Hydrogeological Assessment (water wells survey) notifications, for which the LSSSRA indicated it would be willing to assist in getting notification letters to addresses.

The LSSSRA followed-up on February 22, 2024, with a letter to the Minister of the Environment and Climate Change Canada (ECCC), the Ontario Minister of the Environment, Conservation and Parks, IAAC, the LSRCA and the GIFL Secretariat. The letter requested that the proposed GIFL Project be subject to a joint federal IA and Ontario EA.

Further correspondence was submitted to IAAC's Regional Director and posted on the Canadian Impact Assessment Registry in April 2024 (LSSSRA, 2024). The letter accompanied a report, dated April 22, 2024, that provided a review of the GIFL Project and the LSSSRA's input on why it believes an IA is required under the IAA.

On August 28, 2024, the LSSSRA followed-up with an email to the IAAC's President Terry Hubbard concerning the Project. It is understood that IAAC met with the LSSSRA to discuss procedural aspects of the amended IAA and IAAC's role, as well as the LSSSRA's concerns related to the Project.

The LSSSRA was also represented at the public engagement session held on January 24, 2024, which was described in Section 3.2.

As a result of the papers and contributions from the LSSSRA, the Project team has taken the feedback into account in the preparation of the DPD and in reviewing the design originally proposed in the IPD. Since the time of the public comment period on the IPD, and based on the additional input received and data gathered, additional alternatives including new design options, have been explored. These options, which were not available at the time of the IPD preparation, are presented in Section 12.1.3, along with an explanation of the selection of the preferred new design. As well, the Project team has responded by augmenting and updating the DPD. Of most relevance for the LSSSRA's comments, this includes the baseline and assessment of environmental impacts to the marine environment, fish and fish habitat, migratory birds, and other species, the alternatives assessment, navigation safety, and accidents during operations.

Additionally, the Project Team posts Project-related information, including the requested study reports as they are completed. The LSSSRA is notified of all new publicly available information through its inclusion as a subscriber to both the Project website and social media channels. Some of reports were made available in the Project website, including the following:

- *Georgina Island Fixed Link: Coastal Engineering* by WSP, draft, dated August 15, 2023;
- *Georgina Island Fixed Link Project – Aquatic Existing Conditions Report for the Preferred Alignment* by Cambium Inc., final report, dated October 27, 2023;
- *Georgina Island Fixed Link Project – Terrestrial Existing Conditions Report* by Cambium Inc., final report, dated November 3, 2023, and;
- Executive Summary Geotechnical document prepared by WSP, no date.

See **Appendix F** for records of submissions and engagement.

3.3.3 Other Not-for-profit Organizations

On **July 22, 2021**, CIPS met with various NFP organizations focused on protecting Lake Simcoe. This meeting followed up on the initial conversation with the RLSC and was based on a list of relevant organizations provided by the IAAC on **March 3, 2021**.

CIPS presented the GIFL Project background and preliminary understanding prior to the official initiation of the IAAC process. The session also served as an invitation for these professional and invested stakeholders to contribute their collective insights, aligning with the GIFN's commitment to protecting Lake Simcoe.

The following NFP organizations were present or received access to the recorded presentation:

- Rescue Lake Simcoe Coalition
- Friends of Strawberry Island
- Carden Field Naturalists
- South Lake Simcoe Naturalists
- Ontario Water Centre
- North Gwillimbury Forest Alliance
- AWARE Simcoe
- Lake Simcoe Association
- Nature Barrie
- Orillia Naturalists Club
- The Ontario Headwaters Institute
- Windfall Ecology Centre
- Lake Simcoe Watch
- Save the Maskinonge
- Ontario Rivers Alliance
- Ecojustice
- Sail Georgina
- Ontario Water Centre

At the outset of the session, participants were informed that the GIFN sought collective input from the organizations present. Each organization was encouraged to provide feedback directly to the GIFL Secretariat as project activities progressed or if specific concerns arose. Organizations were offered the choice to remain part of the collective group or receive individual presentations. Consequently, the issues raised during the session were treated as collective input rather than attributed to individual organizations.

Following the presentation, a formal response was received from the RLSC. The response expressed support for the Fixed Link Project, recognizing it as a positive and necessary initiative that would enhance safety and benefit the local First Nation community. However, similar to feedback received from GIFN members, the need to prioritize protection of the lake environment was identified as paramount. Participants appreciated the GIFN's clear directive and commitment to safeguarding Lake Simcoe, as conveyed in the presentation.

During the presentation and discussion, concerns were raised about potential impacts on individual landowners, particularly regarding views, property values, and future infrastructure development. In response, the GIFL Secretariat acknowledged these concerns, emphasizing that, as with all major infrastructure projects, both positive and negative impacts are anticipated. To address transparency, GIFN committed to hosting presentations for both Indigenous and non-Indigenous communities, ensuring open communication. The IA process was also highlighted as a key tool for independent, non-Indigenous reviews of potential impacts, ensuring that environmental and community concerns are thoroughly evaluated.

Participants also discussed the environmental risks posed by the current diesel ferry system, including emissions, aging infrastructure, and the potential for accidents that could harm the lake's ecosystem. The project team acknowledged these risks, emphasizing that a Fixed Link would significantly reduce the likelihood of such incidents. However, concerns were also noted regarding potential environmental risks during the construction phase, with participants stressing the importance of ongoing monitoring and communication with stakeholders throughout the process.

The key outcome from this session was a shared understanding that continued information sharing is essential, and all organizations committed to protecting Lake Simcoe must be included in the process.

On **June 23, 2023**, the GIFL Project team hosted an in-person session at the Peter Gzowski Library in Jackson's Point, Ontario, with representatives from various Lake Simcoe stakeholder organizations. The session aimed to provide an update on the initial pre-feasibility planning for the Fixed Link initiative and establish connections and dialogue with key stakeholders. Key topics covered included:

- **Project Overview and Context**: The session included a historical overview of the project, its significance, and technical studies conducted to date, such as geological assessments, geophysical analysis, traffic studies, and infrastructure requirements.
- **Technical Insights**: WSP experts in bridge and tunnel engineering shared technical details and feasibility insights.
- **Stakeholder Engagement and Concerns**: Attendees raised questions about the IA process, design options for the Fixed Link, and environmental considerations, such as the importance of protecting the Sand Islands and the sensitive Holland River area.
- **Project Timeline and Next Steps**: The team outlined the IA timeline, upcoming engagement opportunities, and the integration of stakeholder feedback into the planning process.

The session reaffirmed the project team's commitment to transparency, environmental stewardship, and ongoing dialogue with stakeholders throughout the project's development.

The GIFL Secretariat has also opened multiple lines of communication. The GIFL website, subscription to receive Project updates, and direct email address opportunities are available to those requesting information. In addition, the IA process, which is familiar to the some of the NFP participants, was also initiated to allow for direct, formal inputs into the Project.

See **Appendix F** for meeting notes with the NFP organizations.

3.3.4 Summary of Community Interest Group Engagement

A summary of the meetings with the regional public and community interest groups to date is provided in **Table B-2**.

See Table B-16 for further information on the commitment to continue to provide updates.

Table B-2 Summary of Community Interest Group Consultation Events

Event	Attendance	Date	Topics Presented
Rescue Lake Simcoe Coalition (RLSC)	1 representative	April 22, 2021	Introduction to the Project, aspects of interest, processes for formal engagement and next steps.
Non-for-profit (NFP) Organizations:	10 representatives	July 22, 2021	Introduction to the Project, including background and understanding prior to

Event	Attendance	Date	Topics Presented
• RLSC • Carden Field Naturalists • South Lake Simcoe Naturalists • North Gwillimbury Forest Alliance • Lake Simcoe Association • Windfall Ecology Centre • Lake Simcoe Watch • Ontario Rivers Alliance • Sail Georgina • Ontario Water Centre			the official IA process being initiated.
Georgina Island Fixed Link Project Lake Simcoe Stakeholders Engagement Session	• AWARE Simcoe • Barrie Métis Council • Lake Simcoe Region Conservation Authority • Nature Barrie • Ontario Water Centre • Regional Municipality of York • South Lake Simcoe Naturalists (Ontario Nature) • Town of Georgina	June 23, 2023	Update on the initial pre-feasibility planning for the Fixed Link initiative and establish connections and dialogue with Lake Simcoe Stakeholder Organizations.
Lake Simcoe South Shore Residents Association (LSSSRA)	• 2 representatives from CIPS, 1 representative from LSSSRA	November 29, 2023	Overview of the LSSSRA Discussion Paper, status updates for the Project studies and timeline for uploading to the Project website, the status of the design work being

Event	Attendance	Date	Topics Presented
			undertaken and a clear interest from the LSSSRA to see the results, and the Hydrogeological Assessment (water wells survey) notifications, for which the LSSSRA indicated it would be willing to assist in getting notification letters to addresses.

3.4 Regulatory Agencies Engagement

3.4.1 Canadian Infrastructure Bank

On October 5, 2020, GIFN engaged the Canadian Infrastructure Bank (CIB) and held an introductory meeting that was also attended by IAAC to discuss the Project and subsequent steps. The outcome of this meeting was the identification that the Fixed Link falls under the designated activity list under the federal IAA because it is proposed to contain a contiguous causeway greater than 400 m and crosses Lake Simcoe. The result of this meeting led to the initiation of this Planning Phase by the GIFN.

Following that initial discussion, GIFN continued to work with the CIB as a potential funding partner. In August 2021, the CIB issued a Memorandum of Understanding (MOU) for Chief and Council's consideration intended to offer 'Accelerator' project loan support for the upcoming development and study costs related to the Project. The MOU for financial support was signed by Chief and Council in mid-September 2021.

GIFN has continued to meet with the CIB on a regular basis to provide updates about the Project status.

On November 24, 2025, GIFN met with CIB to the 'Accelerator' funding portion of the Project, as the Project moves its next phases. CIB will continue to support financial modelling efforts of GIFN and engage in being a part of the financing plan for the build.

3.4.2 Impact Assessment Agency of Canada

GIFN consulted IAAC on numerous occasions, starting in October 2020, to introduce the Project and determine the need for an IPD. The need was confirmed by IAAC in mid 2021. A meeting was also held to discuss the need for coordinating federal-provincial IA/EA requirements for the Project with the Ministry of the Environment, Conservation and Parks (MECP) in May 2021.

The Project Team has met or corresponded with IAAC several times from 2021 to date to provide updates on the status of the Project, clarify process requirements, and seek input on the proposed approach to the Project planning.

3.4.3 Fisheries and Oceans Canada

On behalf of GIFN, members of Cambium Inc. submitted a background information request for the Study Area to Fisheries and Oceans Canada (DFO) on May 24, 2022, to incorporate potential information into the Aquatic Existing Conditions Report (see Appendices T1, T2, and T3). No response has been received.

As well, WSP submitted a Request-for-Review (RfR) form to DFO on July 12, 2024, for a geotechnical borehole investigation being completed in 2024 on Lake Simcoe in support of the Project. DFO provided the review to WSP last August 2024 and noted that the proposed geotechnical investigation will not require an authorization under the *Fisheries Act*, the Aquatic Invasive Species Regulations or the *Species at Risk Act* (SARA).

As the Project proceeds through preliminary and Detail Design phase, GIFN and its consultants will engage further with DFO, through the regulatory process, for review of the proposed Project to evaluate and address the potential adverse effects to fish and fish habitat.

A summary of the engagement activities with DFO can be found in **Table B-3.**

Table B-3 Summary of Engagement Activities with DFO

Date of Engagement	Summary of Engagement
May 24, 2022	A Request for Information (RFI) was submitted to DFO. No response has been received.
July 12, 2024	An RfR for the geotechnical investigation was submitted to DFO.
August 2024	DFO completed the RfR and confirmed that the geotechnical investigation will not require an authorization by the agency.

3.4.4 Transport Canada

On behalf of GIFN, on June 28, 2024, WSP submitted an application to Transport Canada's (TC) Navigation Protection Program (NPP) for geotechnical testing in Lake Simcoe. An NPP officer reached out to WSP last August 14, 2024, to inquire if the fixed support barges will remain in the water for the entire drilling period (i.e., September 20, 2024, to October 28, 2024). In addition, TC noted that the NPP review process includes sending applications to the Indigenous Relations Unit (IRU) to determine if the department will consult with potentially impacted Indigenous communities. IRU, through the NPP officer, inquired if a municipal EA has been completed for the Project, and inquired if a copy can be provided to them.

The NPP officer reached out on August 27, 2024, to provide directions to publish a notice pursuant to subsection 7(3) of the *Canadian Navigable Waters Act* (CNWA). As a prerequisite of the approval, WSP notified the NPP officer on September 9, 2024, to inform their office that a public notice for the proposed works will be published in the Georgina Post's September 10 edition. On September 20, 2024, WSP emailed the NPP Officer to provide answers to the two inquiries from TC on August 14, 2024. WSP noted that the barges will remain in the borehole location for the duration of the borehole drilling, and it will be transported back and safely secured until the next day, when it will be mobilized to the next borehole location.

WSP noted that depending on the time of the completion of the borehole, it may be directly mobilized to start the next borehole at a different location. They noted that the barge will be manned on the water, and the only time it will be unmanned is when it is safely secured in the shore. In addition, WSP noted that, in May 2021, the provincial MECP indicated that a municipal Class EA was not required for the Project.

On October 11, 2024, NPP provided its approval under the CNWA for the proposed geotechnical testing program. Following the approval, the schedule for the activities was revised, and activities commenced on November 5, 2024. On November 12, 2024, WSP provided the NPP office with photographs showing temporary works that commenced for the geotechnical testing investigation and noted that equipment will be demobilized at the end of each working day and secured at the shore.

A summary of the engagement activities with TC can be found in **Table B-4.**

Table B-4: Summary of Engagement Activities with Transport Canada

Date of Engagement	Summary of Engagement
June 28, 2024	WSP, on behalf of GIFN, submitted the Application for Approval to the NPP
August 14, 2024	NPP reached out to WSP to further inquire about details of the application
August 27, 2024	NPP reached out to Sussex Strategy Group (a consultant to the GIFN) to provide directions for publishing a public notice pursuant to CNWA
September 9, 2024	WSP informed NPP to inform them about the scheduled public notice on Georgina Post
September 20, 2024	WSP sent the NPP officer an email to answer the inquiries from August 14, 2024
October 11, 2024	NPP provided its approval under the CNWA for the proposed geotechnical testing program

3.4.5 Environment and Climate Change Canada

On behalf of GIFN, Cambium Inc. engaged with ECCC – Canadian Wildlife Service (CWS) in 2022 to obtain background information about the Study Area to incorporate in the Terrestrial and Aquatic Existing Conditions Reports (see Appendices T1, T2, and T3). A response to the data request was received on May 26, 2022 (Cambium Inc., 2023).

In addition, two separate meetings with ECCC took place in 2023 and 2024 in line with the Project. On behalf of GIFN, Cambium Inc. engaged with ECCC in 2022 to obtain background information about the Study Area to incorporate in the Terrestrial and Aquatic Existing Conditions Reports (see Appendices T1, T2, and T3). A response to the data request was received on May 26, 2022 (Cambium Inc., 2023).A summary of the engagement activities with ECCC can be found in **Table B-5**.

Table B-5 Summary of Engagement Activities with ECCC

Date of Engagement	Summary of Engagement
May 25, 2022	An RFI was submitted to ECCC CWS. Confirmed that in terms of data, ECCC is concerned about population-level information and less often has information about specific sites. The district offices of the Ontario Ministry of Natural Resources and Forestry are usually a better contact for site specific information.
May 26, 2022	A response to data request was received from CWS (see Appendices T1, T2, and T3).
June 12, 2023	A meeting with Sean Mitchell, Special Assistant (Minister's Office) took place with the following subject/purpose: Aboriginal Affairs, Environment, and Infrastructure.
July 23, 2024	A meeting with Joshua Swift, Policy Advisor (Minister's Office) took place with the following subject/purpose: Aboriginal Affairs, Environment, and Infrastructure.

3.4.6 Indigenous Services Canada

Since 2023, Sussex Strategy Group has been working on behalf of GIFN to engage with Indigenous Services Canada (ISC) regarding the Project. A summary of the recorded engagement activities with ISC can be found in **Table B-6.**

Table B-6 Summary of Engagement Activities with ECCC

Date of Engagement	Summary of Engagement
June 28, 2023	A meeting with Clinton Couchie, Deputy Regional Director, and Kaitlyn Peters, Regional Advisor (Ontario) took place with the following subject/purpose: Aboriginal Affairs and Infrastructure.
July 29, 2023	A meeting with Alex Filbey, Policy & Regional Advisor (Ontario) took place with the following subject/purpose: Aboriginal Affairs and Infrastructure.
November 2024	A meeting with Director General-level officials took place to discuss updates regarding the Project.
January 2025	A meeting with Director General-level officials took place to discuss updates regarding the Project.

3.4.7 Infrastructure Canada

On June 5, 2023, Sussex, on behalf of GIFN, met with Chris Knipe, Regional Advisor (Ontario) of Infrastructure Canada, to discuss the Project. The meeting focused on matters related to Aboriginal Affairs and Infrastructure.

3.4.8 Ontario Ministry of the Environment, Conservation, and Parks

GIFN has consulted with the Ontario Ministry of the Environment, Conservation, and Parks (MECP) Environmental Assessment Services department starting in March 2021. In May 2021, the MECP confirmed that a provincial Individual Environmental Assessment (EA) was not required under the Ontario *Environmental Assessment Act* for the Project. While an Individual EA is not required, additional regulatory requirements under the Ontario *Environmental Assessment Act* (e.g., Class EA requirements) may apply to the Project and are discussed specifically in **Section 18** of this DPD.

In addition, as part of the ongoing work for Project planning, GIFN's consultants have engaged with the MECP to request provincial data, report species at risk (SAR) observations, and clarify MECP expectations.

Furthermore, as outlined in **Section 18**, other provincial permits and approvals are expected to be required from the MECP for construction. Consultation with the MECP regarding the preparation of relevant applications will continue as part of the planning for the Construction phase (refer to **Section 18** of the DPD for the list of permits).

A summary of the engagement activities with MECP can be found in Table B-7**.**

Table B-7 Summary of Engagement Activities with MECP

Date of Engagement	Summary of Engagement
March 9, 2021	Meeting to determine what is required for the provincial EA process, if a provincial EA is required.
May 24, 2022	An RFI was submitted to MECP – SAR Branch (SARB) for existing environmental data.
May 26, 2022	An email response from MECP was received. The following was noted in the response: • MECP added Black Ash and Chimney Swift as species to be considered as part of the list of SAR to be considered. • MECP recommended removing Least Bittern from list of SAR to be considered. • MECP recommended for Cambium Inc. to contact DFO for additional information regarding any of the occurrences (i.e., Black Redhorse) obtained from the DFO SAR mapping. • MECP requested search for Butternut, and completion of Butternut Health Assessment on all trees that might be impacted, prior to any vegetation removal. • MECP provided Blanding's Turtle record from within 250m of the study area and information regarding the General Habitat Description. • MECP provided the 2021 Bat Survey Standards Note. • Noted that although the Project team's letter states that MECP staff attended initial consultation meetings in spring 2021, the SARB has no record attending.

Date of Engagement	Summary of Engagement
	• MECP recommended that an Information Gathering Form (IGF) be submitted so that impacts to provincially listed SAR and their habitat can be assessed.
September 29, 2022	• Provided information about what MECP considers as habitat for Least Bittern and what to consider when assessing for harm or harassment (including timing windows). • Suggested waiting to complete the IGF until further information about the proposed works is known so that potential impacts can be accurately assessed.
October 27, 2022	• MECP provided details on Least Bittern habitat avoidance requirements and timing windows. • MECP advised that a project on First Nation lands may be exempt from provincial requirements of the *Endangered Species Act, 2007* as jurisdiction resides with the federal government, including the SARA. • MECP recommended the submission of IGF as detail design progresses and determination of applicable laws for the Project through legal advice.

3.4.9 Ontario Ministry of Natural Resources

GIFN has consulted the Ontario Ministry of Natural Resources (MNR), starting in May 2021. The MNR has indicated that numerous potential authorizations under its mandate, including under the *Public Lands Act, Fish and Wildlife Conservation Act*, or *Lakes and Rivers Improvements Act* may be required for this Project. These are discussed specifically in **Section 18** of this DPD.

In addition, on behalf of GIFN, Cambium Inc. engaged with the MNR in 2022 to obtain background information about the Study Area to incorporate in the Terrestrial and Aquatic Existing Conditions Reports (see **Appendices T1, T2, and T3**).

In July 2024, WSP submitted an MNR Work Permit Application for the onshore and offshore geotechnical investigation for the Project. To support the application, WSP provided DFO's RfR results issued in August 2024. MNR issued the work permit on October 4, 2024.

Consultation with the MNR regarding the preparation of additional applications will continue as part of the planning for the construction phase (refer to **Section 11** for the anticipated Project Schedule).

A summary of the engagement activities with MNR can be found in Table B-8 Summary of Engagement Activities with MNR.

Table B-8 Summary of Engagement Activities with MNR

Date of Engagement	Summary of Engagement
May 26, 2021	A meeting was held to discuss EA processes and requirements, including potential works on the shorelands and lake bottom under MNR jurisdiction.
May 24, 2022	An RFI was sent to NDMNRF (now MNR) Aurora District
June 16, 2022	As a result of the request, NDMNRF (now MNR) Aurora District provided the following information: • Noted that the Virginia Beach wetland is currently shown in the Land Information Ontario (LIO) database as non-provincially significant; however, 2011 field work found a number of significant species that would make them provincially significant and they should be treated as such. • Proposed to combine the Virginia Beach and Sibbald Point wetlands into one Provincially Significant Wetland (PSW). • Referred the Project Team to the Regional Aquatic Scientist for further information on Lake Simcoe fish resources. • Clarified previous comments about Muskellunge and Northern Pike Spawning habitat. • Noted that Aurora District has fish dot mapping for the tributaries.
June 16, 2022	An RFI was sent to Lisa Graham (Regional Aquatic Science Specialist) regarding mapped fish spawning habitat and historical studies.
August 18, 2022	• MNR provided fall egg collection results from Lake Trout surveys completed at Sibbald Point (raw data). Acknowledged that additional survey work, specific to spawning, is not completed by their unit. • Forwarded request to Brent Shirley with MNR to acquire Fish Activity Data layer.
October 18, 2022	• Acknowledged that limited information is available as to how the Fish Activity Areas are generated. • Provided additional information regarding the Muskellunge stocking in Lake Simcoe and proximal to the Georgina Island. • Agreed to setup a call to discuss further.
October 19, 2022	• A virtual meeting was held to discuss the various data that the Project Team is waiting for, and a summary of this virtual meeting was provided by Cambium Inc. to MNR Staff. • Action items resulting from the meeting included for MNR to request relevant information from the Muskellunge Restoration project team, including context of Fish Activity and input on scoping assessments at Sibbald Point (documented Lake Trout spawning).

Date of Engagement	Summary of Engagement
October 19, 2022	• MNR provided the Muskellunge Restoration Feasibility Study, and the Muskellunge Restoration Program Summary. • MNR confirmed that limited information is available within MNR as to how the Fish Activity Areas are generated and developed.
July 2024	• WSP submitted an MNR Work Permit Application for the onshore and offshore geotechnical investigation for the Project
August 2024	• WSP provided MNR with DFO's authorization to support the Work Permit application.
October 2024	• MNR issued the work permit on October 4, 2024.

3.4.10 MNR - Natural Heritage Information Centre

On behalf of GIFN, Cambium Inc. engaged with the MNR Natural Heritage Information Centre (NHIC) branch in 2022 to obtain background information about the Study Area to incorporate in the Terrestrial Existing Conditions Report. A summary of the information provided by NHIC can be found in Section 3.3.4 of **Appendix T3**.

A summary of the engagement activities with NHIC can be found in **Table B-9.**

Table B-9 Summary of Engagement Activities with NHIC

Date of Engagement	Summary of Engagement
May 25, 2022	An RFI was submitted to MNR - NHIC
May 27, 2022	As a result of the RFI, MNR's NHIC branch provided the following: • Provided information for one restricted species within the study area. • Attached reports for the Georgina Island Wetland Complex. • Did not have information on the Georgina Snake and Fox Islands or the Virginia Beach Wetland Complex and referred to the MNRF district office for more information. • Provided information on Colonial Waterbird Nesting Areas (4 records for 4 different species dating from 2004-2008).

3.4.11 Lake Simcoe Region Conservation Authority

GIFN has consulted Lake Simcoe Region Conservation Authority (LSRCA) since August 2021. Through consultation, LSRCA confirmed that it does not have jurisdiction for this Project but can participate to provide technical feedback and advice as needed. The LSRCA has provided several recommendations to ensure that impacts and risks to Lake Simcoe are minimized or mitigated. LSRCA has inquired about the anticipated volume and source of the fill and raised truck volume as an issue in the Region. The LSRCA also stated that a Voluntary Project Review

(VPR) process is recommended, and it was confirmed during an LSRCA Board Meeting, held in September 2021, that GIFN will provide the Natural Environment assessment report to the LSRCA Board once more information becomes available.

On behalf of GIFN, Cambium Inc. engaged with the LSRCA in 2022 to obtain background information about the Study Area to incorporate in the Terrestrial and Aquatic Existing Conditions Reports (see **Appendices T1, T2, and T3**).

Several consultation meetings with LSRCA also took place between 2023 and 2024. A meeting was held on August 22, 2023, with LSRCA outlining the natural science investigations completed for the Project to date. Representatives from LSRCA, Cambium Inc., CIPS, and WSP were in attendance (Cambium Inc., 2023)). Another meeting, attended by LSRCA, CIPS, and WSP, was held on October 30, 2023, to present the findings of the draft Coastal Engineering Report. As a follow-up to the meeting, CIPS provided LSRCA copies of requested technical reports and summaries relating to coastal engineering, ecology, geology and civil engineering, for review. The titles of these documents are as follows:

- *Georgina Island Fixed Link: Coastal Engineering* by WSP, draft, dated August 15, 2023;
- *Georgina Island Fixed Link Project – Aquatic Existing Conditions Report for the Preferred Alignment* by Cambium Inc., final report, dated October 27, 2023;
- *Georgina Island Fixed Link Project – Terrestrial Existing Conditions Report* by Cambium Inc., final report, dated November 3, 2023
- Executive Summary Geotechnical document prepared by WSP, no date, and;
- Executive Summary Civil Engineering document prepared WSP, no date.

Through 2024, based on the offer to provide technical advice, the Project team has continued to consult with the LSRCA. A meeting took place on January 15, 2024, to further discuss the above mentioned submitted documents. The meeting was attended by LSRCA, CIPS, and WSP. Following this meeting, LSRCA reviewed the documents and provided comments for consideration. A meeting was held on November 1, 2024, with LSRCA to discuss the Project team's responses to LSRCA's comments on the documents. Considerations have been carried forward in the development of the DPD.

A summary of the engagement activities with LSRCA can be found in **Table B-10**.

Table B-10 Summary of Engagement Activities with LSRCA

Date of Engagement	Summary of Engagement
August 11, 2021	Meeting to introduce the Project and overview on the current status.
September 24, 2021	Meeting to provide the LSRCA Board members an overview of the proposed Project and review the timeline dating back to pre-2008 when discussions were held and federal commitments were made.
May 24, 2022	An RFI was submitted to LSRCA.

Date of Engagement	Summary of Engagement
June 2, 2022	LSRCA provided the link to the Open Data Portal.
August 22, 2023	Meeting to present and discuss findings from Terrestrial and Aquatic Existing Conditions study prepared by Cambium Inc.
October 30, 2023	Meeting to present and discuss the findings of the draft Coastal Engineering Report prepared by WSP.
January 15, 2024	Meeting to discuss the submitted technical reports and summaries relating to coastal engineering, ecology, geology and civil engineering.
January 31, 2024	LSRCA emailed CIPS to inquire if there are any concerns about the public release of their technical comments, and clarified that LSRCA is not able to / required to issue a permit as the Project is a nation-to-nation matter and not subject to provincial legislation.
November 1, 2024	Meeting to present updates on technical reports, and discuss responses to LSRCA's comments on submitted technical reports
November 18, 2025	Meeting to present an update on the Project. This information session had a brief question and answer where formal questions could be documented through IAAC or directly to CIPS. None have been received to date.

3.4.12 Ministry of Transportation Ontario

Prior to initiating the Transportation Impact Study (TIS) to inform this DPD, in September 2022, WSP submitted a TIS Terms of Reference (TOR) to the Ontario Ministry of Transportation (MTO) for review. Through this process, MTO confirmed that the proposed Fixed Link is outside its jurisdiction and no provincial highway intersections need to be assessed; thus, it does not expect to have an approval role. The TIS for the Project has been completed on October 4, 2023 (**Appendix N**).

The TOR and correspondence with MTO are included in **Appendix F**.

A summary of the engagement activities with MTO can be found in **Table B-11**.

Table B-11 Summary of Engagement Activities with MTO

Date of Engagement	Summary of Engagement
September 2022	Consultation on the proposed TIS TOR and study requirements.

3.4.13 Ministry of Citizenship and Multiculturalism

3.4.13.1 Archaeological Studies

On March 2, 2025, the Ministry of Citizenship and Multiculturalism (MCM) issued a letter of registration for the Stage 1 Terrestrial Archaeological Assessment Report entitled "*Georgina*

Island Fixed Link, Part of Georgina Island and Part of Lots 9-12, Concessions 7-8, Georgina Township, York County, Ontario" dated September 6, 2023 and filed with MCM on September 14, 2023. MCM noted that the report is consistent with the *2011 Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licenses. The full report, which has been entered into the Ontario Public Register of Archaeological Reports, can be found in **Appendix R**. The letter of compliance can be found in **Appendix F**.

In addition, on Jan 30, 2025, MCM provided feedback to the Archeologist Licensee and WSP regarding the Marine Desktop Archaeological Assessment entitled "*Georgina Island Fixed Link, Lake Simcoe, Offshore from Georgina Island, Georgina Island First Nation, and Lots 9-12, Concession 8, Georgina Township, York County, Ontario"* dated September 6, 2023, and filed with MCM on the same date. WSP submitted a revised Marine Archaeology Report to MCM. MCM issued a letter of registration to the Archaeologist Licensee on March 10, 2025, noting that the report is consistent with the terms and conditions for a marine archaeological license. WSP received the letter in the same date. The full report, which has been entered into the Ontario Public Register of Archaeological Reports, can be found in **Appendix Q1**. The letter and correspondences can be found in **Appendix F**.

On August 28, 2025, WSP submitted a Marine Archaeological Impact Assessment Report conducted under permit #2024-46 (**Appendix Q2**). MCM confirmed receipt on the same day.

3.4.13.2 Cultural Heritage Studies

On January 17, 2024, MCM's Archaeology Program Unit, Heritage Operations Branch acknowledged receipt of the Cultural Heritage Report and provided their comments in an accompanying letter and table. WSP confirmed receipt of this feedback on January 22, 2024, and requested a meeting with MCM to discuss the comments in more detail. MCM subsequently responded with their availability.

On July 31, 2024, WSP provided an update on the Project as well as a comment response matrix to the Cultural Heritage Report for the comments received on January 17, 2024. In addition, WSP noted that a Cultural Heritage Evaluation Report (CHER) has been completed and accepted by GIFN, and posted on the Project website. WSP also sought clarification on the comments received on the Cultural Heritage Report and how these relate to future heritage reporting. WSP highlighted that the cultural heritage landscape in the study area is uniquely intertwined with its natural heritage, making it difficult to separate the two. Most of the identified cultural heritage value is linked to the GIFN's stewardship and the contextual value of the water body. WSP clarified whether a Heritage Impact Assessment (HIA) is required or appropriate, especially since some impacts and mitigation measures may be better addressed by other technical disciplines (e.g., ecology). In addition, WSP sought feedback on CHER's adequacy, the role of MCM in the project, and suggestions for any future reporting that avoids duplicating existing work. On August 15, 2024, MCM acknowledged receipt of the CHER and the accompanying comment response table, indicating they would provide feedback by mid-September. They also inquired about the project timeline and noted a change in their main contact. WSP responded on August 19, confirming receipt and directing MCM to the project timeline available on the website.

WSP followed up on September 30, 2024 regarding MCM's review, and MCM replied on October 1 that their review was still in progress. A second follow-up was sent by WSP on

November 18, 2024 and MCM provided comments on November 22. WSP confirmed receipt on January 28, 2025, noting that a Cultural Heritage Report Addendum was being prepared to address MCM's January 17 comments, along with revisions to the CHER based on the November 22 feedback. MCM acknowledged this response on February 6.

On April 4, 2025, MCM requested a meeting for April 15th to discuss the comment responses, which WSP confirmed on April 7. On September 29, 2025, WSP emailed MCM to inform them that their comments have been incorporated in the final CHER and Cultural Heritage Report - Addendum.

The Cultural Heritage Report Addendum can be found in **Appendix O1** whereas the revised CHER can be found in **Appendix O2**. The letters and correspondences can be found in **Appendix F**.

A summary of the engagement activities with MCM can be found in **Table B-12**.

Table B-12 Summary of Engagement Activities with MCM

Date of Engagement	Summary of Engagement
January 17, 2024	MCM acknowledged receipt of the Cultural Heritage Report and provided their comments in an accompanying letter and table.
July 31, 2024	WSP provided an update about the Project, as well as a comment-response matrix for the comments received on January 17, 2024. In addition, WSP submitted the Cultural Heritage Evaluation Report (CHER), and noted that the CHER has been completed and accepted by GIFN, and posted on the Project website.
August 15, 2024	MCM acknowledged receipt of the CHER and the accompanying comment response table, indicating they would provide feedback by mid-September.
November 22, 2024	MCM provided their comments on CHER and Cultural Heritage Report.
January 28, 2025	WSP confirmed receipt on January 28, 2025, noting that a Cultural Heritage Report Addendum was being prepared to address MCM's January 17 comments, along with revisions to the CHER based on the November 22 feedback.
April 4, 2025	MCM requested a meeting to discuss the comment responses.
March 2, 2025	MCM issued a letter of registration for the Stage 1 Terrestrial Archaeological Assessment Report dated September 6, 2023 and filed with MCM on September 14, 2023 (see **Appendix R**)
March 10, 2025	MCM issued a letter of registration for the Marine Desktop Archaeological Assessment dated September 6, 2023, and filed with MCM on the same date (see **Appendix Q1**).
August 28, 2025	WSP submitted a Marine Archaeological Impact Assessment Report conducted under permit #2024-46 (**Appendix Q2**). MCM confirmed receipt on the same day.

Date of Engagement	Summary of Engagement
September 29, 2025	WSP emailed MCM to inform them that their comments have been incorporated in the final CHER and Cultural Heritage Report - Addendum.

3.4.14 York Region and Town of Georgina

Prior to initiating the TIS to inform this DPD, in September 2022, WSP submitted a TIS TOR to the Town of Georgina and York Region for review. York Region also circulated the TOR to York Region Transit (YRT) and Student Transportation Services of York Region (STSYR). No comments were received from the Town of Georgina.

The TIS was completed on October 4, 2023 (**Appendix N**). Key comments on the TIS TOR, as well as how the comments were addressed in the TIS, are summarized in **Table B-13.** Detailed correspondence is provided in **Appendix F**.

Table B-13 Key Comments on Transportation Impact Study Requirements

Review Agency	Key Comments	How the comments were addressed or will be addressed
MTO	• The proposed Fixed Link is outside MTO's jurisdiction and no provincial highway intersections need to be assessed.	• No further action is required.
York Region	• The TIS should be consistent with the Region's 2016 Transportation Mobility Guidelines for Development Applications. • Include the additional intersection of Black River Road and Park Road in the TIS. • Include summer weekend analysis due to heavier seasonal traffic.	• The TIS incorporated York Region's 2016 Transportation Mobility Guidelines for Development Applications in its methodology and analyses. • The TIS analysis included the intersection at Black River Road and Park Road. • Traffic analysis was extended to include summer weekend traffic volumes.
YRT	• Currently, island residents are serviced at the ferry dock at Virginia Beach by Mobility On-Request (MOR) North, MOR Sutton-Pefferlaw, and MOR 65+. • For future public transit on the island and the Fixed Link, further consultation with the residents and permission by the Chippewas of GIFN Band Council would be required.	• GIFN Council to determine whether YRT services will be required on the island. • Based on the completed TIS, closer to the completion of the Project, GIFN may consult with YRT and STSYR regarding potential public transit and school bus service to and from the island.

Review Agency	Key Comments	How the comments were addressed or will be addressed
	• YRT would consult with the residents and GIFN at a time closer to completion to determine if service is wanted and what resources are warranted.	
STSYR	• The potential for school bus service cannot be determined at this time. • It is possible that student transportation would be provided if criteria in the board's policy are satisfied, and the conditions are safe for school bus to travel.	• The Project Team will provide the TIS to STSYR once available. • Based on the completed TIS, closer to the completion of the Project, GIFN may consult with YRT and STSYR regarding potential public transit and school bus service to and from the island.
GIFN	• Proposed commercial development at 78 Hadden Road could generate traffic that could add trips to the intersections studies in the TIS.	• Proposed development at 78 Hadden Road to was included in the TIS (see Section 3.7 of Appendix N).

A summary of the engagement activities with York Region, Town of Georgina, YRT and STSYR can be found in **Table B-14.**

Table B-14 Summary of Engagement Activities with York Region, Town of Georgina, YRT and STSYR

Date of Engagement	Summary of Engagement
September 2022	Consultation on the proposed TIS TOR and study requirements.

3.4.15 Future Engagement Activities

Future engagement activities will be undertaken directly with other regulatory agencies as well, such as the DFO and TC. Ongoing engagement regarding specific permits, approvals and questions will be held with various approval and permitting agencies as outlined in **Section 18** in this DPD.

3.5 Elected Officials Engagement

3.5.1 Member of Parliament for York-Simcoe – Scott Davidson, and for Kawartha Lakes – Jamie Schmale

On August 31, 2021, Chief Donna Big Canoe (assisted by CIPS) provided a Project introduction presentation to the Member of Parliament (MP) for York-Simcoe, Scot Davidson. This 30-minute presentation was provided as a courtesy to the MP to provide the required information to properly direct communications to the First Nation from constituents as the Project becomes

public knowledge. During this meeting, MP Davidson expressed strong support for the Project and was supportive of the First Nation members determining their own path for the future. MP Davidson has also offered to assist the GIFN leadership when requested.

See **Appendix F** for meeting notes with MP Davidson.

3.5.2 Town of Georgina Mayor and Council

On November 17, 2021, a meeting was held with the Town of Georgina Mayor and Council to introduce and provide an overview of the Project. The town inquired whether the properties identified in the Project study area as potential mainland landing areas are owned by the GIFN. CIPS confirmed that the properties are currently owned by the GIFN. All of the properties are going through the Additions to Reserve process through the federal government.

It was acknowledged by the town that a large quantity of fill would be required, and the town inquired about the composition and source of the fill. The fill source has not been determined yet; however, it is expected that the type of fill would be coming from the north along Highway 48 and that truck traffic will be higher during the construction phase of the Project. The volume of fill required has spurred brainstorming by the community members about potentially owning their own quarry, but conversations have not progressed.

In October 2023, CIPS presented to the Town of Georgina Council. The purpose of the presentation was to provide an update to the Georgina Town Council regarding the Project, including background information, project progress, past and upcoming community engagement events, and information on the environmental impact assessment and coastal engineering studies.

The presentation was well-received by Council. Following the presentation, the Town of Georgina Council expressed appreciation for the update and encouraged ongoing communication with the broader Lake Simcoe community. The council recognized the efforts made to provide accurate information and the importance of sharing information to dispel rumours and misinformation.

See **Appendix F** for meeting notes with the Town.

3.5.3 Member of Provincial Parliament for York-Simcoe – Caroline Mulroney

The GIFN made initial contact with Caroline Mulroney's office (Member of Provincial Parliament (MPP) for York-Simcoe) to schedule a similar presentation to that provided to MP Davidson. A meeting with held on December 3, 2021, that provided information to the MPP's office pertaining to how constituents can engage GIFN, as well as to determine what the Project relationship between GIFN Council and the MPP's office would be moving forward. GIFN also inquired about the MPP's project role as the current Minister of Transportation for the province of Ontario. It was confirmed that the Fixed Link Project is outside the jurisdiction of the MTO.

See **Appendix F** for meeting notes with MPP Mulroney.

A summary of the engagement activities with MP Davidson, Town of Georgina Mayor and Council, and MPP Mulroney can be found in **Table B-15**.

Table B-15 Summary of Engagement Activities with Elected Officials

Date of Engagement	Summary of Engagement
August 2021	Provided an introduction and overview of the Project to the MP for York-Simcoe, and presented how constituents can engage the Project.
November 2021	Provided an introduction an overview of the Project to the Town of Georgina Mayor and Council.
December 2021	Presented to the MPP for York-Simcoe on how constituents can engage the Project.
October 2023	Presented an update to Town of Georgina Council on the progress made on the Project, including recent studies and engagement undertaken.

3.6 Impact Assessment Act Engagement

IAAC established a public comment period from April 26, 2022, to May 29, 2022, to collect input from the public, Indigenous groups, federal authorities, provincial ministries and municipalities on the IPD and any issues that the stakeholders considered relevant to the Project. To support public participation during the comment period, IAAC facilitated four virtual information sharing and discussion sessions between May 10 and 19, 2022, in English and in French, to provide information about the Project and the IA process. Each session was broken down into two parts. The first part of each session consisted of a description of the proposed Project, and the second regarding the IAA process. Below is a summary of the virtual information sessions.

- English Sessions:
    - May 10, 2022, from 5:30 p.m. to 7:30 p.m. EST
    - May 18, 2022, from 9:30 a.m. to 11:30 a.m. EST
- French Sessions:
    - May 13,2022, from 9:30 a.m. to 11:30 a.m. EST
    - May 19,2022, from 5:30 p.m. to 7:30 p.m. EST

The IAAC then collected written comments through the Canadian Impact Assessment Registry during the comment period. These comments can be found on the Registry on the IAAC website at: https://iaac.gc.ca/050/evaluations/exploration?projDocs=83539. The Registry includes comments that were received from Indigenous groups, the public, federal authorities, provincial ministries, municipalities and the public. A total of 83 comments were received by IAAC. The majority of the comments were requesting information about the alternatives to the Project, potential environmental impacts due to the Project, access to and safety of the community, and clarification about the proposed mitigation measures.

During this time, the GIFL Secretariat also used GIFL website (www.gifixedlink.com), to announce that comments could be provided directly to IAAC to ensure so they are received and documented as part of the process. The website provided a link to the IAAC Registry where stakeholders could review the IPD, provide comments, and review the comments of others.

On June 8, 2022, a Summary of Issues document that reflected the comments relating to the IA process was submitted by IAAC to GIFN. The Summary of Issues is available on the Canadian Impact Assessment Registry page for the Project. (Reference # 83539 at https://iaac-aeic.gc.ca/050/evaluations/document/144102?culture=en-CA). A “Summary of Issues” and responses to these issues can be found in **Appendix C**.

3.7 Future Engagement with Regulatory Agencies and the Public

The GIFN Chief and Council recognize that additional consultation with government agencies and other stakeholders will be required. As a result, the Fixed Link Engagement Plan (**Appendix E**) was finalized and approved by Council in February 2022 for implementation. Regularly scheduled engagement sessions will be provided as a part of the GIFN and greater Lake Simcoe community engagement events. The frequency of these dates has been determined through initial discussions and presentations by the GIFL Secretariat Team, as outlined in **Table B-16** below.

Furthermore, as outlined in **Section 18**, other provincial permits and approvals are expected to be required from the various regulatory agencies for construction. Consultation with the regulatory agencies regarding the preparation of relevant applications will commence as part of the planning for the Construction phase.

Table B-16 Public, Community Interest Groups and Regulatory Agency - Future Engagement

Engagement Stakeholders	Frequency	Anticipated completion	Notes
Government Agencies	• Updates are to be offered on a quarterly basis, depending on Project progress and need. • Presentations to government agencies will be conducted as desired (either when desired or according to a fixed schedule).	• Meetings are set to be held throughout 2025.	• GIFL Secretariat has opened a line of communication through a Project website (www.gifixedlink.com), email contact and project meetings.
Public, and targeted public community interest groups	• Public presentations will be conducted to solicit input regarding potential impacts during the IA process, as required. • Community interest groups currently protecting Lake Simcoe (e.g., the LSSSRA and the Virginia Beach/Sutton Community) may request presentations to their respective groups given the shared interest with the GIFN community of Georgina Island. • A website has been developed to share information, reports, and updates on an ongoing, real-time basis. • General public can subscribe for updates • Facebook pages has been developed to support general public engagement.	• The GIFL Secretariat remains committed to ongoing engagement and transparency. Project updates, including new studies, reports, and other developments, will continue to be shared through: • The **Project website**: www.gifixedlink.com • The **email mailing list**: Subscribers will receive real-time updates. • **Social media platforms**: Regular updates and engagement opportunities will be posted. • Community members and stakeholders are encouraged to provide their feedback through the IAAC process. This ensures all voices and perspectives are heard as the project progresses.	• GIFL Secretariat has opened a line of communication through the website, email contact and presentations.

4. SUMMARY OF INDIGENOUS ENGAGEMENT

A summary of and the results of any engagement undertaken with Indigenous peoples of Canada, including:

- a list of the Indigenous groups that may be affected by the project, including those groups that identified themselves during the planning phase as being potentially affected; and
- a description of how the proponent intends to address the issues raised in the Summary of Issues, including the perspective of Indigenous groups regarding any potential adverse impact that the project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the *Constitution Act* 1982.

The Government of Canada has a duty to consult, and where appropriate, accommodate Indigenous groups when considering projects that might adversely impact potential or established Aboriginal or treaty rights. The nature of this Project will trigger this obligation of the federal government. As the Project proponent, GIFN will need to execute the Fixed Link Engagement Plan to help ensure that the Project does not impact GIFN rights, or the rights of other Nations. The GIFN is a Williams Treaty signatory to the Williams Treaties and its members are constitutionally recognized as Aboriginal people of Canada. As such, the GIFN will respect the Nation-to-Nation relationship with the federal government of Canada and request the same from the federal government of Canada. This relationship is documented by “Characteristics of a Nation-to-Nation Relationship - Discussion Paper” (February 2017) – Submitted to the Institute on Governance (Marcia Nickerson).

Indigenous communities considered to have real or asserted interactions with the proposed study area for the Project have been engaged. As the Duty to Consult and Accommodate requirement is the responsibility of the federal government, IAAC provided a letter on February 26, 2021, that identified Indigenous groups that may be impacted by the Project. IAAC identified the Indigenous groups listed below based on information available to the Crown from the government’s Aboriginal and Treaty Rights Information System, and from publicly available information. The following constitutes the anticipated initial stakeholders list:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama
- Curve Lake First Nation
- Hiawatha First Nation
- Huron Wendat Nation
- Métis Nation of Ontario – Region 7
- Mississaugas of Scugog Island First Nation

A copy of the letter is included in **Appendix F**.

4.1 GIFN Community Engagement

In the fall of 2019, WSP was retained to develop a Project Plan, preliminary design, and construction plan for a fixed link. On November 4, 2019, WSP engaged the GIFN Chief and Council and presented its understanding of the background context, engineering options and work completed to date. The objective of the meeting was also to hold a visioning workshop with GIFN leadership to determine project need, challenges and issues, and a method for engagement within the GIFN community, as discussed below.

4.1.1 GIFN Community Holiday Bazaar – December 3, 2019

On December 3, 2019, a pop-up booth for the Project was set up at the Georgina Island Annual Community Holiday Bazaar to enhance outreach with members and cottagers. Present at the booth were representatives from the Consultant Team alongside members of the Georgina Island First Nation Economic Development Department. The Project constraints, opportunities, and proposed schedule were presented to approximately 60 attendees. Members of GIFN and cottagers present at this pop-up event were presented with a study area map, and feedback pertaining to project issues, concerns and opportunities were collected. This pop-up event was also used to advertise a community-wide workshop. The holiday bazaar event resulted in the identification of key issues and concerns that the community wanted to address as part of the Fixed Link Study, including land protection, security, route selection, tax impacts, and effects on species.

A copy of the display materials is included in **Appendix F**.

4.1.2 GIFN Community Visioning Workshop – January 13, 2020

A Community Visioning Workshop was facilitated by the Project Team at the Georgina Island Community Centre on January 13, 2020. Live questions were asked using Clicker Technology during a formal presentation, after which the 31 attendees were divided into five facilitated focus groups and asked to discuss the benefits and constraints in greater detail. More specifically, the groups focused on discussion about the potential positives, objections, enhancements, and remediation related to the Project, as well as other comments and suggestions. Panels around the room were provided to describe technical aspects of the Project plan and schedule. GIFN community members expressed a strong preference for continued communication by email and continuing to hold community meetings and events regarding the Project.

Key issues raised in this meeting related to the risks associated with the current Aazhaawe Ferry and inclement weather that has resulted in loss of life within the community. These issues include safe, unlimited access for GIFN members to travel to the mainland and back to the island, access to jobs, impacts on the natural environment, and traditional knowledge. Youth, elders and overall GIFN community health and wellbeing (quality of life) were also discussed, and matters pertaining to the historical importance of a pedestrian footpath from the mainland to the island (which is now submerged) were discussed.

During this workshop, the Project team presented the alternatives means and alternatives to the Project that were developed and evaluated in the Preliminary Evaluation of Engineering and Environmental Alternatives, Neegan Burnside, 2008, refer to **Section 5.3.1** for further information about this study.

The results of the Community Visioning Workshop informed Chief and Council of the vision and objectives of the Fixed Link Study and the preferred alternative for undertaking this Project on behalf of the community. As a result, 73% of participants were interested in seeing GIFN construct a combination of a causeway and bridge, and 63% were interested in including a multi-use path (MUP) or other form of pedestrian connection as part of the Fixed Link Study. Furthermore, 63% of meeting participants saw an urgent need for a fixed link within the next year, though most understood the Project will likely take from 5 to 10 years to complete. Participants identified water pollution, fish habitat, and wildlife habitat as important environmental features to be protected.

The comments from this workshop also indicated that the south-western shoreline of Georgina Island is the preferred location for the Fixed Link, consistent with previous studies, refer to **Section 5.3** for a description of these studies, and that the quality of life, healthcare, and job creation were cited as the top socio-economic concerns in the community that the Fixed Link would help to address. Other comments discussed included the duration of construction, the duty to consult, who will complete the EA, other environmental concerns, access and security, and traffic expectations.

The outcome of this meeting provided WSP and the GIFN Chief and Council with a path forward to engage the GIFN community evaluating a potential fixed link and to select a preferred method for carrying out the investigations and future engagement that would be required to progress the Project planning.

A copy of the Community Visioning Workshop Summary is included in **Appendix F**.

4.1.3 Band Council Resolution – February 16, 2021

Following the GIFN community engagement events described in the previous sections, the GIFN council completed a formal Band Council Resolution on February 16, 2021. The Band Council Resolution documented the need for a permanent and reliable transportation mode that will allow for reliable, safe and secure crossing between Georgina Island and the mainland. It was resolved that Chief and Council of GIFN intend to build a fixed link that will connect Georgina Island to the mainland; complete an IA of the Project; and have the fixed link operation by 2026.

A copy of the Band Council Resolution is included in **Appendix F**.

4.1.4 GIFN Community Presentation – March 5, 2021

A virtual community presentation was held on March 5, 2021, which was attended by 66 community members, the Elder session, Chief and Council, and representatives of CIPS. The meeting was to inform the community of 2020 work and to notify community of the intent to enter the IA process. Some of the key concerns that were raised included changes in community support from directives identified by the Chief and Council, navigability of the lake and the height of the bridge, geotechnical concerns regarding Lake Simcoe's lakebed, and availability of the presentation.

See **Appendix F** for the meeting notes, summary of issues raised, official response to the issues, and action items during this presentation.

4.1.5 GIFN Semi Annual Community Meeting – July 27, 2021

A Fixed Link Project Update was presented at a community meeting to inform residents about the Project's progress. The meeting provided information on the work completed since the previous Project Update, the development and purpose of the GIFL Secretariat, ways to participate and engage as a community member in the Project's future activities, and the development of the Fixed Link Environment Principles and the need for Knowledge Keepers in the community.

Refer to **Appendix F** for the community meeting invitation, which includes detailed information about the event.

4.1.6 GIFN Youth Workshop – November 9, 2021

A workshop was held with Georgina Island youth on November 9, 2021, and was facilitated by CIPS. Feedback was collected from the workshop participants around three main areas: whether the presentation was informative; main fears about the Fixed Link Project; and potential benefits from the Project. Eleven (11) attendees participated in the workshop and provided their feedback and submitted questions to the facilitators. Some of the key concerns that were raised included: fear of cottagers being able to come and go more as they please; concerns about development that may happen once construction materials are easier to transport to the island, decreased sense of security for the community, and job loss due to the ferry being discontinued.

See **Appendix F** for meeting notes and summary of feedback collected during this workshop.

4.1.7 GIFN Fixed Link Project Community Update – May 31, 2022

During the May Community meeting, a Project Community Update was delivered by CIPS. Several questions and issues were raised and documented from this meeting, which included concerns about unregulated growth and development on Georgina Island, effects of the Project to the environment (i.e., water, wildlife, wetlands), waste management, cost of the Project, procurement/employment opportunities, and documentation of community support.

A summary of the questions/issues raised from the Project Community Update, as well as the response to these issues, can be found in **Appendix F**.

4.1.8 GIFN Fixed Link Project Community Update – October 6, 2022

A Fixed Link Project Community Update was held on October 26, 2022, to present information on the ongoing work and activities of the Project and the Project's progress in terms of the IA process. A Community question and answer (Q&A) session was held after the presentation.

Refer to **Appendix F** for the community meeting invitation, which includes detailed information about the event.

4.1.9 GIFN Land Use Committee Meeting – September 5, 2023

A meeting was held between the GIFL Secretariat and the GIFN Land Use Committee on September 5, 2023. To facilitate discussion, the GIFL Secretariat Team presented a draft version of the Terrestrial Existing Conditions Report (Appendix T3). This session was not recorded or officially documented as it was intended to be an open discussion, detailing key issues that need to be addressed internally at GIFN. The objective of this session was to

determine if GIFN Land Use Plan (Figure D-65) would need to be updated as a result of the Project.

4.1.10 GIFN Annual General Meeting – October 11, 2023

During the GIFN Annual General Meeting on October 11, 2023, CIPS delivered a presentation to the community regarding Project updates. The presentation included information about the IA process and the Project's progress; list of ongoing, completed, and future technical studies that will be completed to support the Project; Project design updates; and, engagement and information dissemination activities that are planned before the submission of the DPD. CIPS also shared information on how the GIFN can stay engaged on the Project.

A copy of the presentation can be found in **Appendix F**.

4.1.11 GIFN Fixed Link Project Update – November 2, 2023

A Fixed Link Project Update was presented by CIPS on November 2, 2023 to provide the community members with updates on the Project. The presentation included information on the Project status in line with the IA process; a list of completed and planned technical studies to support the Project, as well as the status of ongoing studies; planned engagement and information dissemination opportunities for the Project; and, status of other ongoing Project work (i.e., financial assessment report; risk assessment/management plan, and; Nation to Nation negotiations). The presentation also included information on how the community members can stay engaged on the Project.

A copy of the presentation can be found in **Appendix F**.

4.1.12 GIFN Fixed Link Project Technical Townhall – January 31, 2024

On January 31, 2024, a Technical Townhall was held at the Georgina Island Community Centre to provide Georgina Island First Nation (GIFN) members with updates on the Fixed Link Project. Approximately 40 attendees participated in the session, which featured technical presentations on the reports and studies conducted to date, including terrestrial and aquatic ecology, coastal engineering, civil and bridge engineering, and geotechnical studies.

The event also included a presentation of the 5% design for the Fixed Link and an open house, allowing participants to engage directly with technical experts. Key topics discussed included environmental impacts, alternative options such as an electric icebreaker ferry, habitat compensation, and design considerations like stormwater management, snow removal, and lighting.

The session aimed to prepare community members for the DPD submission, enhance understanding of the studies included in the DPD, and provide a platform for community input. Participants raised questions and shared concerns about impacts on traditional practices, shoreline stability, and ecological systems, all of which were noted for further consideration as the project advances.

See **Appendix F** for meeting notes and summary of feedback collected during this meeting.

4.1.13 GIFN Fixed Link Project Virtual Community Update – December 11, 2024

On December 11, 2024, Georgina Island First Nation (GIFN) hosted a virtual community update to provide members with the latest developments on the Fixed Link Project. Facilitated by

Sussex Strategy Group, the session covered project updates, environmental studies, ferry alternatives, and community concerns. Key highlights included design changes to replace causeways with bridges in sensitive areas to improve water flow and protect habitats, as well as updates on the Coastal Engineering Report and species-at-risk assessments. The project team emphasized that environmental protection, community-led decision-making, and transparency remain top priorities.

The session also addressed questions about bylaw enforcement, infrastructure readiness, and the potential socioeconomic impacts of the project. A new ferry alternatives report, nearing completion, will help the GIFN community make an informed decision (see **Section 12.3**). With ongoing studies and financial assessments refining project details, GIFN reaffirmed its commitment to ensuring that all voices are heard and that the project aligns with the community's long-term needs and values.

See **Appendix F** for meeting notes and summary of feedback collected during this meeting.

4.1.14 GIFN Community – Additional 2025 Engagement

During the GIFN Annual General Meeting on May 12, 2025, BMT presented an update to the Ferry Alternatives Report at the GIFN community annual general meeting.

In June 2025, Chief and Council held a meeting with GIFN community members to provide an update on the Project. This meeting led to Chief and Council confirming the process to formally ask the GIFN community to decide on the next steps for the Project.

In October 2025, the GIFN community members took part in a vote to guide the next steps for the Project. Of those who voted, approximately 64% supported pursuing a Fixed Link future.

4.2 Summary of GIFN Community Engagement

In addition to the engagement events above, several community meetings, presentations, and/or updates have been held within the GIFN community to inform them of Project updates and progress. **Table B-17** below provides a summary of the engagement events discussed above as well as community meetings held from 2021 to 2024.

Table B-17 Summary of GIFN Community Engagement Events

Event	Date/time	Attendance	Topics presented
GIFN Community Holiday Bazaar	December 3, 2019	60 participants	Project constraints and opportunities, as well as schedule and Project study area map.
GIFN Community Visioning Workshop	January 13, 2020	31 participants	Potential positives, objections, enhancements, and potential mitigation measures related to the Project.
GIFN Community Presentation	March 5, 2021	71 participants	Notify community of the Project's intent to enter the IA process. Informed the community on upcoming engagement and vote

Event	Date/time	Attendance	Topics presented
			requirements that may be required as a result of the Fixed Link Progress.
GIFN Semi-annual Community Meeting	July 27, 2021	Not recorded	Semi-annual community meeting to inform of Project progress.
GIFN Youth Workshop	November 9, 2021	11 participants	General project overview and Questions and Answers portion to respond to GIFN youths' questions/concerns about the Project.
GIFN Fixed Link Project Community Update	May 31, 2022	50 participants	General update on the Project timeline, IA process refresher, technical studies taking place, and a questions and answers portion to respond to the GIFN community's questions about the Project
GIFN Fixed Link Project Community Update	October 6, 2022	60 participants	General update on 2022 Project activities and a questions and answers portion to respond to the GIFN community questions about the Project.
GIFN Land Use Committee Meeting	September 5, 2023	7 participants	Update on studies carried out to date within the framework of the project, concerns or questions regarding infrastructure and land use planning.
GIFN Annual General Meeting	October 11, 2023	45 participants	General update on 2023 project studies progress, preferred alignments, an IA process refresher, and a questions and answers portion to respond to GIFN community questions about the Project.
GIFN Fixed Link Project Update	November 2, 2023	Not recorded	Project status in line with IA process; technical studies progress planned engagement and dissemination opportunities.

Event	Date/time	Attendance	Topics presented
GIFN Community Meeting	January 31, 2024	40 participants	Technical presentations on existing conditions studies that have been completed for the Project, potential impacts, as well as 5% design. Informed the community of the upcoming DPD submission.
GIFL Community Meeting Virtual	December 11, 2024	15 participants	Project updates on revised Fixed Link designs, environmental studies, and ferry alternatives. Addressed community concerns about infrastructure, environmental impacts, and governance. Reaffirmed transparency and community-led decision-making.
GIFN Community AGM	May 12, 2025	Not recorded	Updates on the Ferry Alternatives Report presented to GIFN community.
GIFN Chief and Council Session with GIFN Community	June 2025	Not recorded	Chief and Council formally asked the GIFN community to decide on the next steps for the Project.
GIFN Community Referendum Vote	October 22, 2025	255 participants	Members were asked to choose between two transportation options for the community's long-term connection: a Fixed Link or a Water-Based Option. Of those who voted, approximately 64% supported pursuing a Fixed Link.

4.3 Williams Treaties First Nations

4.3.1 Meeting – July 15, 2021, and Follow-up

On July 15, 2021, Chief Donna Big Canoe met with the Williams Treaties First Nations (WTFN) Chiefs to introduce the Project and inform them of the community's formal Band Council Resolution (February 2021) (Refer to **Appendix F**) initiating the GIFN's intent to construct a Fixed Link.

Following up from the meeting, Chief Big Canoe reintroduced the Project on August 26, 2021, requesting a Letter of Support from each community. As a result of this meeting, GIFN has received Letters of Support from each of the WTFN Chiefs on behalf of the following communities:

- Curve Lake First Nation (August 10, 2021)
- Chippewas of Rama First Nation (September 13, 2021)
- Mississaugas of Scugog Island First Nation (September 13, 2021)
- Alderville First Nation (September 13, 2021)
- Hiawatha First Nation (September 15, 2021)
- Beausoleil First Nation (September 15, 2021)

In the Letters of Support, the WTFN Chiefs confirmed that they will follow an internal, agreed-to process to ensure that appropriate Indigenous consultation is occurring. As well, some First Nations expressed interests in mitigating impacts to Lake Simcoe or the environment in general. GIFN informed the communities that, regardless of the internal process, IAAC will be contacting their consultation departments about the federal IA process and that federal funds are available to support their consultation efforts in relation to this Project.

No concerns were raised by the WTFN Chiefs regarding exercising their Treaty rights with the introduction of the Fixed Link. The Georgina Island First Nation has preserved its claims, rights or entitlements to aboriginal title to waterbodies or water beds in Clause 1, 2 and 3 of the Williams Treaties. For greater certainty, Georgina Island's compliance with federal and provincial legislation is without prejudice to its aboriginal title to the waterbody or waterbed of Lake Simcoe.

See **Appendix F** for a copy of the Letters of Support received from the WTFN.

4.3.2 January 23, 2024 – Session #1

This was the first engagement session held for the WTFNs and provided an update presentation on the pre-feasibility planning for the Fixed Link project. The session aimed to provide a comprehensive understanding of the DPD. In addition to sharing project updates, the session sought to engage the WTFNs and gather feedback regarding how they would like to remain informed and updated on the project. It provided an opportunity for WTFN consultation staff to express their opinions, ask questions, and voice any concerns they wished to be considered during the planning and implementation phases of the Fixed Link project.

Attendees included representatives from:

- Chippewas of Rama First Nation
- Chippewas of Georgina Island First Nation
- Hiawatha First Nation
- Beausoleil First Nation

Discussions included support for this First Nation led infrastructure project, concerns with environmental, coastal and socioeconomic impacts from the Project and associated mitigation measures to minimize impacts.

See **Appendix F** for a copy of engagement notes for this session.

4.3.3 January 26, 2024 – Session #2

This was the second engagement session held for the WTFNs and provided an update presentation on the pre-feasibility planning for the Fixed Link project. The session aimed to provide a comprehensive understanding of the DPD. In addition to sharing project updates, the session sought to engage the WTFNs and gather feedback regarding how they would like to remain informed and updated on the project. It provided an opportunity for WTFN consultation staff to express their opinions, ask questions, and voice any concerns they wished to be considered during the planning and implementation phases of the Fixed Link project.

Attendees included representatives from:

- Curve Lake First Nation
- Mississaugas of Scugog Island First Nation

Discussions included archaeological considerations, restoration and compensation and support for this First Nation led infrastructure project.

See Appendix F for a copy of notes for this session.

4.4 Métis Nation of Ontario

4.4.1 Meeting #1 – August 12, 2021

On August 12, 2021, GIFN met with the Métis Nation of Ontario (MNO) to introduce the Project, to request project support, and to identify key consultation plans that may be required moving forward. The MNO expressed interest in any processes that would require archaeological studies or impacts, as well as identifying any potential socio-economic benefits that may be realized by the MNO citizens as a result of such a large infrastructure project. MNO was informed that a procurement plan is in development that does place a priority on Indigenous participation. GIFN also reiterated its equal concern for any potential archaeological and environmental impacts. Of particular note was the acknowledgement by GIFN and MNO of the unique opportunity for Indigenous people to be on both the Proponent and consultation sides of this Project to show how consultation from an Indigenous lens can occur. See **Appendix F** for meeting notes with the MNO.

The meeting was attended by several MNO representatives.

4.5 Huron Wendat Nation

4.5.1 Meeting #1 – November 30, 2021

Throughout the summer of 2021, GIFN has initiated, via email communications, initial consultation procedures required with the Huron Wendat community. A project presentation was shared with the community on November 30, 2021, and initial discussions focused on archaeology support and Huron Wendat participation during development of the Stage I Archaeological Assessment. During this meeting, the Huron Wendat First Nation inquired about whether the Fixed Link will travel through the Sand Islands. GIFN explained that the study area travels east of the Sand Islands. The community specifically asked to stay ‘inside’ the sand Islands for this Project.

The Huron Wendat Nation noted support to the Project from a community-based lens. The First Nation emphasized that economic participation by the Nation would be desired, and time would

be committed to discussion if the GIFN were in need of economic partners, suppliers, or human resources (skilled or training programs). Following the meeting in 2022, Huron Wendat indicated that it does not have capacity to participate in the development of the Stage 1 Archaeological Assessment. See **Appendix F** for meeting notes with the Huron Wendat Nation.

This meeting was attended by two representatives of the Huron Wendat Nation.

Huron Wendat Nation has an archaeological heritage service provider named Yändata', meaning "village" in Wendat, in partnership with Archaeological Services Inc. A meeting with Yändata' has been planned prior to February 2022, as well as scheduling an initial project update meeting prior to March 31, 2022, with Huron Wendat Nation and the GIFL Secretariat. GBA Plus processes will be applied during these engagements to ensure that diverse perspectives are considered to best assess which sub-group is likely to be most impacted by any given issue.

It is often identified through communications that other Indigenous communities or groups may have an ancestral or treaty tie to locations across Canada that have only been documented through the community's local oral traditions. If additional communities or organizations do get added to the above list, this will be noted in final reports and these additional stakeholders will receive a copy of the relevant project documents.

4.6 Engagement with Other Indigenous Communities and Organizations

A summary of feedback collected during the Indigenous consultation and engagement meetings to date, is included in **Table B-18** below.

Table B-18 Summary of Non-GIFN Indigenous Engagement

Community	Attendance	Date	Issues Raised
Williams Treaties First Nations: • Curve Lake First Nation • Hiawatha First Nation • Alderville First Nation • Beausoleil First Nation • Chippewas of Georgina Island First Nation • Chippewas of Rama First Nation • Mississaugas of Scugog Island First Nation	8 representatives	July 15, 2021	Overall, the communities were in support of the Project, but shared a general concern about potential environmental impacts that may occur as a result of the Project.
Métis Nation of Ontario (MNO)	6 representatives	August 12, 2021	Overall, the Project was received favourably, particularly with regard to

Community	Attendance	Date	Issues Raised
			the economic benefit this Project could have to Georgina Island, the Indigenous community, and the regional economy.
Williams Treaties First Nations: • Curve Lake First Nation • Hiawatha First Nation • Alderville First Nation • Beausoleil First Nation • Chippewas of Georgina Island First Nation • Chippewas of Rama First Nation • Mississaugas of Scugog Island First Nation	8 representatives	August 26, 2021	Following the July 15, 2021 meeting, Chief Big Canoe reintroduced the Project to request a Letter of Support from each community. Six Letters of Support were received.
Huron Wendat First Nation	2 representatives	November 30, 2021	Primary concerns pertained to archaeology, with environmental and technical issues outside of archaeology entrusted to the GIFN and the Williams Treaty First Nations (WTFN) as part of the environmental impact evaluation process. The First Nation also noted that it believes that GIFN and its Williams Treaties counterparts will take the required environmental care of the site and would trust that stewardship to the Proponent and its Treaty allies.

4.7 Future Engagement with Indigenous Communities

The GIFN Chief and Council recognize that additional consultation with Indigenous leaders will be required for many portions of the Project . As a result, the Fixed Link Engagement Plan (**Appendix E**) was finalized and approved by Council in February 2022 for implementation.

Regularly scheduled engagement sessions will be provided. The frequency of these dates has been determined through initial discussions and presentations by the GIFL Secretariat Team, as outlined in **Table B-19** below.

Future engagement activities will apply GBA Plus processes ensure that diverse perspectives are considered to best assess which sub-group is likely to be most impacted by any given issue.

Table B-19 Indigenous Communities - Future Engagement

Engagement Stakeholders	Frequency	Notes
GIFN Members	GIFN community update meetings on a quarterly basis. Specific engagements on community segments and populations, reports; community input will be scheduled as required.	GIFN community meetings will be held virtually or in person. GIFN community will be given notice of opportunities for Project-based inputs as they arise through project development.
WTFN Allies	Updates to WTFN Chiefs will be provided at scheduled meetings of the WTFN Communities. Formal duty to consult requirements to be developed on a community-by-community basis.	The Chiefs are in consistent contact on a regular basis and letters of support from the Project have been provided. If required, GIFN will request special or ad hoc meetings with WTFN Chiefs.
Other Indigenous Leadership	Updates are to be offered on a quarterly basis, depending on Project progress and need. Presentations will be conducted as desired (either when desired or according to a fixed schedule). Duty to consult activities will be conducted by the GIFN community and IAAC for the Huron Wendat First Nation and the MNO.	GIFL Secretariat has opened a line of communication through a Project website (www.gifixedlink.com), email contact and presentations.

5. RELEVANT PLANS OR STUDIES

Any study or plan relevant to the project, that is being or has been conducted in respect of the region where the project is to be carried out, including any regional assessment that is being or has been carried out under section 92 or 93 of the Act, or by any jurisdiction, including by or on behalf of an Indigenous governing body, if the study or plan is available to the public.

Proponents are advised to contact the Agency during the preparation of the Detailed Project Description for information regarding any regional studies that may be relevant.

5.1 Regional Assessments

No regional EAs have been carried out under section 92 or 93 of the IAA in relation to the Project or its study area.

5.2 Provincial, Municipal and Local Studies, Plans, and Guides

5.2.1 Lake Simcoe Protection Plan (LSPP)

The LSPP was prepared and approved under the *Lake Simcoe Protection Act, 2008* (MECP, 2020) and is a comprehensive plan to protect and restore the ecological health of Lake Simcoe and its watershed, comprising all the land that drains into Lake Simcoe directly or via rivers and streams. The Plan consists of targets, indicators and policies organized into chapters that address the following policy themes: aquatic life, water quality, water quantity, shorelines and natural heritage, other threats and activities (including invasive species, climate change and recreational activities), and implementation.

The Act requires that decisions under the *Planning Act* or the *Condominium Act, 1998* or decisions related to a "prescribed instrument" conform with the applicable designated policies in the Plan and have regard to the other applicable policies. For example, a work permit issued under the *Public Lands Act* is a "prescribed instrument"; thus, if the MNR determines that a work permit under the *Public Lands Act* must be issued prior to construction of the Project, it may need to verify the work will conform with the applicable policies in the Plan prior to issuing the permit.

The Project Team will consult further with provincial regulators, such as the MNR and MECP, regarding the applicability of permits or approvals that may trigger the application of the LSPP (e.g., an environmental compliance approval (ECA) under the *Ontario Water Resources Act* s. 53 for sewage (stormwater) works, a work permit under the *Public Lands Act*), and also confirm the expectations in relation to conformance with the LSPP.

In the interim, the Project Team has reviewed the LSPP and its appended Schedule of Applicable Policies to determine which Designated Policies may apply. Several of the policies have specific requirements or mitigation measures, which have been cross-referenced against those in the DPD to either confirm that equivalent measures have been included or to add additional measures. For example, Policy 4.20 indicates several measures that shall be undertaken for any site alteration in the Lake Simcoe watershed. The measures under this policy are consistent with the proposed mitigation measures in the DPD, specifically, items a and b of Policy 4.20 are reflected in Section 20.1.2 of the DPD, and items c, d, e, and f of Policy 4.20 are reflected in Section 19.1.2.1 of the DPD, which also provides further information about the proposed erosion and sediment control (ESC) Plan.

Regardless of the legislative and policy requirements, the GIFN was involved in the development of the LSPP and is committed to abiding by the spirit of the plan's requirements to protect Lake Simcoe's water quality (e.g., by protecting the shoreline, restoring or enhancing natural features, working with DFO for *Fisheries Act* authorization, maintaining the natural flow

of water along the shoreline, and designing the bridge's stormwater management to meet modern design standards). As such, consideration of the protections of the LSPP have been incorporated into various sections of this DPD, and will continue to be recognized throughout the planning and permitting processes.

For sections of this DPD that address potential effects and mitigation measures directly relevant to provisions of the LSPP, please specifically refer to the following:

- Section 19.1 Fish and Aquatic Habitat,
- Section 20.2 Natural Environment,
- Section 20.4 Stormwater / Drainage,
- Section 20.7 Coastal Environment
- Section 20.9 Navigation

Figure B-1 depicts the *Lake Simcoe Protection Act* Watershed Boundary, which encompasses Georgina Island and the mainland.

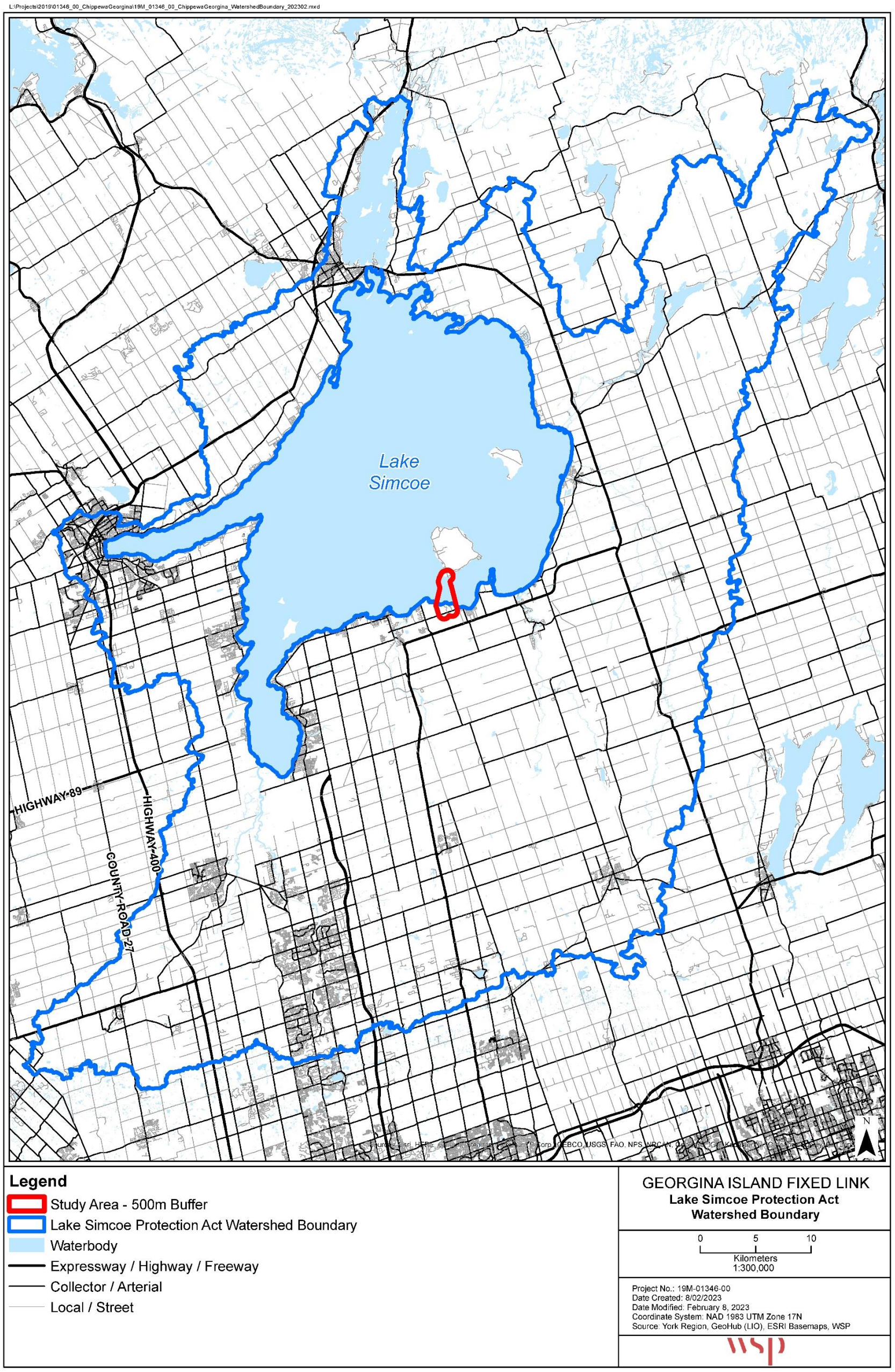

Figure B-1 Lake Simcoe Protection Act Watershed Boundary (MECP, 2020)

5.2.2 Sibbald Point Provincial Park Management Plan

The Sibbald Point Provincial Park Management Plan provides the long-term direction for managing Sibbald Point Provincial Park, including the purpose, permitted uses, zoning and implementation priorities (MECP, 2021a). The plan is written with a 20-year perspective and can be adjusted to address changing issues or conditions as necessary. At the 20-year interval, the plan will be examined for the need for adjustment or replacement.

Sibbald Point Provincial Park is managed as a recreational class park. Recreational class parks provide a wide variety of compatible outdoor recreation opportunities in attractive natural surroundings. The provincial park is close to several large urban centres and offers a sandy beach, both sunny and shaded campsites, large grassy picnic areas and a forested hiking trail. The recreational classification has been assigned to the park in recognition of the variety and quality of recreation opportunities it provides and its vicinity to population centres in central and southern Ontario (MECP, 2021a).

The Sibbald Point Provincial Park Management Plan identifies a potential addition to the park's waterfront boundary (**Figure B-2**), which is approximately 5-minute drive from the Project study area.

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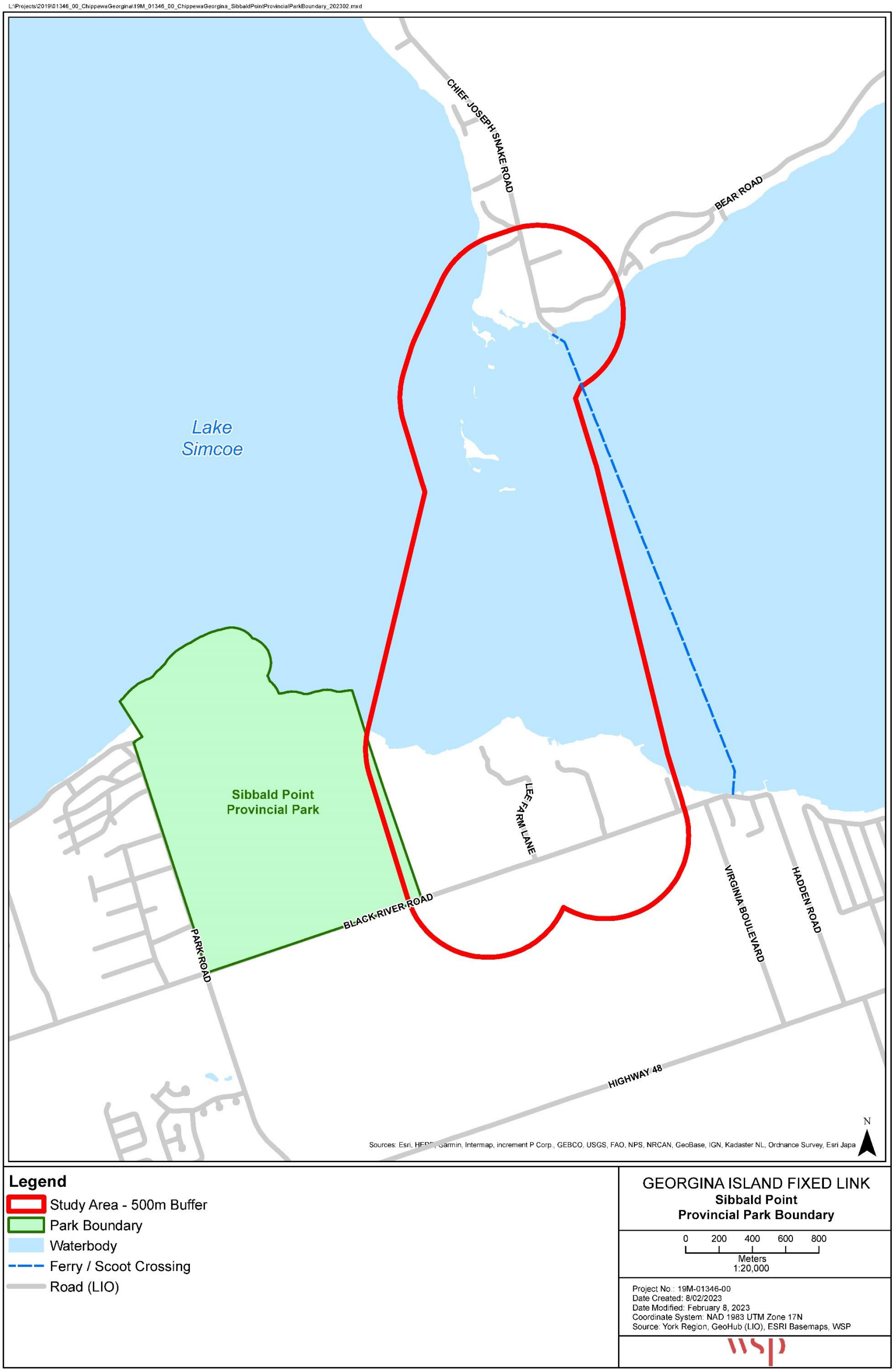

Figure B-2 Sibbald Point Provincial Park Boundary (MECP, 2021a)

5.2.3 Greenbelt Plan

The Greenbelt protects 1.8 million acres of environmentally sensitive and agricultural lands in the Greater Golden Horseshoe from urban development and sprawl (Government of Ontario, 2017). The Greater Golden Horseshoe is a broad region that stretches from the area of the Trent–Severn Waterway (TSW) up to the area of the Grand River and includes centres such as Peterborough in the northeast; Barrie and Lake Simcoe in the north; and Brantford, Waterloo Region, and Guelph to the west. The Plan covers approximately 58% of the land area of the Lake Simcoe watershed and works in conjunction with the Growth Plan for the Greater Golden Horseshoe, with the Growth Plan directing where future growth will occur.

Section 4.2 of the Greenbelt Plan acknowledges that new infrastructure will be needed to continue serving existing and permitted land uses within the Greenbelt and to serve the substantial growth projected for the GGH. The Growth Plan provides the policy framework to guide infrastructure planning and investments to support and accommodate forecasted growth in a manner that is integrated with land use planning and environmental protection. The Greenbelt Plan also notes that climate change poses a challenge for planning for new infrastructure, and that identifying infrastructure risks and vulnerabilities and undertaking climate change adaptation strategies can help mitigate the impacts of climate change.

Components of the Project located along the shoreline of the Town of Georgina / Greenbelt Boundary fall within the Protected Countryside designation of the Greenbelt Plan (MMAH, 2023). Section 4.2.1 contains general infrastructure policies for lands falling within the Protected Countryside. For example, policy 4.2.1.1 indicates:

- All existing, expanded or new infrastructure subject to and approved under the *Canadian Environmental Assessment Act*, the *Environmental Assessment Act*, the *Planning Act*, the *Aggregate Resources Act* or the *Telecommunications Act* or by the National or Ontario Energy Boards, or which receives a similar environmental approval, is permitted within the Protected Countryside, subject to the policies of this section and provided it meets one of the following two objectives:
    - It supports agriculture, recreation and tourism, Towns/Villages and Hamlets, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or
    - It serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban centres and between these centres and Ontario's borders.

The Project is expected to meet the requirements of the Plan because it will be subject to environmental approval under the IAA (which replaced the *Canadian Environmental Assessment Act* in 2019) and it provides infrastructure connections that will allow GIFN community members better access to recreation, tourism and economic activity on the mainland. It also provides an infrastructure connection between the community and the mainland, where no connection currently exists.

In addition, the location and construction of the Project in the Protected Countryside will comply with the criteria set out in 4.2.1.2 of the Greenbelt Plan. Specifically, the new infrastructure aims to avoid key natural heritage features, key hydrologic features and key hydrologic areas to the

extent possible. As described in Sections 7 and 12 of this DPD, extensive work has gone into determining the need for the project and reviewing alternative options that meet the need, yet also consider environmental, social, technical and economic constraints. In the view of the community, there is no reasonable alternative; thus, complete avoidance has not been possible.

Where the Project does cross the Natural Heritage System, or intrude into or result in the loss of a key natural heritage feature (e.g., species at risk habitat, fish habitat and wetlands), key hydrologic feature or key hydrologic areas (e.g., streams, lakes and wetlands), mitigation measures have been, and will continue to be, identified to minimize negative impacts on and disturbance of the features or their related functions. Such measures are primarily outlined in Section 19.1 Fish and Aquatic Habitat, Section 20.2 Natural Environment, and Section 20.7 Coastal Environment, of this DPD, and it is anticipated that additional measures will be identified through permitting processes.

By integrating environmental protection measures and climate change adaptation strategies, the project aims to support the local communities and economy while preserving the natural and agricultural integrity of the Greenbelt. This approach ensures that the infrastructure development is both responsible and forward-thinking, aligning with the broader goals of the Growth Plan for the Greater Golden Horseshoe.

Refer to **Figure B-3** for a depiction of the Greenbelt Plan Boundaries.

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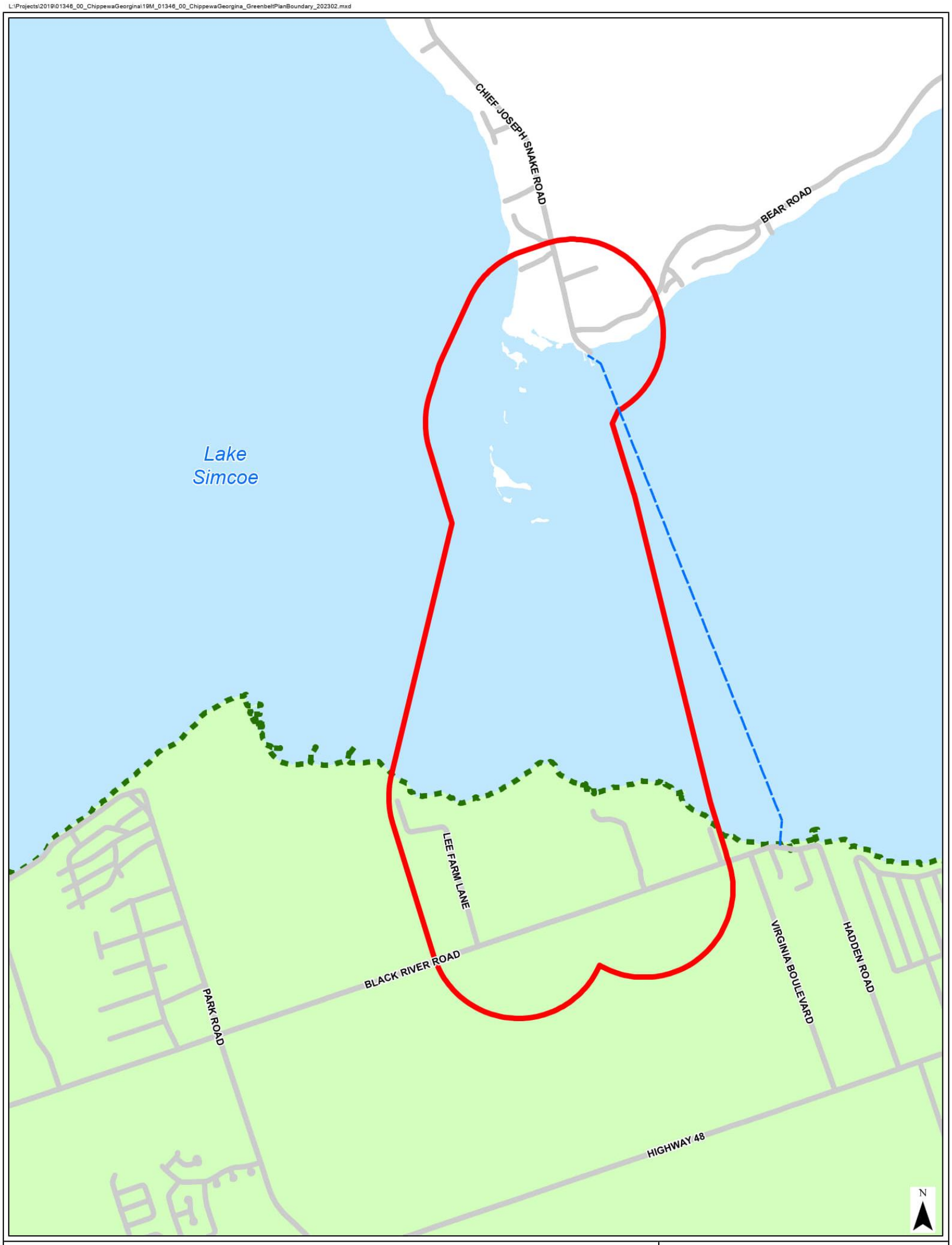

Figure B-3 Greenbelt Plan Boundaries (MNRF, 2022a)

5.2.4 York Region Official Plan

Land use within portions of the study area, excluding Georgina Island and the Sand Islands, is characterized in the York Region Official Plan (OP) (York Region, 2022c). The Plan identifies Significant Natural Features, Significant Forest Resources and the Regional Greenland System (particularly around on the mainland and Duclos Point, which is on the mainland to the east of the study area) and Rural Policy Areas within the study area. The objectives of the Significant Natural Features and Forest Resources policies are to ensure that the features and functions are preserved, to ensure no loss of wetland function, and to protect forested areas. The objective of the Rural Policy Areas is to retain the rural character of the lands and the viability of existing agricultural operations.

5.2.5 Town of Georgina Official Plan

The Town of Georgina OP excludes Georgina Island, and the areas covered by the study area are generally designated as a mix of Environmental Protection Area, Rural Area, and Greenlands System land use within the mainland (Town of Georgina, 2017).

5.3 Project-specific Studies and Plans

From 2008 to 2022, a number of environmental and technical studies were completed to support this Project. The following section describes several of the studies that have been undertaken to inform the proponent's understanding of the region where the Project is to be carried out and other issues relevant to the Project.

5.3.1 Preliminary Evaluation of Engineering and Environmental Alternatives, Neegan Burnside, 2008

In 2006, Neegan Burnside Ltd. was retained by GIFN to complete a Preliminary Evaluation of Engineering and Environmental Alternatives (**Appendix A**) as a first step toward realizing a Fixed Link between the island community and the mainland. The report was completed in 2008 and focused on a preliminary evaluation of routes and alternative crossing methods to begin to explore options to answer the question of how to provide a more convenient and consistent mode of travel for the island residents and their visitors (Neegan Burnside Ltd., 2008).

5.3.2 Climate Adaptation Plan, GIFN and Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR), 2015

From 2012 to 2015, the GIFN as Project Lead and the Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR) as Project Partner, collaborated on a Community Climate Change Adaptation Project that broadened the expertise within the community, and recommended adaptation measures to deal with current and future impacts of climate change. A Climate Change Adaptation Plan was completed in 2015 and recommended adaptation measures to address the climate risks identified as a result of changing climate on Georgina Island (**Appendix J**).

5.3.3 The Georgina, Fox and Snake Islands Sub-watershed Plan, GIFN and LSRCA, 2017

This sub-watershed plan studied the three islands of Georgina Island, Fox Island and Snake Island and mainland area that make up the Georgina, Fox and Snake Islands sub-watershed, located in the southern portion of Lake Simcoe. The lands within the sub-watershed are owned by the GIFN (refer to **Section 13.3** of the DPD for further information regarding the legal land description) and fall within the Regional Municipality of York. The total sub-watershed area is 1.4 km^2, comprising 0.5% of the Lake Simcoe watershed.

This sub-watershed plan was prepared by the GIFN and the LSRCA to identify impacts on the islands' natural features, ensure that the cultural values of the First Nation as keepers of Mother Earth are captured and integrated into the efforts put forth to restore and protect such features for future generations, and to be consistent with the efforts that are on-going within the Lake Simcoe watershed.

The LSPP and the LSRCA's Integrated Watershed Management Plan (IWMP) also influenced the development of this sub-watershed plan. Although it was not required under the LSPP, the plan reflects the goals, objectives, and targets of the LSPP. The IWMP is considered to be a road map that outlines the future direction of the protection and rehabilitation of the entire Lake Simcoe watershed. Its broadscale recommendations provide the basis for a number of the recommended actions for the smaller scale Georgina, Fox and Snake Islands sub-watershed.

5.3.4 Phase I Environmental Site Assessment – 1 Bayvista Lane, Georgina, Ontario (2020)

This Phase I ESA study was undertaken for 1 Bayvista Lane to identify environmental concerns associated with current and historical activities at the Site and surrounding properties. The property is 23 ha and is described as undeveloped and irregular land parcel. Based on the study's findings, no actual and/or potential on-site sources of environmental concern was identified for this property. In addition, since there were no identified evidence of potential or actual environmental concern associated with the property, Phase II ESA was not required. The full report can be found in **Appendix M**.

5.3.5 Phase I Environmental Site Assessment – Black River Road, Georgina, Ontario (2019)

This Phase I ESA study was undertaken for a property on Black River Road to identify environmental concerns associated with current and historical activities at the Site and surrounding properties. The Site is legally known as "East Part Lot 9, Concession 8, Georgina Being Part 1, 65R-37393". The site is a 15 ha property described as a rectangular land parcel used for residential purposes. Based on the study's findings, no actual and/or potential on-site sources of environmental concern was identified for this property. In addition, since there were no identified evidence of potential or actual environmental concern associated with the property, Phase II ESA was not required. The full report can be found in **Appendix M**.

5.3.6 Phase I Environmental Site Assessment – 7522 Black River Road, Georgina, Ontario (2019)

This Phase I ESA study was undertaken for a property at 7522 Black River Road to identify environmental concerns associated with current and historical activities at the Site and surrounding properties. The Site is legally known as "Part Lot 10, Concession 8, Georgina as in B34937B, S/T B34937B, If Any; Georgina". The site is 6 ha and is described as an undeveloped rectangular land parcel. Based on the study's findings, no actual and/or potential on-site sources of environmental concern was identified for this property. In addition, since there were no identified evidence of potential or actual environmental concern associated with the property, Phase II ESA was not required. The full report can be found in **Appendix M**.

5.3.7 Phase I Environmental Site Assessment - Part Lot 10, Concession 8, as in B34937B, Georgina, Ontario (2019)

This Phase I ESA study was undertaken for a property on Black River Road to identify environmental concerns associated with current and historical activities at the Site and surrounding properties. The site is 6.6 ha and is described as a rectangular land parcel used for residential purposes. Based on the study's findings, no actual and/or potential on-site sources of environmental concern was identified for this property. In addition, since there were no identified evidence of potential or actual environmental concern associated with the property, Phase II ESA was not required. The full report can be found in **Appendix M**.

5.3.8 Phase I Environmental Site Assessment – Part Lot 10, Concession 8, as in R299178 (2019)

This Phase I ESA study was undertaken for a property on Black River Road to identify environmental concerns associated with current and historical activities at the Site and surrounding properties. The Site is legally recognized as "Part Lot 10, Concession 8, as in R299178; Georgina". The site is 0.7 ha and is described as an undeveloped rectangular land parcel. Based on the study's findings, no actual and/or potential on-site sources of environmental concern was identified for this property. In addition, since there were no identified evidence of potential or actual environmental concern associated with the property, Phase II ESA was not required. The full report can be found in **Appendix M**.

5.3.9 Health Impact Assessment, Intrinsik, 2021

In mid 2021, Intrinsik Corp. was retained by the GIFN to conduct an HIA for available transportation options to and from Georgina Island (**Appendix G**). The study was completed in November 2021 and provided the foundation for the development of recommendations to maintain, protect and improve the community's health and well-being, as it relates to transportation options available to GIFN. Overall, the HIA concluded that:

- The current transportation option is aging (i.e., the Aazhaawe Ferry);
- The ferry runs for a longer duration every year and there have been increased costs associated with its repair and maintenance;
- The ferry is over capacity and community members face long wait times;
- The airboat (scoot) is uncomfortable to ride but it is the safest mode of transportation during the freeze-up and thaw seasons;

- The airboat is routinely replaced due to its overuse as a shuttle, which is not what it is made for;
- The community members try to use the airboat as little as possible as it is really intended to be for search and rescue, and emergency purposes;
- There are concerns about occupational health and safety for transportations workers due to weather and the physical impacts of operating the scoots, and it is becoming more difficult to retain existing staff and to hire new staff to operate these vessels;
- The ice road is used during favourable ice conditions; however, the duration of the ice road season is reducing, which means it is more dangerous and there is more community reliance on the airboat; and
- Improvements to the current transportation options can potentially be made by adding new infrastructure, replacing old infrastructure, or considering other options such as a bridge to connect the Island and the mainland.

5.3.10 Georgina Island Fixed Link Project Plan, WSP, 2022

In 2020, the GIFN retained WSP to complete a Project Plan that considered the regulatory and legal parameters in place in Canada for major infrastructure projects that have the potential to impact the environment (**Appendix L**). The Project Plan was completed in 2022; it identified the planning process, engagement process, EA requirements, and the guiding principles of the GIFN and community that were expected to be applicable in order to construct a Fixed Link.

5.3.11 Fixed Link Engagement Plan, GIFN, 2022

In February 2022, a Fixed Link Engagement Plan was developed to serve as an initial guide to engagement used to inform on-going stakeholder engagement through the various stages of Project development, construction, and operation (**Appendix E**). The Plan is considered a working document that will evolve over all stages of the Project and defines a technically and culturally appropriate approach to engagements.

The Fixed Link Engagement Plan is a useful tool for managing communications between the GIFN and their stakeholders, both internal and external to the Community. The key objectives of the Plan can be summarized as follows:

- To differentiate between Project-specific engagement activities and the Crown's Duty to Consult and Accommodate;
- To differentiate between internal and external engagement requirements;
- To guide GIFN to build mutually respectful, beneficial and lasting relationships with Project stakeholders, their departments, and their representatives;
- To identify the most effective methods and structures through which to disseminate Project information, and to ensure regular, accessible, transparent and appropriate Project communication and interaction;
- To develop an engagement process that provides stakeholders with an opportunity to influence project planning and design; and
- To define roles and responsibilities for the implementation of the Engagement Plan.

5.3.12 Fixed Link Socio-Economic Study, CIPS, 2022

In March 2022, a Fixed Link Socio-Economic Study was completed. It examined the socio-economic considerations of the proposed Project for the GIFN community. This study was one component piece required by the community in the Fixed Link Project Plan process. (**Appendix B**).

5.4 Completed and Future Studies

In addition to the aforementioned studies, WSP and Cambium have completed a number of detailed existing environmental conditions studies between 2022-2024 (Table B-20), undertaken to incorporate the valuable feedback the Project received during the public comment on the IPD and in response to the Summary of Issues. Results available from these studies have been included in the DPD, where applicable.

The list of the future studies and investigations are as follows:

Future (Part of the Detail Design Phase):

- Surface Water Quality Impact Study
- Erosion and Sediment Control (ESC) Plan
- Stormwater Management Strategy
- Spills Management and Response Plan
- Visual Impact Study
- Lighting Plan
- Air Quality Management Plan
- Construction Noise and Vibration Assessment Report
- Additional Archaeological Investigations
- Underwater Acoustics Assessment Report

Table B-20 Fixed Link Project Completed, Ongoing, and Future Technical and Environmental Studies

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
Completed Studies							
Air Quality Impact Assessment	WSP	An air quality impact study was completed to assess baseline air quality conditions and evaluate project-related air contaminants emissions including greenhouse gas (GHG) emissions.	None	Completed	2023	Appendix U	Formerly Listed in the IPD/Draft DPD as *Air Quality Existing Conditions and Impact Study*
Noise Impact Assessment Report	WSP	This study was completed to establish noise effects at noise sensitive land uses (e.g., dwellings) as well as to determine any required noise mitigation to demonstrate compliance with *Guidance for Evaluating Human Health Impacts in Environmental Assessment (2017)* by Health Canada.	An Ambient/Background Noise Monitoring Program was completed from September 7 to 15, 2022, which included two monitoring locations: one on Georgina Island and one on the mainland (see Section 14.6). The data was used to establish the baseline for the next steps of the noise impact assessment study. Additional noise sampling was undertaken at the two monitoring locations from August 20 to 27, 2025 to verify the Points of Reception (POR). No vibration component in this study. From the preliminary studies, it was determined that the Prohibited Construction Vibration originating from general construction does not extend beyond 20 m from the construction boundaries. There were no receptors noted within this zone of influence. Therefore, a detailed vibration assessment was not completed.	Completed	2025	Appendix V	Formerly listed in the IPD/Draft DPD as *Noise and Vibration Existing Conditions and Impact Study*
• **Aquatic Existing Conditions Report** • **Aquatic Existing Conditions Report for the Preferred Alignment** • **Terrestrial Existing Conditions Report**	Cambium	Extensive aquatic and terrestrial field programs were completed in 2022 and 2023. Results have been documented in separate aquatic and terrestrial existing conditions reports that are summarized in this DPD. A preliminary impact assessment of the preferred alignment is documented in this DPD. The impact assessment will be refined through preliminary and Detail Design.	The Terrestrial Field Program included the following surveys (Cambium Inc., 2023): • Vegetation Community Classification and Botanical Inventory • Wetland Boundary Delineation • Butternut Survey • Breeding Bird Surveys (BBS) • Least Bittern Surveys • Grassland Bird Surveys • Eastern Whip-poor-will Surveys • Waterfowl Nesting Area Surveys • Raptor Stick Nest Survey • Woodland Raptor Nesting Surveys	Completed	2023	• Appendix T1 • Appendix T2 • Appendix T3	Formerly listed in the IPD/Draft DPD as *Natural Environment Impact Study*

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
			• Bald Eagle and Osprey Nesting, Foraging and Perching Habitat Surveys • Waterfowl Stopover and Staging Areas • Shorebird Migratory Stopover Surveys • Wintering Raptor Surveys • Pileated Woodpecker Habitat Surveys • Gull Nesting Surveys • Amphibian Calling Surveys • Snake Surveys • Turtle Surveys • Bat Maternity Roost Habitat Surveys • Bat Acoustic Monitoring • Deer Wintering Habitat Surveys • Winter Mammal Survey • Insect Survey • Terrestrial Crayfish Surveys • Seep / Springs The Aquatic Field Program included the following surveys: • Watercourse Assessments • Waterbody Habitat Assessment and Mapping • Spring Spawning Surveys				
Preliminary Hydrogeological Study	WSP	Preliminary assessment was completed and focused on evaluation of baseline (existing) hydrogeological conditions and evaluation of impacts related to construction of a causeway / bridge of the Fixed Link on natural resources	A private water Well Survey Program was completed by CIPS in December 2023, in which the following activities were completed: • Reviewed MECP water well records and water servicing in the study area • Reviewed details related to the Georgina Island Water Treatment Plant • Reviewed details related to existing drinking and recreational water sources (surface water and groundwater) used domestically and outside the house during fishing, hunting and gathering by the First Nation. The well surveys included groundwater analysis for key parameters of Ontario	Completed	2024	Appendix W	Formerly listed in the IPD/Draft DPD as *Hydrogeological Baseline Conditions and Impact Study*

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
			Drinking Water Standards, including general and inorganic parameters, concentration of bacteria (Total Coliform and E. Coli), metals (including sodium) and PHCs (benzene, toluene, ethylbenzene and xylene).				
Cultural Heritage Report: Existing Conditions and Preliminary Impact Study and Cultural Heritage Report Addendum	WSP	A Cultural Heritage Report (2022) was completed and identified existing and potential built heritage resources (BHR) and cultural heritage landscape (CHL) and reviewed the background history of the Project area. The study also provided a preliminary description of potential effects to conserve BHRs and CHLs as well as mitigation and/or monitoring for potential impacts. The report recommended the completion of CHER due to the potential for direct impacts to Lake Simcoe. In January 2024, the MCM provided comments on the 2022 Cultural Heritage Report and requested revisions to reflect the latest Project details. As such, WSP prepared the Cultural Heritage Report Addendum to address MCM's requested updates.	A field assessment for this study included a survey of the cultural heritage study area from the publicly accessible rights-of-way to confirm or identify existing and/or potential BHR and CHL. Where identified, potential resources were photographed and mapped, and physical characteristics visible from the right-of-way (ROW) or aerial imagery were described. The survey was completed on October 21, 2022.	Completed and submitted to MCM for review and information purposes.	Original Report: 2022 Addendum: 2025	Appendix O1	N/A
Cultural Heritage Evaluation Report (CHER): Lake Simcoe, Georgina Island and the Township of Georgina, Ontario (CHER)	WSP	As described above, the 2022 Cultural Heritage Report identified Lake Simcoe, including the marsh and associated shoreline, as a potential CHL. The Cultural Heritage Report concluded that the Project has the potential for direct impacts to Lake Simcoe. As such, a CHER was completed to establish whether the Study Area has cultural heritage value or interest (CHVI) per Ontario Regulation (O. Reg.) 9/06 of the *Ontario Heritage Act* (OHA).	Cultural Heritage Specialists conducted field investigation of the Study Area on November 30, 2023. The fieldwork included taking photographs and documenting the existing conditions of the Study Area. The fieldwork was conducted from the public ROW, from the ferry, and from properties owned by GIFN.	Completed and submitted to MCM for review and information purposes.	2025	Appendix O2	N/A
Ferry Alternatives Report	BMT	GIFN retained a ferry consultant to examine, in response to GIFN and public requests, an investigation into the seven generations' costs of a ferry alternative that would meet community desires for a safe and timely water-based transportation system.	This review took place in the fall of 2024. The BMT team were in community and completing an investigation of the current ferry, and transportation infrastructure to support the next seven generations of	2025	2025	N/A (Awaiting Presentation to GIFN membership)	N/A

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
			transportation. The report has been provided to the GIFN for acceptance.				
Seven Generations Financial Report	BDO	This report for GIFN Council will evaluate the community's financial implications related to this Project for the next seven generations. It will take into account the financial assumptions and support the development of a financing package for the project.	This project was awaiting the completion of the work in the ferry alternatives project.	Initiated	2025	N/A	N/A
Stage 1 Terrestrial Archaeological Assessment	WSP	The Stage 1 Terrestrial Archaeological Assessment was completed and provided information about the study area's geography, history, previous archaeological fieldwork and current land condition; to evaluate the archaeological potential of the study area; to recommend appropriate strategies for further archaeological assessment (i.e., Stage 2), where required, per the guidelines enumerated in the *Ontario Heritage Act* (consolidated 2007) and the Ministry of Citizenship and Multiculturalism (MCM) *Standards and Guidelines for Consultant Archaeologist* (2011).	A visual site Inspection was completed on October 9-10, 2022.	Completed	2023	Appendix R	N/A
Marine Archaeological Desktop Assessment	WSP	The Marine Archaeological Desktop Assessment was completed and identified the potential for submerged Indigenous and Euro-Canadian cultural resources that may be inadvertently impacted during the Project, to identify the risk to these potential resources within the aquatic landscape and develop appropriate strategies to minimize and mitigate this risk.	A visual site inspection was completed on October 11, 2022. It was limited to accessible shoreline and terrestrial locations to inspect features visible from the surface, such as shoreline erosion and infrastructure. No diving or in-water work was completed as part of the site inspection.	Completed	2023	Appendix Q1	N/A
Marine Archaeological Impact Assessment	WSP	The Marine Archaeological Impact Assessment was completed with the following objectives: • To provide information about the study area's geography, environment, cultural history, previous archaeological fieldwork and current land condition; • To investigate potential for buried archeological resources through geotechnical sampling; and,	The marine archaeological fieldwork was completed throughout November and December 2024. The offshore borehole core sampling was conducted on November 9, 10, 15, 20, 21, 25, and 28, 2024. The boreholes are located along the proposed bridge alignment.	Completed	2025	Appendix Q2	Analysis and recommendations contained in this report should be incorporated into recommendations and analysis from the Marine Archaeological Desktop Assessment Report (WSP 2023).

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
		• To recommend appropriate methods and strategies for additional assessment, mitigation, or avoidance and protection for known and potential resources within the study area. This assessment consisted of screening the sediments recovered from the geotechnical investigation. The study primarily aimed to identify archaeological material in the recovered sediments and characterize the submerged substrate, as it relates to buried areas of archaeological potential.					
Transportation Impact Study (TIS)	WSP	A TIS was completed to identify the impacts and potential improvements such as left-turn lanes, right-turn lanes, signalization (if warranted) and recommend the lanes configurations at key intersections. Key intersections included the Black River Road, Hadden Road at Highway 48 on the mainland side and the intersection of Chief Joseph Snake Road and Bear Road on the island side. Preliminary results of this study are included in **Section 20.8.**	To assess existing traffic operations, WSP commissioned third-party traffic counters specialized in traffic data collection to collect the following information: • Automatic traffic record (ATR) data for Black River Road, Chief Joseph Snake Road and Bear Road; and • Peak period (7-9 am and 4-6 pm) turning movement counts (TMC) at the intersection of Black River Road and Park Road, and Chief Joseph Snake Road at Bear Road.	Completed	2023	Appendix N	N/A
Coastal Engineering Study	WSP	This study will focus on hydrodynamic, wave and sediment transport modeling, scour analysis, wave runup and overtopping analysis, ice assessment and Navigation Impact study. The results from the coastal study will address the impacts of proposed causeway and bridge on currents, sediment transport, shoals, and mainland shoreline, Navigation Impact study and provide input to causeway bridge design.	The coastal engineering field program will include the following surveys: • Bathymetry Survey • Sediment Sampling • Acoustic Doppler Current Profiler (ADCP) Deployment.	Completed	2024	Appendix Y	N/A

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes

Geotechnical Investigation Program	WSP	A geotechnical investigation program has been completed to obtain adequate information on the geotechnical conditions in the Project area for use in the subsequent stages of the Project.	The program consisted of:
			• Drilling of onshore (land) boreholes along the proposed road alignments and shallow areas of the causeway;
			• Drilling of nearshore (marine) boreholes along the proposed causeway and bridge alignment. These boreholes, in particular, would mostly extend into the bedrock to obtain information of its engineering characteristics;
			• Field testing, in the form of Standard Penetration Test (SPT) at selected depths in the drilled boreholes to collect soil samples and to obtain information on the engineering characteristics of different soils.
			• Laboratory testing, including but not limited to:
			  • Index soil tests, such as moisture content, grain size distribution and Atterberg Limits
			  • Advanced soil testing to evaluate soil strength and deformability, including Triaxial and Consolidation testing
			  • Corrosivity and chemical analysis testing
			Rock strength and deformability tests, such as uniaxial compressive strength and Point Load Index
				Completed	2024	N/A; Part of Design Phase	N/A

Geophysical Investigation Program	WSP	Seismic surveys will be conducted to calculate the approximate moduli of large areas of soils and rock. Shear-wave velocities form the basis of measuring soil strength which can be accomplished with Multichannel Analysis of Surface Waves (MASW) to obtain shear-wave velocities and Refraction to obtain compressional wave values.	The Geophysical field program have completed the following surveys in 2022: • **Magnetometer survey (February 28 – March 1, 2022):** The survey was performed using a gradiometer that was composed of two magnetometers sensors • **Land and Marine Multichannel Analysis of Surface-Waves** (MASW) (August 2022): a series of 24 low frequency (4.5 Hz) geophones and hydrophones were used for this survey.	Completed	2025	N/A; Part of the Design Phase	N/A

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
			• **Seismic and electrical resistivity surveys** (July 29, 2024 to August 2, 2024): surveys were done to determine the depth to rock and stratigraphy. Additionally, based on the Archaeology team's requirements, side scan and magnetometer surveys were conducted to identify water bottom features and any buried metal objects along the bridge alignment.				
Future Studies and Mitigation Plans							
Surface Water Quality Impact Study	TBA	The study will review source water protection policies and assess the footprint of the Intake Protection Zones (IPZ). It will also provide recommendations regarding further data analysis related to water quality.	To be determined at a later stage of the Project.	Not yet started	To be completed in the Detail Design phase	N/A	N/A
Erosion and Sediment Control (ESC) Plan	TBA	The ESC Plan will be prepared to recommend methodologies to be put in place during construction of the Fixed Link to prevent or minimize erosion and sediment release into Lake Simcoe.	None	Not yet started	To be completed in the Detail Design phase.	N/A	N/A
Stormwater Management Strategy	TBA	The Stormwater Management (SWM) strategy will be established to meet the requirements of the Development Design Criteria and guidelines of the Town of Georgina, as well as the criteria set out in the Georgina Comprehensive Stormwater Management Master Plan. Ultimate alignment and configuration notwithstanding, the Project site is within the Lake Simcoe and Region Conservation Authority (LSRCA) mapped Regulated Area, and criteria outlined in the Lake Simcoe and Region Conservation Authority (LSRCA) Technical Guidelines for Stormwater Management Submissions (LSRCA, 2016) is recommended as part of the design criteria. The province's "Stormwater Management Practices – Planning and Design Manual" (MECP, 2003) will be referenced for best management practices involving stormwater management.	None	Not yet started	To be completed in the Detail Design phase.	N/A	N/A

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
Spills Management and Response Plan	TBA	The Plan will describe how the drainage of the roadway will accommodate and manage any accidental spills.	None	Not yet started	To be completed in the Detail Design phase.	N/A	N/A
Visual Impact Study	TBA	A Visual Impact Study will be conducted to assess potential visual impacts or changes to the scenic attributes of the landscape brought about by the introduction of the Fixed Link and the associated changes in the human visual experience of the landscape.	A visual site inspection will be completed to capture photos of the existing landscape and viewsheds.	Not yet started	To be completed in the Detail Design phase.	N/A	N/A
Lighting Plan	TBA	A Lighting Plan will be completed during the Detail Design phase to depict where lighting on the bridge, causeway and roadway intersections will be proposed to accommodate for the Fixed Link. The Plan will include the location and label specification of all exterior luminaires light fixtures to be installed within the Fixed Link, their lumen values, mounting heights, shielding and directionality, controls and the location of all adjacent streets, the uses of abutting properties and properties located directly across a street, any relevant Project site conditions, vertical illuminance calculations, and any additional information required to demonstrate compliance with applicable standards.	To be determined.	Not yet started	To be completed in the Detail Design phase.	N/A	N/A
Construction Air Quality Management Plan	TBA	Air Quality Management Plans should ensure that dust from construction and demolition activities do not impact the surrounding environmentally sensitive areas such as aquatic habitats and fisheries, terrestrial vegetation, and faunal communities, as well as residential properties in proximity to work areas. This plan was indicated as a proposed mitigation measure from the Air Quality Impact Assessment report (Appendix U)	TBA	Not yet started	TBA	N/A	N/A
Additional Archaeological Investigations	TBA	Additional archaeological investigations may be necessary to further confirm the presence or absence of terrestrial and marine archaeological resources in the areas	Marine Archaeological Impact Assessment and Stage 2 Archaeological Assessment for specific areas have been recommended.	Not yet started	To be determined	N/A	N/A

Technical Study	Author	Description	Supporting Field Investigation/Survey	Status	Year Completed or Expected Completion	Appendix in DPD	Notes
		identified to contain archeological potential (see Section 15.7)	GIFN and Indigenous Communities identified in **Section 4 of the DPD** will be engaged in the field investigation planning and surveys.				
Underwater Noise and Vibration Impact Study		Based on the results of the Aquatic Existing Conditions Report (2023), a detailed and separate Underwater Noise and Vibration Impact Study regarding construction noise and vibration impacts to identified aquatic species will be completed as part of the Detail Design phase. This is recommended to identify: • Standard mitigation measures (i.e., restrictive timing window for construction works that may impact fish during their sensitive life stages); • General monitoring and management considerations; • Concepts to reduce potential vibration effects; and, • Applicable vibration guidelines during construction.	To be determined	Not yet started	To be completed in the Detail Design phase.	N/A	N/A

5.5 Nearby Assessments

The following subsections provide a list of nearby projects that may be relevant to identify effects that have potential to interact cumulatively with the effects of this Project. These projects, as well as others if appropriate, will be considered in a future cumulative effects assessment of the Project where required.

5.5.1 Nearby Federal Impact Assessments

For preliminary identification of other projects that could contribute to potential cumulative effects, a spatial boundary of a 200 km radius from the Project site was used based on the "nearby assessments within 200 km" feature on IAAC's Canadian Impact Assessment Registry page for the Project. This spatial boundary was anticipated to be a sufficiently broad initial study area to capture reasonably foreseeable projects that were being considered under a portion of the federal IAA and that might have residual effects that could interact with the residual effects from this Project. The most relevant assessments from the list are those in proximity to the Project Study Area, including some being proposed by the GIFN. The spatial boundary and list of reasonably foreseeable projects would be further refined for the IA.

The projects and assessments identified in the Registry are described below.

5.5.1.1 Chippewas of Georgina Island First Nation - South/East Region Watermain Extension

A 5,300 m extension of watermain has been completed to service community members on Bear, Loon and Milne Roads, approximately 3 km away from the Fixed Link project study area. The existing water treatment plant, constructed in 2019, has sufficient capacity to service these locations, while also providing eastern and southern residents with fire protection. This design will meet the water servicing needs of all community members over the next 20-year design lifetime.

5.5.1.2 Chippewas of Georgina Island - Rehabilitation of Watermains

This Project will rehabilitate aging watermains on Georgina Island. The work involves upgrading approximately 1,960 m of watermain along Chief Joseph Snake Road and restoring and reconnecting all water services. The Project will increase access to potable water by increasing the reliability and capacity of the transmission infrastructure. Portions of this Project coincide with the Fixed Link Project study area. At the time of submission, this project is currently in its pre-construction phase (Housing, Infrastructure and Communities Canada, 2024).

5.5.1.3 Chippewas of Georgina Island First Nation - Early Childhood Learning Centre

The GIFN are constructing a new Early Childhood Learning Centre on Lots 6-19-2 on Georgina Island, approximately 3 km away from the Fixed Link Project study area. The new facility will replace the outdated existing Early Childhood Learning Centre and will provide the children of Georgina Island with a better learning experience. The new building will include an approximately 25,000 square feet learning facility with bus loop and parking for staff and buses. A Peatland System will be constructed on an approximately 2,070 metre square (m^2) area of the property to service the wastewater from the facility. Access will be directly off Chief Joseph Snake Road. Construction is continuing with an expected completion date of 2026.

5.5.1.4 Bradford Bypass Project

The MTO is proposing the construction, operation and maintenance of the Bradford Bypass, which is a new 16.2 km four-lane controlled access highway. The Bradford Bypass project is located approximately 31 km south of the Fixed Link Project study area and is also known as the Highway 400-404 Connecting Link, the Highway 400-404 Extension Link or the Holland Marsh Highway, would connect Highway 400 in Bradford West Gwillimbury (Simcoe County) to Highway 404 in East Gwillimbury (Regional Municipality of York) and cross north King Township. The corridor would require a new 100-m wide ROW and would cross over the Holland River and Holland River East Branch within the Holland Marsh. The Project would also include the replacement of the 9th Line structure on Highway 400.

5.5.1.5 Hadden Road Development Project

The GIFN are proposing a future mixed use residential development along Hadden Road in the Virginia Settlements Area of Georgina, Ontario, located just a few metres east of the Fixed Link Project study area. The Property is situated north of Highway 48 and only steps south of Lake Simcoe's waterfront and the ferry terminal. The Site is surrounded by existing residential and commercial development, located immediately north of the approved Highway 404 extension to Highway 12 (CBRE, 2021). A concept site plan was prepared in 2021 based on conversations with the municipality for a 29-lot residential development that fits with the existing character of the low-density residential development surrounding the site. Hadden Road properties are in the Additions to Reserve process, and as such, GIFN treats these parcels as reserve lands under the *First Nations Land Management Act*.

5.5.2 Nearby Provincial Assessments

As part of the preliminary review of projects that have potential to contribute to cumulative effects, provincial EA projects within the spatial boundary of a 50 km radius from the Project site have also been identified (MECP, 2022). This spatial boundary and list of reasonably foreseeable projects would be further refined for the IA. Some of the projects are as follows:

- North Yonge Street Corridor Public Transit and Associated Road Improvements Municipal Class EA
- Teston Road transportation network project (or Teston Road Individual Environmental Assessment Study)
- Western Vaughan Transportation Improvements Individual Environmental Assessment
- York-Durham Sewage System Modifications Impact Assessment study (Declaration Order -- Order in Council 399/2018)
- Henderson Sewage Pumping Station Municipal Class EA
- Mount Albert Water Supply Upgrades Municipal Class EA
- Warden Avenue and Kennedy Road from Major Mackenzie Drive to Elgin Mills Road Municipal Class EA
- Elgin Mills Road from Yonge Street to East of Newkirk Road Municipal Class EA
- Ballantrae Water - Long-term Water Supply Municipal Class EA
- Stouffville Long-term Water Supply and Servicing Municipal Class EA

5.5.3 Nearby Municipal/Other Jurisdiction Assessments

Based on the Road Construction Schedule listed in York Region's official website and infrastructure projects listed in the Town of Georgina's official website (Town of Georgina, n.d.a; York Region, n.d.), some relevant municipal projects that may have the potential to interact cumulatively with the Project's effects include:

- *"Road Construction on Kennedy Road, Ravenshoe Road and Woodbine Avenue"*: this regional transportation improvement project initiated by the York region is expected to occur between Mid-April 2024 to September 2024. Road improvement work includes replacement of asphalt road surface, guiderails, and culverts, and; cleaning and restoring ditches. Impacts to travellers include lane restrictions due to work that will occur during weekdays from 9:30 AM to 7:00 PM. (York Region, 2024a).
- *"The Queensway South and Garrett Styles Drive/Miami Drive"*: this regional transportation project aims to improve road safety in the Town of Georgina by installing a new signal at The Queensway South and Garrett Styles Drive/Miami Drive. This project is anticipated to occur within the next six months from July 2024. Impacts to travellers include lane restrictions due to work that will occur during weekdays from 9:30 AM to 3:30 PM (York Region, 2024b).
- *"Udora Roads Updates"*: this project was initiated by the Town of Georgina, and is focused on improving the roads in Udora to meet the acceptable standards for an all-season gravel road surface. The construction is anticipated to start in 2025 or 2026, and the roads will be constructed in sections over 10 years (Town of Georgina, n.d.b).
- *"Black River Road Reconstruction"*: this road improvement project initiated by the Town of Georgina focuses on the reconstruction of Black River Road, which is approximately 3,200 m long. The project includes the establishment of a new paved roadside parking area for a water fill station near the Black River Road. The project is scheduled to commence on August 8, 2024. The majority of the work is expected to be completed by the first week of September, with the remaining tasks wrapping up by October 2024 (Town of Georgina, n.d.c).

The Town of Georgina has an existing digital map of current construction projects within its jurisdiction (Construction 2024 (arcgis.com). Some of the projects within the vicinity of the Study Area include the following:

- Highway 48 – Resurfacing pavement, Intersection widening, guiderail replacement, resurfacing of adjacent roadways and driveways, bridge rehabilitation, storm sewer installation, installation of traffic signal at Highway 48 and Moorings Road, and rehabilitation of existing culverts, rehabilitation of bridge over CN rail, installation of storm sewer, resurfacing pavement.
- Duclos Point Road – Rout and seal works on Hydroxymethyl Carbon Black (HCB) pavement.
- Maintenance works (i.e., rout and seal) and stormwater facility works on residential areas near Highway 48.

The website will be reviewed to gather the latest information for the cumulative effects assessment. Additionally, coordination with the Town of Georgina may be undertaken to obtain further details about the construction projects listed on their website.

6. SECTION 95 STRATEGIC ASSESSMENTS

Any strategic assessment, relevant to the project, that is being or has been carried out under section 95 of the IAA.

Proponents are advised to contact the Agency during the preparation of the Detailed Project Description for information regarding any strategic assessments that may be relevant.

The only relevant strategic assessment for the Project is the Strategic Assessment of Climate Change (SACC) (ECCC, 2020). Under the SACC, any project undergoing a federal IA will be required to provide an estimate of the Project's GHG emissions.

The Aazhaawe Ferry is the single largest energy user within the GIFN. From 2014 to 2017, the ferry consumed approximately 244,600 litres (L) of diesel annually. It is responsible for the production of an estimated 676 tonnes of carbon dioxide equivalent (CO_2eq) annually, which is about 17% of the total GHG emissions produced by GIFN per year. By building a Fixed Link, and eliminating the need for the ferry, there is a potential for annual GHG production through fossil fuel combustion to be reduced.

Potential GHG emissions from the construction and operation of the Fixed Link have been calculated and are discussed in **Section 23**. In general, the proposed Fixed Link GHG emissions have been estimated to result in a decrease of 3 to 5% less than the expected GHG emissions from the current ferry operations; thus, supporting the goals of Canada's Climate Action Plan.

No other strategic EAs have been completed in relation to the Project or study area.

PART C. PROJECT INFORMATION

7. PURPOSE AND NEED FOR THE PROJECT

An updated statement of the purpose of and need for the project, including any potential benefits.

The purpose of the project is what is to be achieved by carrying out the project, including any objectives the proponent has in carrying out the project.

The need for the project is the opportunity that the project is intended to solve or satisfy. That is, the "need for" establishes the fundamental justification or rationale for the project.

The "purpose of" and "need for" the project should be established from the perspective of the project proponent and provide the context for the consideration of alternatives to and alternative means (below).

7.1 Purpose of the Project

The purpose of the Project is to solve several issues that the GIFN community faces with regard to lack of safe and reliable two-way travel between Georgina Island and the mainland, especially during the winter months, but also for emergency situations, which can occur at any time of year.

Currently, Georgina Island is accessible solely by the Aazhaawe Ferry during the spring, summer, and autumn months of the year. The Aazhaawe Ferry operates between Georgina Island and the mainland and has been funded by Indigenous Services Canada (ISC) to date. The ferry can carry up to 18 cars and has cabin space for 50 walk-on passengers; however, it is taken out of service and inoperable in the winter when ice conditions make crossings impossible. During the freeze and thaw months of January to March, the ferry is winterized at the Virginia Beach site. During these winter months, transportation to Georgina Island is accessible solely by airboat (i.e., "the Scoot") (**Figure C-1**), which is a 12-passenger air-propelled vehicle, or by ice road when Lake Simcoe is frozen with a reasonable depth and vehicles such as personal cars, snowmobiles, and ambulances can cross the lake (**Figure C-2**).

There can be periods, at any time of year, where two-way access to and from Georgina Island is completely prohibited due to the lack of a safe and reliable means of transportation. This includes when Lake Simcoe is not frozen enough during winter months for ice road formation, in which, vehicles cannot safely travel across the lake. It also includes times when the ferry has malfunctioned and is unable to operate. Unexpected operational issues and malfunctions can cause the ferry to be out of operation for long periods of time. Such operational failures have included the ferry ramp falling off, and in recent years minor steering failures have occurred due to the age of the vessel.

Compounding this is the issue that the dated ferry system is nearing the end of its service life by 2027 (i.e., in approximately three years), and there is a lack of safe and viable alternative transportation option to replace it. Thus, the community is looking to implement a viable solution with a sense of urgency.

Figure C-1 Airboat ("Scoot")

Figure C-2 Georgina Island Ice Roads

7.2 Need for the Project

The need for the Project stems from an immediate need to address issues of health and safety as well as reliability of access, particularly during winter crossings, but also at any time of year in relation to access to medical and other urgent emergency services (e.g., medical, fire and police services). These health and safety issues present a need for investment in a safer, more reliable, and cost-effective transportation alternative to allow continuous two-way access between Georgina Island and the mainland.

The current methods to access Georgina Island are neither reliable, nor safe, and have caused threats to the health and safety of GIFN community members and other island inhabitants (i.e., non-GIFN cottagers). In more than one case, the lack of safe crossing method has resulted in loss of life.

7.2.1 Health and Safety Considerations

According to a HIA completed in 2021 (Intrinsik, 2021) (**Appendix G**), and based on community knowledge, current methods of transportation have resulted in a variety of safety issues for the GIFN community, including:

- loss of vehicles;
- loss of life; and
- the potential to contribute to stress-related disorders and other mental health issues.

Additionally, weather is another important safety factor when considering the use of airboats as a means of transportation. During high-wind events, airboats have the potential to flip over, thus making them an unsafe and unviable mean of transportation during high-wind conditions (Intrinsik, 2021).

Medical care is provided on Georgina Island via regular visitations from mainland physicians, who typically face the same inherent risks with regard to travel to and from the island during winter months. Access to medical emergency services (e.g., ambulance) is slow and limited through the current means of transportation, and first responders travelling to and from Georgina Island also face the inherent risks associated with travel during winter months. Travel to the island varies between the emergency services:

- Police officers use the Aazhaawe Ferry, their police boats, and driving on the ice road (when safe to do so) to come to the island.
- Firefighters travel to the island to respond to emergencies either by the Aazhaawe Ferry or using their airboats, but do not use the ice road. The island does have a firetruck and pumper, but when additional support is needed, firefighters from the mainland come to the island as additional resources, typically without equipment or additional trucks.

As a result of these health and safety issues, the GIFN community members engaged in preliminary studies for a Fixed Link identified the following future Vision Statement.

> *"Chippewas of Georgina Island First Nation is a responsible and sustainable community that values safety and community health. A* Fixed Link will offer the community with safe passage during all seasons while protecting the environmental, cultural, social and economic future of the community."

7.2.2 Socio-economic Considerations

The intent of the Project is not to increase future development or tourism on Georgina Island; however, in addition to the health and safety considerations for the Project, the proposed Project would also have inherent social and economic benefits to the GIFN community, such as improved access to jobs and education on the mainland.

These are discussed in further detail in **Section 22**.

8. PROJECT DESIGNATION PER THE PHYSICAL ACTIVITIES REGULATIONS

The provisions in the schedule to the *Physical Activities Regulations* describing the project, in whole or in part.

Proponents must detail how the project meets the description, threshold (e.g., provide the length of new right of way) and the criteria of any of the other provisions.

Indicate whether the designated project is a component of a larger project that is not listed in the Project List.

As currently proposed, pending finalization of the Detailed Design phase, the Fixed Link includes approximately 110 m of causeway for the approach to the bridge, 731 m of low-level bridge, 494 m of causeway, and 1,250 m of high-level bridge. To ensure that the Fixed Link is a part of the transportation network on the mainland, approximately 800 m of new roadway will be needed to connect the Fixed Link to Black River Road (**Figure C-3**).

The Schedule to the *Physical Activities Regulations* under the IAA (i.e., the Project List), provides a description of the physical activities that are deemed to be designated projects, including activities relating to transportation. Section 50 specifically includes the "*construction, operation, decommissioning and abandonment of a new permanent causeway with a continuous length of 400 m or more through navigable water*."

The Fixed Link is proposed to traverse Lake Simcoe, which is a navigable body of water as defined by the *Canadian Navigable Waters Act*, and will involve the construction and operation of a permanent causeway greater than 400 m; thus, the Fixed Link is a designated project by definition of the Project List.

The Project is not a component of a larger project that is not listed in the Project List.

Figure C-3 Proposed GIFL Project

9. PROJECT COMPONENTS AND ACTIVITIES

A description of all activities, infrastructure, permanent or temporary structures and physical works to be included in and associated with the construction, operation, decommissioning of the project, including their purpose, size and capacity.

Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.

Include a description of the physical activities that are incidental to the designated project. In determining such activities, the following criteria shall be taken into account:

- nature of the proposed activities and whether they are subordinate or complementary to the designated project;
- whether the activity is within the care and control of the proponent;
- if the activity is to be undertaken by a third party, the nature of the relationship between the proponent and the third party and whether the proponent has the ability to "direct or influence" the carrying out of the activity;
- whether the activity is solely for the benefit of the proponent or is available for other proponents as well; and,
- the federal and/or provincial regulatory requirements for the activity.

9.1 Overview of the Project Components

The proposed Fixed Link consists of three main sections: a bridge, a causeway, and a low-level bridge, with an overall length of approximately 2.6 km. The proposed Project will provide a safe and permanent connection with two-way access from the southwest shore of Georgina Island to the mainland in the Town of Georgina. The proposed route has been selected and the structure is being designed to minimize environmental impact while remaining cost-effective. For further information on the rationale and decision-making in selecting a route and alignment for the Project, see **Section 12.1**.

While the detailed design is in the planning stages and will be informed by ongoing studies and consultation with regulators and stakeholders, the following provides an overview of the proposed Project at this time. From north (Georgina Island) to south (mainland), the Fixed Link includes approximately 110 m of causeway for the approach to the bridge, 731 m of low-level bridge, 494 m of causeway, and 1,250 m of high-level bridge. To ensure that the Fixed Link is a part of the transportation network on the mainland, approximately 800 m of new roadway will be needed to connect the Fixed Link to Black River Road.

The low-level bridge, with an approximate length of 731 m, will be constructed with a low profile, allowing approximately 3.0 m vertical clearance to the water to accommodate kayaks, canoes and small boats for navigation. This structure is proposed to have 14 piers and be of slab on precast girders type with spans of 48.75 m. At the south of the low-level bridge structure, there will be a causeway 494 m long. This causeway will be constructed by placing fill on the lakebed with natural side slopes. The high-level bridge structure, with an approximate length of 1,250 m,

will consist of the main structure and approach structures. The main structure is proposed to be a single box with long spans, varying from approximately 60 m to 150 m, on high profile with the tallest span allowing approximately 10.0 m vertical clearance to the water. The approach structures to the main span will be on low profile and made of slab on precast girders. The number of piers of the high-level bridge structure is 14.

The Fixed Link is proposed to feature two lanes for vehicle traffic and a MUP that will give a pedestrian walkway and bike lane, separated from vehicular traffic by concrete barriers. The proposed cross-section of the bridges (from east to west) (Figure C-4) will consist of:

- concrete barrier
- 1.5 m paved shoulder
- 2 x 3.75 m traffic lanes
- 1.5 m paved shoulder
- concrete barrier
- 3.6 m Multi-Use Path (MUP)
- pedestrian open barrier

The roadway cross-section on the approaches and causeway sections will be similar.

The piers and foundations of the bridges will be designed to resist water current, ice load, and scour. The piers adjacent to the navigable channel will be designed for collision loading, or crash protection will be provided to protect piers from collision.

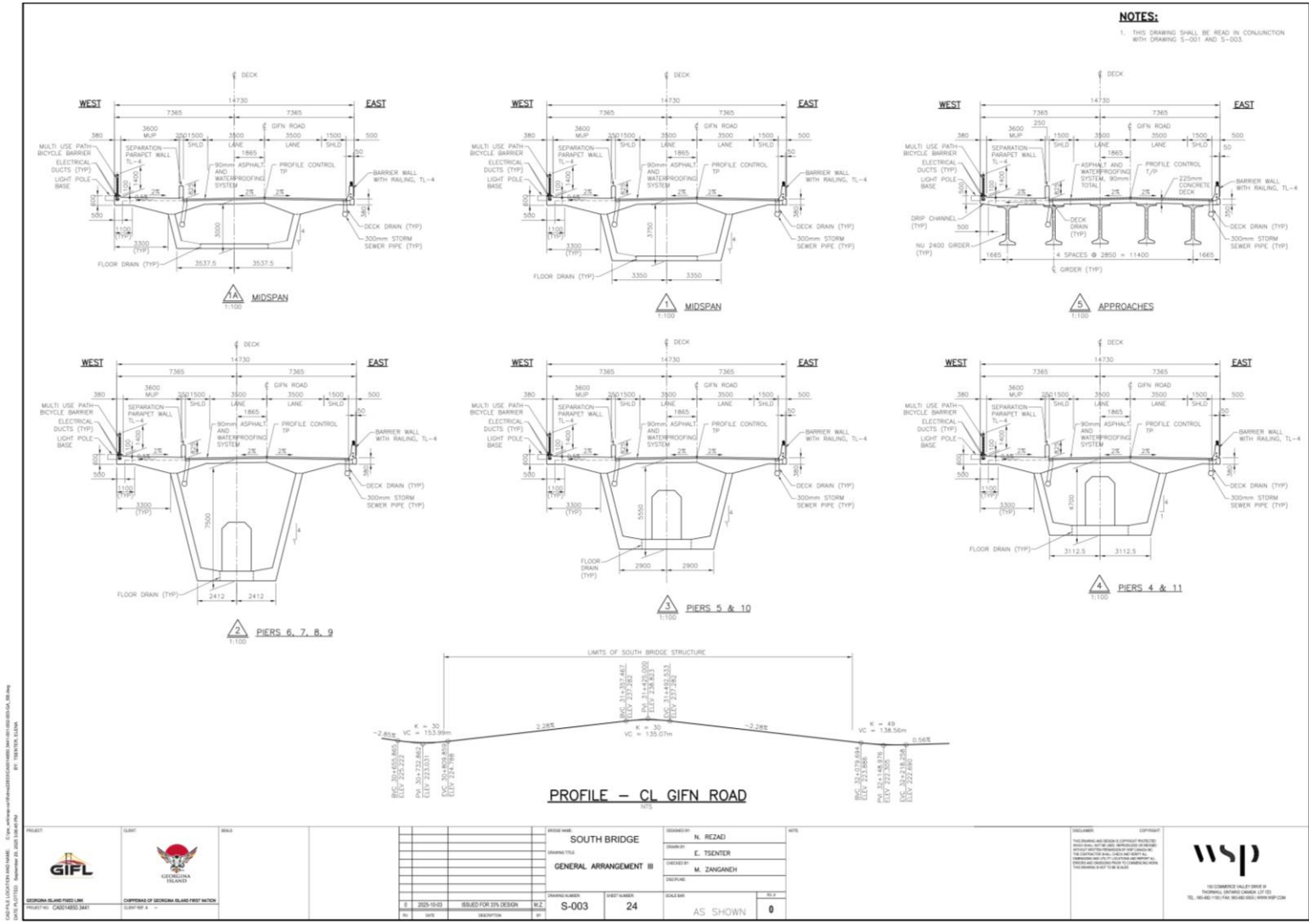

Figure C-4 Segmental Bridge Conceptual Design Arrangement Options

9.2 Pre-Construction Design Considerations

The following section provides an overview of some of the aspects that are being refined during the ongoing investigations and detailed design phase.

Geotechnical requirements: The geotechnical investigation program, which has been completed, helped identify the nature of subsurface layers and their engineering properties, which informed an evaluation of the stability of the geotechnical conditions, as well as against excessive settlement and potential geotechnical failures. The principal objectives of the investigations are to determine where in the sub-surface of the soil adequate load-bearing capacity is available and by how much, as measured in pounds per square inch (psi). The data obtained were analyzed, and the results of the geotechnical investigation has been used to update the design.

The geotechnical investigation and the subsequent analysis will be reviewed to recommend next steps, as well as requirements for further assessment. The assessment of the geotechnical effects of the Project and the corresponding recommendations will continue to be refined as the Project advances into the Detail Design phase. The final design will be reliant on the findings of further geotechnical investigations.

Likewise, the design will be subject to further developed and refinement to accommodate recommendations from the community and other stakeholders (e.g., regulators) and to minimize the potential environment and ecology impacts within the study area.

Design Criteria: As a starting point, the Fixed Link will generally follow the horizontal and vertical alignment of the existing gravel roads at either end of the Fixed Link, and will follow the following design standards:

- Transportation Association of Canada – Safety performance of bicycle infrastructure in Canada (2020)
- Transportation Association of Canada – Geometric Design Guide for Canadian Roads (2020)
- Transportation Association of Canada – Managing and Enhancing Terrestrial Road Ecology (2021)

Based on the above, the following design criteria has been proposed for the Project:

- Design speed: 80 km/h
- Posted speed: 60 km/h
- 2-lane roadway cross-section
- Lane width: 3.5 m
- Minimum horizontal curve radius: 250 m
- Minimum K factor for sag vertical curves: 30
- Minimum K factor for crest vertical curves: 26
- Maximum longitudinal grade (profile): 5%
- Maximum superelevation rate: 6%

- MUP width: 3.0 m
- MUP maximum grade: 5%, per *Accessibility for Ontarians with Disabilities Act* (AODA) requirements
- MUP cross slope: 2%
- Shoulder width: 1.5 m
- Design vehicle: WB-20
- Nautical clearance (between high water level and underside of high-level bridge): 10 m

Intersection Control and Lane Configuration: The proposed Fixed Link will provide a new permanent connection from Georgina Island and Black River Road on the mainland side. Given these connections, a lane capacity of a maximum of 400 vehicles per hour is projected, akin to the typical lane capacity for a local road. The Project design is envisioned to allow the regular passage of vehicles up to Class A (e.g. semi-trailer) , to be confirmed through further study.

A Traffic Impact Study (TIS) (**Appendix N**) was completed in 2023 to identify the impacts and potential improvements needed to accommodate the Fixed Link, such as left-turn lanes, right-turn lanes, signalization (if warranted), and to recommend the lane configurations.

The outcome of the study included recommended intersection control type and lane configurations at the study intersections, as well as recommended storage lengths for exclusive left-turn and right-turn lanes. The functional and Detailed Design work will be completed for the intersection improvements, as well as the traffic management plan to be implemented during construction on the mainland side.

Access Control: Based on the Project Visioning workshop and other outreach activities, it is proposed that access to the island will be restricted to GIFN community members, leaseholders, and others by permission. As a result, it is expected that the Fixed Link will have enhanced security and controlled access from the mainland, e.g., by using an entrance control such as a guard booth; however, the precise method of access is yet to be determined. Exploring access control options will be required as part of the ongoing planning for the Project.

9.3 Construction Activities

GIFN will tender the construction activities of the Project to be undertaken by a qualified third party, as per the GIFL Procurement Principles (**Appendix S**). This includes the incorporation of Indigenous inclusion into employment opportunities whenever possible for the Project. For further information on employment for the Project, see **Section 22.3.2**.

Timing: The construction activities will be subject to seasonality and weather conditions, and specifically, work occurring in water will accommodate required seasonal timing windows set out by DFO and other relevant environmental restrictions and requirements.

The proposed construction schedule will assume that construction activities could be carried during the winter months (December to March) in compliance with jurisdictional requirements. Although delays could be anticipated during extreme weather events, such as snowstorms, heavy snow fall, etc.

A proposed Project schedule has been prepared to better understand the overall construction timeline (see **Appendix D**) and described in **Section 11**. Activities such as causeway and roadway works have been assumed to be constructed in parallel to the bridge construction.

The detailed construction schedule will be ultimately determined by the contractor in accordance with regulatory approvals.

Key Activities: To assist with the planning for the Project, a list of construction activities was identified to understand the overall construction phase. **Table C-1** below presents the proposed construction activities and their description.

Table C-1 Proposed Construction Activities

Activity	Description
Mobilization	This includes the timeline to get the Project started by bringing mechanical and logistical equipment to the construction site.
Site Preparation and Clearing	Once the appropriate environmental approvals are in place, site preparation and clearing can begin. This includes vegetation clearing, construction of the sediment and erosion control measures, construction of site hoarding, construction of the temporary site offices (including its connection to power and telecommunication), construction of temporary access roads, as well as construction of the temporary jetty mainland / island.
Earthworks (on land)	Earthworks are expected both on the mainland and island sides for the approaches and access roads, as well as for temporary workspaces, etc.
Earthworks (in water)	Earthworks in water for the crossing by the barge and placement of approximately 4.5 million m^3 of suitable fill.
Roadway Construction	This includes construction of the roadway and associated drainage and lighting infrastructure.
Causeway Construction	This includes construction of the causeway and associated drainage and lighting infrastructure.
Foundation Construction	This includes construction of the bridge foundations (piles).
Substructure Construction	This includes construction of the bridge substructure (piers/abutments).
Superstructure Construction	This includes installation of the bridge girders, the bridge deck construction and related items (concrete barriers, deck drainage, lighting, final pavement, etc.).

9.3.1 Bridge and Causeway Components and Activities

Construction of the following permanent and temporary structures is expected to be required for the Project.

Anticipated permanent structures:

- Segmental slab-on-grade and segmental bridges supported on concrete piers with caissons to bedrock below the bed of the water;
- One causeway extending from Chief Joseph Snake Road to the proposed short-span low-level bridge leading to the Sand Islands, and one causeway connecting to the proposed high-level bridge to the mainland, including rubble mound and backfill or rockfill in shallow areas;
- Culverts to allow for road water drainage and wildlife passage;
- Re-design of access roads for the north approach on the island;
- New connecting roadway to Black River Road from the south approach;
- Lighting and drainage infrastructure; and
- Entrance control on the mainland south approach.

Anticipated temporary infrastructure or workspaces:

- sediment and erosion control measures;
- site hoarding;
- site offices, including connections for power and telecommunication;
- access roads;
- shoring for construction of culverts and causeway;
- barges may be required during construction;
- laydown and staging areas on Georgina Island and the mainland; and
- moorings and docks.

A high-level list of activities expected for the construction of the bridges and causeway includes the following:

- Marine survey and confirmation of subsurface geotechnical considerations for fill to be placed;
- Earthworks:
    - Construction of foundations and piers Mass concrete to control water uplift;
    - Grading around the abutments;
    - Dewatering from inside the cofferdam to below the bottom of the concrete cap;
    - Construction of the causeway will require granular fill within permanent rubble mound;
    - Sourcing and trucking of suitable fill to mainland handling area for subsequent loading onto the barges;

- Barge operations in the water from mainland to both causeway construction areas and piers; and
- Extending all roadworks construction activities (listed below) to each end of the bridge segments of the water crossing.

Bridges: The bridge structures, comprised of South Bridge and North Bridge, will be two types: a post-tensioned segmental box girder bridge of 60 m to 150-m-long spans, and slab-on-girder bridge with spans of 45.0 m to 48.75 m, supported deep foundations to bedrock. Stainless steel reinforcing steel will be used according to Ministry of Transportation (MTO) directions and guidelines to reduce future maintenance of the structure. Ice breakers are intended to be constructed to avoid additional forces on the piers. The bridges will be designed in accordance with the requirements of Canadian Highway Bridge Design Code (CHBDC).

Preliminary geotechnical analysis determined that drilled shafts with diameters ranging from 1.2 to 1.8 m are considered the most suitable foundation solution for the bridge portion of the Fixed Link. These caissons should extend 6 m into the bedrock with a total length of about 19 m, assuming that the depth of highly weathered rock is limited to 1 m. Drilled caissons satisfying these conditions can be designed using end bearing pressures equal to 4 and 6 megapascal (MPa) at serviceability limit state (SLS) and ultimate limit state (ULS), respectively. The ongoing geotechnical investigation program will further inform these assumptions for the final design (see **Section 14.1.1**. for a detailed description of the program).

Causeways: As for the causeways portion of the Fixed Link, it was determined that top elevations ranging from +222 to 223 metres above sea level (masl) and side slopes of 1.5H:1V are expected to be adequately stable, considering the expected geotechnical conditions along the proposed alignment. This will be verified in the subsequent stages of the Project upon completion of the Project-specific geotechnical investigation.

A major part of the earthworks for the causeways and embankments will involve the sourcing and placement of suitable fill via trucking on land, and barges on water to place it. This process is a multiple step handling operation that requires substantial project controls and monitoring. The rough order of magnitude estimates of the earthworks required for the causeways is 4.5 million cubic metres (m^3), of which some 2.5 million m^3 would be installed below water surface to fill from existing bottom of Lake Simcoe. Placement of the fill would follow the horizontal alignment of the causeway and would extend to the lake bottom at a slope of 2:1 or 1.5:1. Rock type used for the fill would be a quarried material that will resist erosion and having a minimal impact on the Lake Simcoe water quality. The source of fill material will be determined during the Detailed Design phase.

Temporary works: Temporary structures relating to the construction will include cofferdams for the construction of the pier foundations and may also include trailers, sheds, and bins for various phases and staging of construction. Also, temporary moorings and docks related to construction in and on the water are expected.

9.3.2 Roadway Component and Activities

Roadworks may proceed as temporary improvements along the road corridor to accommodate the construction activities necessary for the causeways and bridges, prior to the full construction of permanent roadworks to access the water crossing.

A general list of physical activities for the roadworks are as follows:

- Earthworks
    - Protect or relocate existing electrical poles and other utilities;
    - Erosion control (e.g., silt fences, sediment pond);
    - Tree clearing and grubbing;
    - Topsoil stripping and re-use or disposal;
    - Rock excavation, to be confirmed as part of the geotechnical investigation;
    - Importing of soil to be used as fill;
    - Earth excavation and grading: approximate preliminary estimate of 650 m^3 of generated cut and approximate preliminary estimate of 10 m^3 of fill material;
- Road construction
    - Rough grading;
    - ROW configuration (approximately 18 m wide), including ditch, shoulder, and stormwater management;
    - Import granular material (e.g., for pavement structure and asphalt);
    - Intersection works at Black River Road and Bear Road (e.g., widening, turning lane, stop sign/controls, other signage, and pavement markings);
    - Culvert for existing ditches;
- Fine grading and restorations of disturbed areas with topsoil, seed/sod, additional plantings as deemed appropriate for landscape and ecology;
- Utilities
    - It is anticipated that aboveground infrastructure would include utility poles with overhead lines to extend electrical power along proposed realigned roadways to provide lighting.
- Temporary and permanent signage, and pavement markings will be required for traffic controls and roadway usage.

9.4 Operations and Maintenance Activities

Operations, monitoring and maintenance activities will be carried out throughout the life of the Fixed Link.

The Project design is not at a stage where operations and maintenance plans can be fully described; however, operation and maintenance activities for a new Fixed Link would typically include:

- Proactive maintenance and life-cycle planning, taking into consideration the applicable codes, by-laws and regulations of the authorities having jurisdiction over the Project;
- Regular maintenance and minor repairs, such as:
    - Cleaning above and below the deck, the inside box girders (if required), the waterway banks and around the foundation units;

    - Cleaning of drains;
    - Snow and ice monitoring and clearance measures
    - Snow removal;
    - Patching/re-paving, minor repainting, and expansion joints replacement; and
    - Repair cracks in the asphalt and crack sealing of concrete surfaces;
- Major rehabilitations, which typically include but are not limited to deck replacement, concrete repairs, waterproofing, structural steel repairs and painting;
- Continuous monitoring and adaptive management measures;
- Maintaining access control;
- Reporting and communications;
- Interventions in case of an accident; and
- Comprehensive detailed inspections scheduled as required for components such as lighting and overall integrity (e.g., monthly, annually, every 3 to 5 years);

It is also expected that ecological monitoring and reporting requirements will be determined in consultation with federal agencies (i.e., DFO, TC and ECCC) as part of permitting under the *Fisheries Act*, *Canadian Navigable Waters Act* and SARA.

GIFN is working to confirm the group or entity that will oversee operations and maintenance of the Fixed Link (whether an outside entity or in-house by GIFN), as well as the long-term source of funding for these activities. Final decisions regarding the operation, monitoring and maintenance of the Fixed Link will be made by the GIFN at a later date and captured in an Operations & Maintenance Management Plan.

9.5 Decommissioning

Decommissioning or abandonment are not anticipated for the proposed Project at this time, but long-term maintenance or replacement of components would be expected over the lifetime of the structure and would involve activities similar to construction.

10. MAXIMUM PRODUCTION CAPACITY

An estimate of the maximum production capacity of the project and a description of the production processes to be used.

Capacity refers to the maximum capacity based on the project's design and operating conditions, not the planned capacity of the project.

IAAC's guidance for a DPD requests an estimate of maximum production capacity of the Project and a description of the production processes to be used; however, the guidance indicates that this information may not be relevant to all project types, which is the case for the Fixed Link as it is not creating new production processes (unlike a new mine or energy generation project).

The proposed Project will provide a permanent link connecting local roads on Georgina Island to and from the mainland. Given its connections, a lane capacity of a maximum of 400 vehicles per hour on the Fixed Link is projected, similar to the typical lane capacity for a local road.

11. ANTICIPATED PROJECT SCHEDULE

The anticipated schedule for the project's construction, operation, decommissioning, and abandonment, including any expansions of the project.

This information should include the schedule for the key activities of the each of those phases.

The schedule should also take into account the anticipated time required to conduct the impact assessment, should one be required.

For the anticipated Project schedule of the sequential phases of the Project development, please refer to **Appendix D** and **Table C-2** for the summary schedule. The precise timeline as to when the sequential phases outlined in **Table C-2** can commence are contingent upon receiving the appropriate approvals from IAAC and other regulators.

Depending on the timing of such approvals, it is plausible that the Detailed Design phase could start in late 2025 and construction could start in early 2026 and be completed in 2029, as per the timeline indicated in **Appendix D**.

Table C-2 Fixed Link Project Schedule Summary

Key Project Development Phase	Timeline for Phase
Detailed Design Phase	9 months
Tendering & Award	5 months
Construction	38 months
Operation	Anticipated to be 75 to100 years of continuous operation
Decommissioning and Abandonment	Post-operation

12. PROJECT ALTERNATIVES

12.1 Alternative Means

Alternative means of carrying out the project that the proponent is considering and that are technically and economically feasible, including through the use of best available technologies.

Preliminary Alternative Route Options (2008-2020): The first stage of the alternative means assessment involved the GIFN Leadership and community examining various technically and economically feasible means of addressing the access concerns between Georgina Island and the mainland. This included the identification of alternative **routes** aimed to determine the general crossing corridor of the Project, considering the entire southern shoreline of Georgina Island and the mainland shoreline from Doyle Beach/Virginia to Duclos Point. This stage served as a preliminary evaluation of alternative means and concluded with the selection of a preferred route. See section 12.1.1 for further details.

Alternative Alignments for Preferred Route (2021-2023): The second stage of the alternative means assessment involved the identification and evaluation of alternative **alignments** for the preferred route. After selecting a preferred route in the previous stage, two initial alignments were introduced based on-site investigations, existing environmental conditions, comments received on the IPD, and feedback from regulatory agencies. These alignments were later refined and modified to minimize impacts on Sand Islands and the Georgina Island Wetland Complex, and to determine the final placement of the Fixed Link on Lake Simcoe. This stage concluded with the selection of a preferred alignment. See section 12.1.2 for further details.

Alternative Design Options for the Preferred Alignment (2024): The third and final stage of the alternative means assessment focused on further design modifications due to feedback received through continued engagement on the Project. Since the public comment period on the IPD, additional engagement has been conducted with interested members of the public, GIFN community members, non-project organizations, other Indigenous communities and the LSRCA. As a result of those discussions, additional design options were explored to address comments received. These options, which were not available at the time of the IPD preparation, are presented in section 12.1.3, along with an explanation of the selection of the preferred new **design**. Ultimately, Option 3B represents the final design of the Project and its placement between Georgina Island and the mainland.

Table C-3 provides a summary of the evolution of the various alternative means considered. For context, “routes” were the broad corridors within which several “alignments” for a fixed link could be proposed, and the “designs” were the considerations of potential Project components that would form the Fixed Link, such various types and combinations of causeways and bridge structures.

Table C-3 Summary of the Various Alternative Means Assessments for the Project

Year	Alternative Means Assessment	Change to Design of Project
2008	Preliminary Alternative Route Options	Three alternative route options for the Project were proposed in the Proposed Fixed Link Study – Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008). Refer to Section 12.1.1 for further information.
2020	Preliminary Alternative Route Options	A GIFN Community Visioning Workshop was held on January 13, 2020, to review the Preliminary Alternative Route Options. Outcome of workshop – decision made to select Alternative Route Option #3 as the **preferred route**. Refer to Section 12.1.1 for further information.
2021	Alternative Alignments for Preferred Route	Two initial alternative alignments for the preferred route were proposed[1]. Refer to Section 12.1.2.1 for further information.

[1] This was the cut-off point in time for information on alternative means to be included in the IPD that was submitted to IAAC on April 26, 2022.

Year	Alternative Means Assessment	Change to Design of Project
2022	Alternative Alignments for Preferred Route	The two initial alternative alignments from 2021 were eliminated from further consideration. Three refined alternative alignments were prepared. Refer to Sections 12.1.2.2 to 12.1.2.4 for further information.
2023	Alternative Alignments for the Preferred Route	Decision made to select Refined Alternative Alignment #2 as the **preferred alignment**. Refer to Sections 12.1.2.2 to 12.1.2.4 for further information.
2024	Alternative Design Options for the Preferred Alignment	Six alternative design options were proposed due to LRSCA and public concerns, including the originally proposed design (causeway-bridge-causeway), which is Option #1 in this assessment. Decision made to select Alternative Option #3B as the new **preferred design** for the Project, which incorporates three main sections: a bridge, a causeway, and a low-level bridge. Refer to Section 12.1.3 for further information.

12.1.1 Preliminary Alternative Route Options (2008-2020)

Starting in 2008, three alternative route options were examined and documented in the Proposed Fixed Link Study – Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008) (**Appendix A**). All three alternative route options were approximately 2,800 m in length. The options included:

Alternative Route Option #1 – Southeast Georgina Island to Duclos Point - this option offered the shortest connecting route with roads developed near each beach point;

Alternative Route Option #2 – Southwest Georgian Island to Doyle Beach/Virginia Beach – this option provided a historically shallow route between the developed on-island marina and a potential beach road allowance on the mainland; and

Alternative Route Option #3 – Southwest Georgina Island to Virginia Beach (existing ferry route) - this option used the existing ferry route as a guideline. The termination points at either end of the route belong to the Georgina Island First Nation and are currently environmentally impacted to some degree.

These three route options are described further below, and a figure showing the Preliminary Alternative Route Options is included as **Figure C-5**.

12.1.1.1 Preliminary Alternative Route Options Evaluation

Through preliminary site assessments and review of existing conditions, the preliminary alternative route options were considered for the Project. Refer to **Appendix A** for a more detailed summary of results of the alternative route options evaluation.

12.1.1.2 Alternative Route Option #1 - *Southeast Georgina Island to Duclos Point*

Alternative Route Option #1 was not considered a preferred alternative for a variety of reasons.

There are no practical connection points for a fixed link on the island or the mainland at this location. A private residential development is located on Duclos Point and a private marina is located on the island; thus, it was expected that the public resistance to this option would be extreme. Although this location had the shortest crossing point, it had the deepest water, which would potentially result in high capital costs. This alternative also had the potential to affect many designated sites and species, particularly on the mainland.

A new road connection would be required from the shore to Bear Road, a distance of about 0.5 km, and the route would need to work around the existing marina and cottage development in that area. Since the primary area of development on Georgina Island is along the west side of the island, a major upgrading of Bear Road would be required to accommodate the additional traffic from the relocated connection westerly to Chief Joseph Snake Road, a distance of about 3.5 km. A major upgrading of Duclos Point Road would also be required to accommodate the additional traffic if the connection point is relocated to Duclos Point.

In addition, land would need to be purchased on Duclos Point for access development, as well as a possible parking lot. The potential for disagreement amongst the mainland private landowners was high for this option.

Therefore, this alternative was not considered to be feasible from a natural environment, social, economic or technical perspective; and was not carried forward in the assessment.

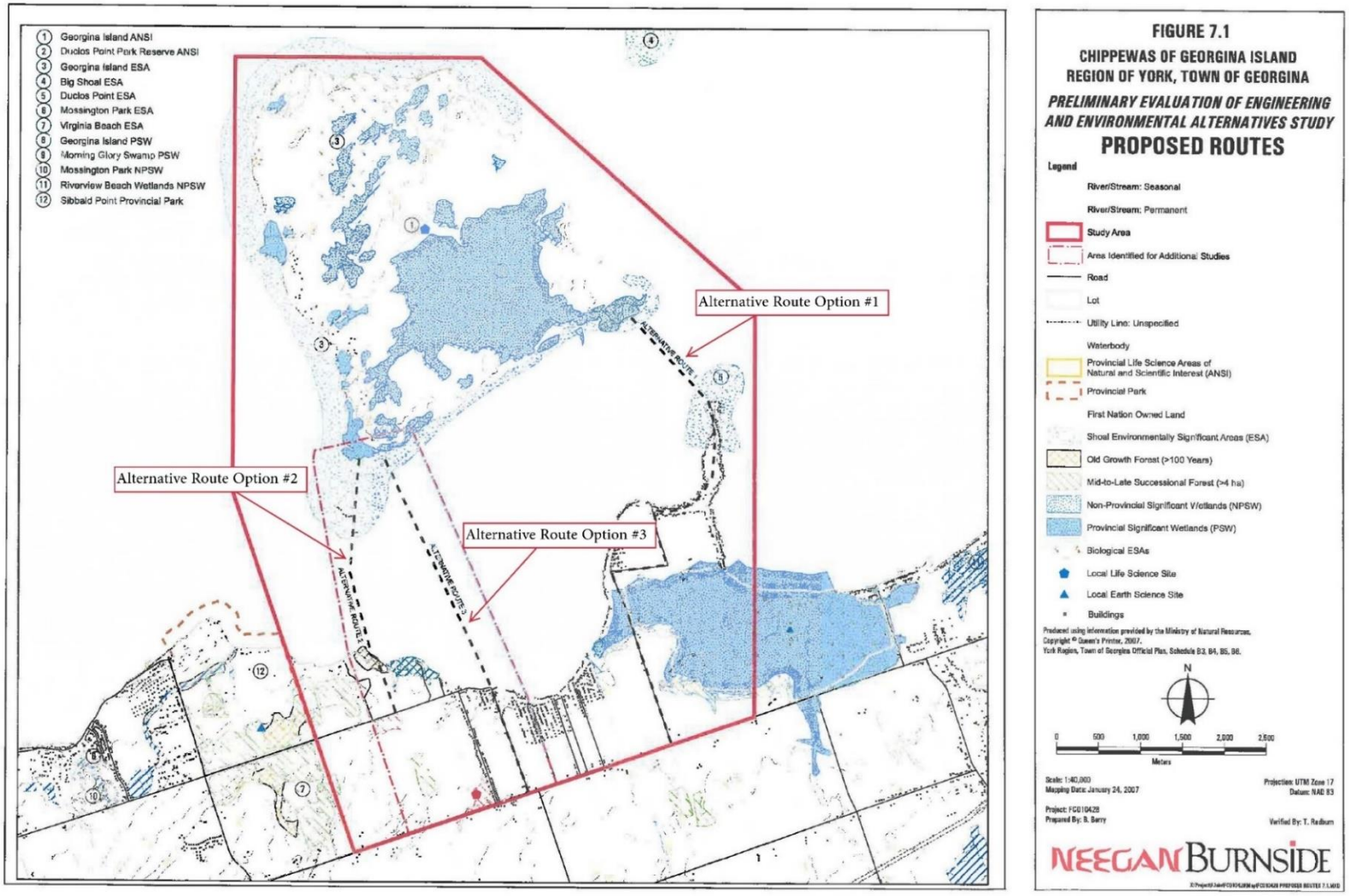

Figure C-5 Preliminary Alternative Route Options for the Project (2008) (Neegan Burnside Ltd., 2008)

12.1.1.3 Alternative Route Option #2 - Southwest Georgian Island to Doyle Beach/Virginia

Alternative Route Option #2 was considered a preferred alternative, along with Alternative Route Option #3, and was carried forward for further assessment. This alternative route fully addressed the technical needs of GIFN and was considered to possibly be financially viable, albeit with some complex technical challenges.

If the connection between Georgina Island and the mainland were relocated to Doyle Beach, the road linkage on the island would require a new road connection of about 0.3 km to connect from the shore to Chief Joseph Snake Road. The new road would traverse a PSW in this area, the effects of which would require mitigation. On the mainland, a new road connection would be required from the shore to Black River Road, a distance of about 1.0 km, over lands that are presently privately owned. Preliminary communication with the Town of Georgina indicated that this road would probably not be a municipal road, but if it were to be constructed as a municipal road that it would require the completion of a Class Environmental Assessment (Class EA) under the requirements of the *Environmental Assessment Act*. The location of this connection would also need to consider the potential for impacts to the relatively small area of old growth forest in this area.

The Town of Georgina requested that a traffic study be provided to assess the impacts on the Town's roads that may result from a fixed link and ultimate development on the Island. It also noted that the potential for impacts on land use planning on the mainland should be considered, especially if major tourist facilities are anticipated that may put pressure to locate ancillary or other types of uses on the mainland.

With the implementation of appropriate mitigation measures this alternative should have limited impacts on the natural, socio-economic/cultural environment; however, additional studies were required to accurately determine potential effects and mitigation measures.

12.1.1.4 Alternative Route Option #3 - Southwest Georgina Island to Virginia Beach (existing ferry route)

Alternative Route Option #3 was also considered a preferred alternative and was also carried forward for further assessment. This alternative route fully addressed the technical needs of the GIFN and was considered to be comparatively financially viable. Minimal land acquisition would be required for this alternative. This route is also relatively disturbed environmentally due to existing ferry activities/infrastructure; therefore, this alternative would result in relatively fewer effects to the natural environment. Based on DFO's "no net loss" policy for fish habitat, this alternative would have the lowest potential loss to fish habitat based on existing access on both mainland and island access point to the existing ferry.

Similar to Alternative Route Option #2, the Town of Georgina requested that a traffic study be provided to assess the impacts on the Town's roads that may result from a Fixed Link and ultimate development on the island. It also noted that the potential for impacts on land use planning on the mainland should be considered, especially if major tourist facilities are anticipated that may put pressure to locate ancillary or other types of uses on the mainland.

With the implementation of appropriate mitigation measures this alternative will have limited impacts on the natural, socioeconomic/cultural environment; however, additional studies were required to accurately determine potential effects and mitigation measures.

12.1.1.5 Results of Alternative Route Options Evaluation

Based on the results of the evaluation of Alternative Route Options #2 and #3, the GIFN community determined the following during the Community Visioning Workshop held in 2020:

- Alternative Route Option #2 was identified as not viable due to substantially higher costs associated with bridge construction over a much longer span and deeper waters.
- Alternative Route Option #3 was determined to leverage the Sand Islands; thereby allowing a portion of the Fixed Link to be a causeway, which would require a shorter bridge and avoid deeper waters, and ultimately be more cost-effective compared to Alternative Route Option #2.
- Alternative Route Option #3 was selected as the ***preferred route***.

12.1.2 Alternative Alignments for the Preferred Route (2021-2023)

12.1.2.1 Initial Alternative Alignments

Following the 2020 Community Visioning Workshop in which Alternate Route Option #3 was selected as the GIFN community's ***preferred route*** (i.e., the general corridor), in 2021 WSP prepared two initial alternative alignments for the preferred route as depicted in **Figure C-6.** Both alignments would provide access from the southwest shore of Georgina Island to the mainland.

A preliminary effects evaluation was undertaken for both initial alternative alignments, and the outcome of this evaluation determined that Initial Alignment #1 could impact woodlands, wetlands (currently mapped as non-PSW, but noted by the MNR to be proposed for classification as a PSW), and a tributary to Lake Simcoe. It was also determined that Initial Alignment #2 could impact a deer wintering area and woodland. As well, on the mainland side, both alignments had the potential to impact additional natural features and functions that would require further study.

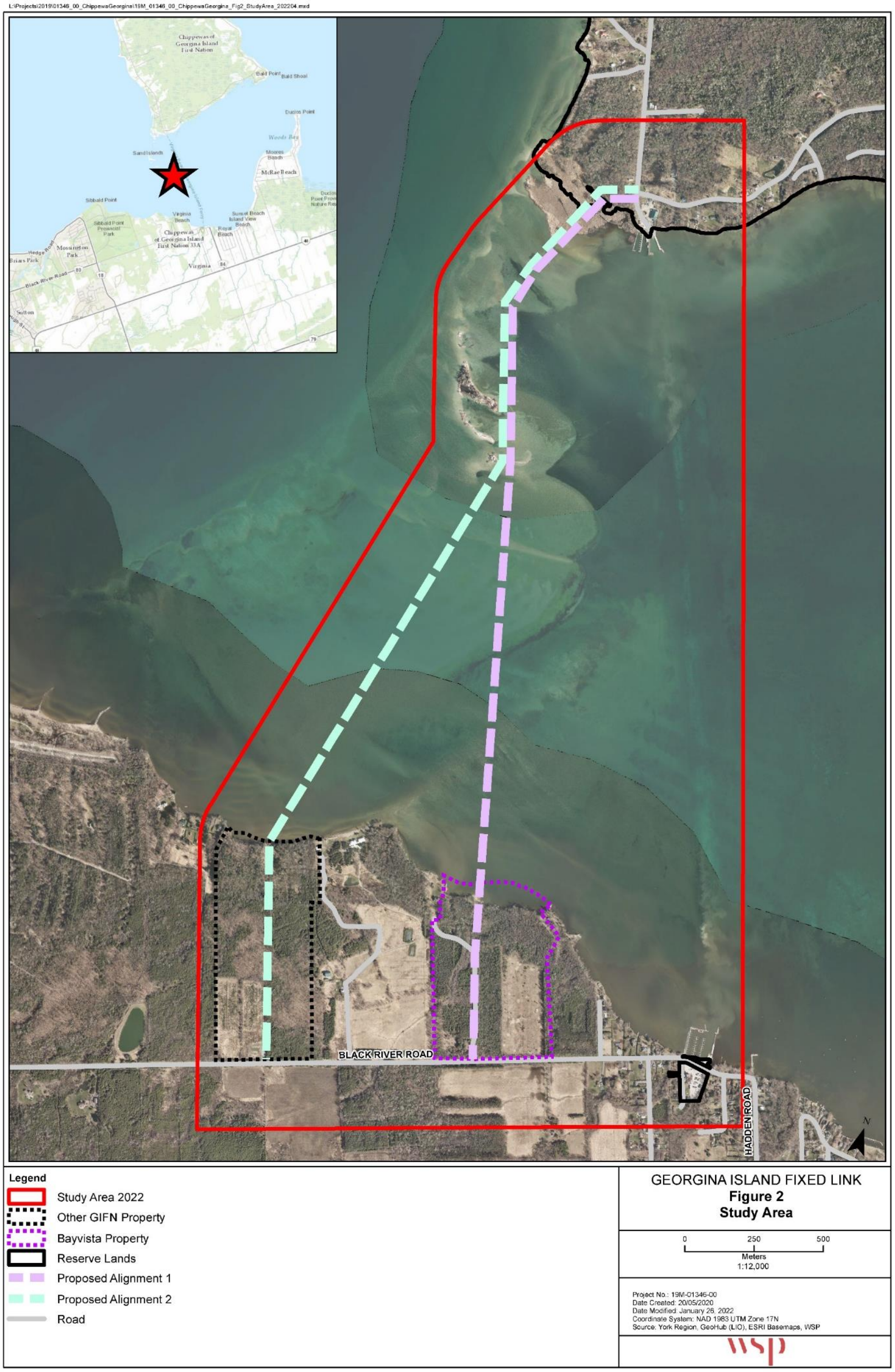

Figure C-6 Initial Alternative Alignments for the Preferred Route (2021)

In 2022, the potential impacts of both initial alternative alignments were further assessed through environmental and technical site investigations and a review of existing environmental conditions. Based on the results of the site investigations and existing environmental conditions, comments received on the IPD, and feedback collected from regulatory agencies, GIFN determined that impacts on Sand Islands and the Georgina Island Wetland Complex will need to be minimized to the extent possible.

As the significance and sensitivity of the Sand Islands and the wetlands at the south end of Georgina Island became apparent, the Project team was asked to revisit the alternative alignments and develop an option that avoided these features. As a result, the two initial alternative alignments noted above were modified, and a new third alternative alignment was introduced within the study area (see **Figure C-7**). The three refined alternative alignments generally followed the horizontal and vertical alignment of the existing gravel roads within the GIFN's West and Bayvista Properties respectively (see **Section 13** for more information on these properties). Two of the refined alternative alignments (Refined Alternative Alignment #2 and #3) largely avoided the Sand Islands and the wetlands at the south end of Georgina Island, lessening the environmental impact to these sensitive areas. The three refined alternative alignments were then evaluated to inform the selection of a preferred alignment.

12.1.2.2 Refined Alternative Alignment #1

Connection through the West Property to Black River Road on the mainland. The Fixed Link would extend over Lake Simcoe to Georgina Island via combination of bridge and causeway. A new roadway would have an approximate length of 600 m and a bridge would have an average grade of 3.0%, a nautical clearance of 10 m and an approximate length of 1030 m. A causeway and approaches would complete the remainder of the approximate 3600 m length and would make use of the shallow lakebed of the Sand Islands to reduce the amount of fill required for construction.

The Fixed Link would ultimately connect to Georgina Island through Chief Joseph Snake Road. The schematic alignment of Refined Alternative Alignment #1 is presented in **Appendix H**.

12.1.2.3 Refined Alternative Alignment #2

Connection through the West Property to Black River Road on the mainland. The Fixed Link would extend over Lake Simcoe to Georgina Island via a combination of bridge and causeway.

A new roadway would have an approximate length of 600 m and the bridge would have an average grade of 3.0%, a nautical clearance of 10 m and an approximate length of 1030 m. Two causeways and approaches would complete the remainder of the approximate 3300 m length and would make use of the shallow lakebed at the southern tip of the Sand Islands to largely avoid the Sand Islands and Georgina Island Wetland Complex, and to reduce the amount of fill required for construction when compared to Refined Alternative Alignment #1.

The Fixed Link would ultimately connect to Georgina Island through Chief Joseph Snake Road. The schematic alignment of Refined Alternative Alignment #2 is presented in **Appendix H**.

12.1.2.4 Refined Alternative Alignment #3

Connection through the Bayvista Property to Black River Road on the mainland. The Fixed Link would extend over Lake Simcoe to Georgina Island via a combination of bridge and causeway. A new roadway through the mainland would have an approximate length of 800 m and a bridge

would have an average grade of 3.0%, a nautical clearance of 10 m and an approximate length of 1030 m. A causeway and approaches would complete the remainder of the approximate 3600 m total length and would make use of the shallow lakebed at the southern tip of the Sand Islands to largely avoid the Sand Islands and Georgina Island Wetland Complex, and to reduce the amount of fill required for construction when compared to Refined Alternative Alignment #1.

The Fixed Link would ultimately connect to Georgina Island through Chief Joseph Snake Road. The schematic alignment of Refined Alternative Alignment #3 is presented in **Appendix H**.

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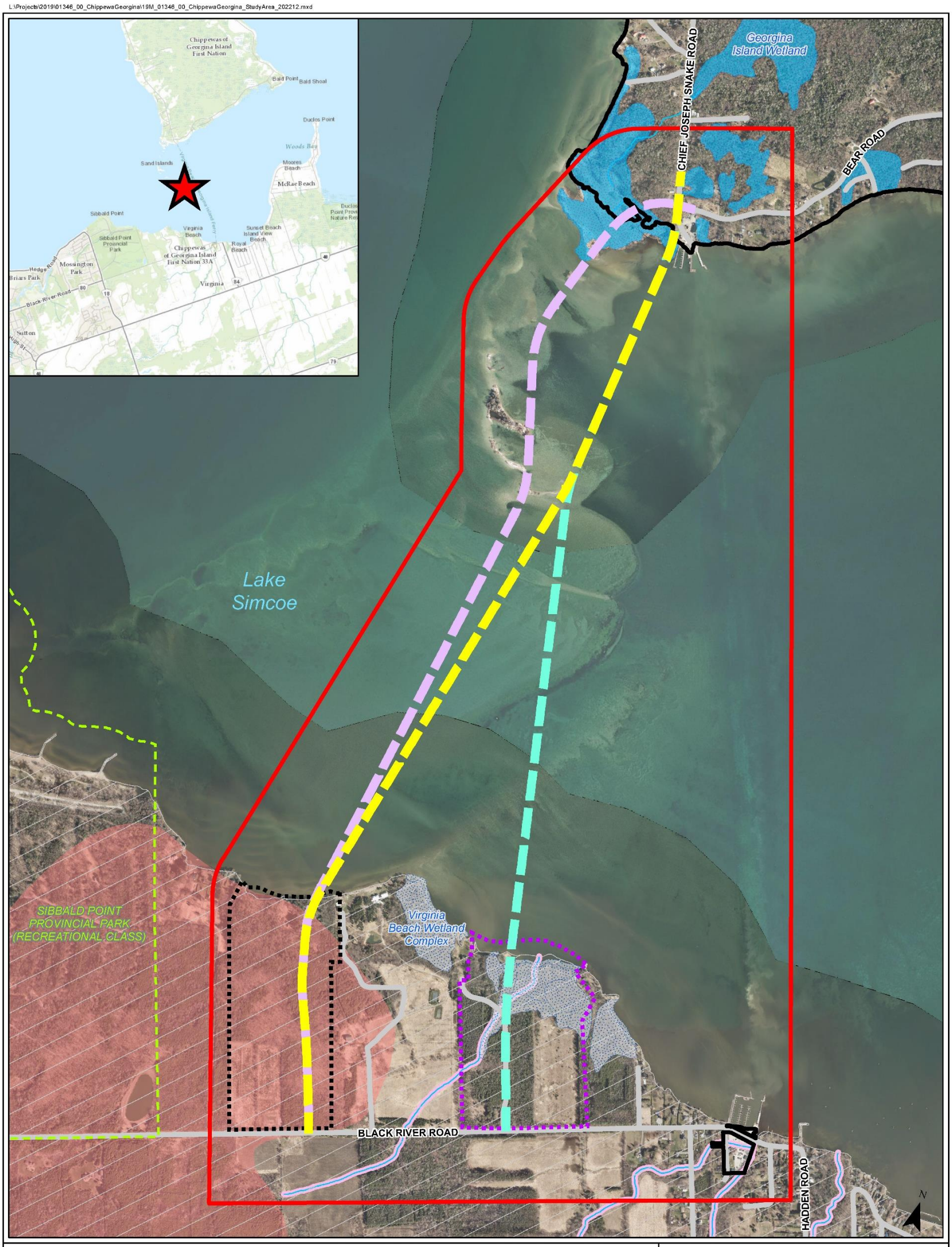


Figure C-7 Refined Alternative Alignments for the Preferred Route (2022)

12.1.2.5 Refined Alternative Alignments Evaluation

Significant analyses and studies were undertaken to finalize the selection of the new preferred alignment. The steps involved in the identification of the preferred alignment included:

- Definition of issues;
- Identification of conceptual alternative alignments to address the issues;
- Review of existing conditions to define potential constraints;
- First Nation, Agency and public consultation to further define issues and concerns;
- Assessment of potential environmental and socio-economic effects and mitigation measures;
- Evaluation of the alignments based on environmental and engineering considerations, and permitting requirements; and
- Identification of overall preferred alternative alignment.

12.1.2.6 Evaluation Criteria

In order to determine the preferred alignment, a number of criteria were considered including

- Natural Environment
    - Designated Natural Areas and SAR
    - Water Quality and Quantity
    - Significant Wildlife Habitat (SWH)
    - Fish and Aquatic Habitat
- Socioeconomic/Cultural Environment
    - Existing recreation (boating, fishing, beaches, etc.)
    - Land use consistency
    - Cultural Heritage Resources (BHR and CHL)
    - Archaeological Features
    - Visual and Aesthetics
    - Land acquisition and residential/business displacement
    - Air Quality
    - Noise and Vibration
- Technical Factors
    - Transportation Impact
    - Marine navigation
    - Impact on existing infrastructure
    - Geotechnical considerations

- Cost Factors
    - Overall cost of construction, operation, and maintenance

12.1.2.7 Evaluation Results

The evaluation was informed by preliminary site investigations and a review of existing conditions for each of the refined alternative alignments. The results of the evaluation for the refined alternative alignments are presented in **Table C-4**. Based on the evaluation of the proposed alignments, Refined Alternative Alignment #2 was selected as the ***preferred alignment***.

Table C-4 Refined Alternative Alignments Evaluation

Criteria	Refined Alternative Alignment #1	Refined Alternative Alignment #2	Refined Alternative Alignment #3
Natural Environment Rating:	Least preferred alignment from a natural environment perspective.	Preferred from a natural environment perspective	Somewhat preferred from a natural environment perspective
Designated Natural Areas & SAR	Potential effects to the following designated natural areas and SAR: Georgina Island: • Direct impacts to one PSW - Georgina Island Wetland Complex • Direct impacts to Least Bittern (Fed: Threatened [THR]; Prov: THR) Habitat • Direct impacts to Western Chorus Frog (Fed: THR) Habitat • Direct impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat Mainland – West Property: • Impacts to a provincially mapped Deer Wintering Area (Stratum II) • Direct impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat • Direct impacts to high quality SAR Bat habitat (Fed: Endangered (END); Prov: END) Potential impacts to one Butternut tree and/or its recovery habitat (Fed: END; Prov: END)	Potential effects to the following designated natural areas and SAR: Georgina Island: • Edge impacts to one PSW - Georgina Island Wetland Complex • Edge impacts to Least Bittern (Fed: THR; Prov: THR) Habitat • Edge impacts to Western Chorus Frog (Fed: THR) Habitat • Edge impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat Mainland – West Property: • Impacts to a provincially mapped Deer Wintering Area (Stratum II) • Direct impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat • Direct impacts to high quality SAR Bat habitat (Fed: Endangered (END); Prov: END) • Potential impacts to one Butternut tree and/or its recovery habitat (Fed: END; Prov: END)	Potential effects to the following designated natural areas and SAR: Georgina Island: • Edge impacts to one PSW - Georgina Island Wetland Complex • Edge impacts to Least Bittern (Fed: THR; Prov: THR) Habitat • Edge impacts to Western Chorus Frog (Fed: THR) Habitat • Edge impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat Mainland – Bayvista Property: • Direct impacts to Western Chorus Frog (Fed: THR) Habitat • Direct impacts to Eastern Whip-poor-will (Fed: THR; Prov: SC) habitat • Direct impacts to Blanding's Turtle (Fed: END; Prov: THR) Category 2 Habitat • Direct impacts to high quality SAR Bat habitat (Fed: Endangered (END); Prov: END) • Direct impacts to Candidate Wood Thrush (Fed: THR) habitat
Water Quality & Quantity	Potential effects on soils/sediments and surface water quality as a result of construction and operation. This alignment is anticipated to have the most effects to the PSW south of the Georgina Island, which in turn may indicate higher impacts to shallow groundwater. This option traverses two private properties with potential presence of private wells.	Potential effects on soils/sediments and surface water quality as a result of construction and operation. This alignment is anticipated to have negligible effects on the unevaluated wetland and PSW on the Georgina Island, which in turn may indicate smaller impacts to shallow groundwater. Avoids mainland Bayvista Property where Virginia Beach Wetland Complex (and potential shallow groundwater) is present. This alignment does not traverse private properties with potential presence of private wells on the Georgina Island.	Potential effects on soils/sediments and surface water quality as a result of construction and operation. This alignment is anticipated to have negligible effects on the unevaluated wetland and PSW on the Georgina Island, which in turn may indicate smaller impacts to shallow groundwater. This alignment does not traverse private properties with potential presence of private wells on the Georgina Island. Potential effects to Virginia Beach Wetland Complex (and potential shallow groundwater) within mainland Bayvista Property are anticipated.
Significant Wildlife Habitat	Potential effects to the following Confirmed or Candidate SWH types: Georgina Island and Sand Islands: • Turtle Overwintering – Confirmed • Amphibian Breeding (Wetlands) – Confirmed • Special Concern (SC) and Rare Wildlife Species (Great Egret, Snapping Turtle) – Confirmed	Potential effects to Confirmed or Candidate SWH: Georgina Island and Sand Islands: • Minor direct and/or indirect effects to the SWH types listed under Refined Alternative Alignment #1 are possible. Mainland – West Property: • Provincially mapped Deer Wintering Area (Stratum II)	Potential effects to Confirmed or Candidate SWH: Georgina Island and Sand Islands: • Minor direct effects and/or indirect effects to the SWH types listed under Refined Alternative Alignment #1 are possible. Mainland – Bayvista Property: • Turtle Wintering Area – Confirmed • SC and Rare Wildlife Species (Eastern Wood-pewee, Wood Thrush, Snapping Turtle) – Confirmed

Criteria	Refined Alternative Alignment #1	Refined Alternative Alignment #2	Refined Alternative Alignment #3
	• Waterfowl Stopover and Staging Area (Aquatic) - Confirmed • Colonially-Nesting Bird Breeding Habitat (Ground) - Confirmed Mainland – West Property: • Provincially mapped Deer Wintering Area (Stratum II) • Special Concern and Rare Wildlife Species (Eastern Wood-pewee) – Confirmed • Woodland Area Sensitive Breeding Bird Habitat – Candidate • Waterfowl Stopover and Staging Area (Aquatic) – Confirmed • Bat Maternity Colonies – Candidate • Raptor Wintering Area - Candidate	• Special Concern and Rare Wildlife Species (Eastern Wood-pewee) – Confirmed • Woodland Area Sensitive Breeding Bird Habitat – Candidate • Waterfowl Stopover and Staging Area (Aquatic) – Confirmed • Bat Maternity Colonies – Candidate • Raptor Wintering Area - Candidate	• Terrestrial Crayfish – Confirmed • Amphibian Breeding (Woodlands) – Confirmed • Waterfowl Stopover and Staging Area (Aquatic) – Confirmed • Terrestrial Crayfish - Confirmed • Bat Maternity Colonies – Candidate • Raptor Wintering Area - Candidate
Fish and Aquatic Habitat	Direct fish and aquatic habitat loss and fragmentation, specifically to habitat south of Georgina Island. Also crosses and directly impacts Watercourse #1. Potential effects to the following moderately sensitive areas: • Georgina Island Wetland Complex – Direct effects to the potential Northern Pike and / or Muskellunge spawning habitat (Cattail Mineral Shallow Marsh). Alignment #1 fragments and removes the largest portion of this habitat compared to the other alignments. It also crosses and would directly affect access to Watercourse #1 by fish, which would require specific mitigation. • Sand Islands Area – Direct effect (removal) to the multi-use habitat for fish spawning, rearing for young-of-the-year, refugia, and foraging. Abundant and relatively diverse aquatic vegetation communities (e.g., beds of Wild Celery, Milfoil, pondweeds).	Direct fish and aquatic habitat loss. Does not cross or directly impact Watercourse #1 (on Georgina Island) or Watercourse #2 (Bayvista Property). Potential effects to the following moderately sensitive areas: • Georgina Island Wetland Complex – Direct effects to the potential Northern Pike and / or Muskellunge spawning habitat (Cattail Mineral Shallow Marsh). The alignment runs along the east side of this habitat, minimizing fragmentation and removing only a small portion of the habitat. • Areas east and south of Sand Islands – Direct effect (removal) to the multi-use habitat for fish spawning, rearing for young-of-the-year, refugia, and foraging. Abundant and relatively diverse aquatic vegetation communities (e.g., beds of Wild Celery, Milfoil, pondweeds).	Direct fish and aquatic habitat loss. Also crosses and directly impacts Watercourse #2 (Bayvista Property). Potential effects to the following moderately sensitive areas: • Georgina Island Wetland Complex – Similar to Alignment #2, direct effects to the potential Northern Pike and / or Muskellunge spawning habitat (Cattail Mineral Shallow Marsh). The alignment runs along the east side of this habitat, minimizing fragmentation and removing only a small portion of the habitat. • Areas east of Sand Islands – Direct effect (removal) to the multi-use habitat for fish spawning, rearing for young-of-the-year, refugia, and foraging. Abundant and relatively diverse aquatic vegetation communities (e.g., beds of Wild Celery, Milfoil, pondweeds). • Crosses Watercourse #2, which would directly affect fish movement and would also remove portions of the associated wetland (Bayvista Property), which has potential Northern Pike and / or Muskellunge spawning habitat. Specific mitigation would be required. • Potential Walleye spawning habitat (Bayvista Property) – Direct effect (removal) of a small area of coarse substates (angular rock) confirmed to be anthropogenic in nature (i.e., base of old dock), that is found in the nearshore area.

Criteria	Refined Alternative Alignment #1	Refined Alternative Alignment #2	Refined Alternative Alignment #3
Socio-economic/Cultural Environment Rating:	Least preferred alignment from a socioeconomic/cultural perspective.	Preferred alignment from a socioeconomic/cultural perspective	Somewhat preferred from a socioeconomic/cultural perspective
Existing recreation (boating, fishing, beaches, etc.)	Existing boat launch and Aazhaawe Ferry landing located ~80 m of the proposed alignment on the island side. Navigation will be maintained to facilitate recreational boat traffic. This may present temporary impacts to the ability to launch recreational boats during summer months and vehicles during the winter months. No fishing area or huts are located within proximity of this alignment.	Existing boat launch and Aazhaawe Ferry landing located ~80 m of the proposed alignment on the island side. Navigation will be maintained to facilitate recreational boat traffic. This may present temporary impacts to the ability to launch recreational boats during summer months and vehicles during the winter months. A number of GIFN Perch Ice fishing huts have been located east of this alignment. These areas are not located within close proximity of the proposed alignment, as such no potential effects are anticipated to impede or hinder the GIFN community's ability to fish at these locations.	Existing boat launch and Aazhaawe Ferry landing located ~80 m of the proposed alignment on the island side. Navigation will be maintained to facilitate recreational boat traffic. This may present temporary impacts to the ability to launch recreational boats during summer months and vehicles during the winter months. A number of GIFN Perch Ice fishing huts have been located east of this alignment. These areas are not located within close proximity of the proposed alignment, as such no potential effects are anticipated to impede or hinder the GIFN community's ability to fish at these locations.
Land use consistency	Consistent with existing land use designations	Consistent with existing land use designations	Consistent with existing land use designations
Cultural Heritage Resources (BHR and CHL)	Potential impacts on cultural heritage resources including: • CHL-1 (Lake Simcoe within alignment, including marsh) Construction activities should seek to avoid direct impacts to Lake Simcoe including the shoreline as well as direct impacts the identified CHL. Where avoidance is not possible, mitigation measures should be developed in consultation with Georgina Island First Nation.	Potential impacts on cultural heritage resources including: • CHL-1 (Lake Simcoe within alignment, including marsh) Construction activities should seek to avoid direct impacts to Lake Simcoe including the shoreline as well as direct impacts the identified CHL. Where avoidance is not possible, mitigation measures should be developed in consultation with Georgina Island First Nation.	Potential impacts on cultural heritage resources including: • CHL-1 (Lake Simcoe within alignment, including marsh) Construction activities should seek to avoid direct impacts to Lake Simcoe including the shoreline as well as direct impacts the identified CHL. Where avoidance is not possible, mitigation measures should be developed in consultation with Georgina Island First Nation.
Archaeological Features	Potential impacts from construction activities on terrestrial and marine archaeological sites/resources that may be present. Areas of archaeological potential, as determined by the Stage 1 terrestrial and marine Archaeological Assessments, within the refined alternative alignment that will be impacted by construction activities should be subject to Stage 2 Archaeological Assessment to determine if archaeological resource/sites are present. If archaeological resources/sites are present, then subsequent Stage 3 Archaeological Assessment and Stage 4 Archaeological Mitigation may be required to mitigate impacts. Mitigation measures should be developed in consultation with Georgian Island First Nation.	Potential impacts from construction activities on terrestrial and marine archaeological sites/resources that may be present. Areas of archaeological potential, as determine by the Stage 1 terrestrial and marine Archaeological Assessments, within the refined alternative alignment that will be impacted by construction activities should be subject to Stage 2 Archaeological Assessment to determine if archaeological resource/sites are present. If archaeological resources/sites are present, then subsequent Stage 3 Archaeological Assessment and Stage 4 Archaeological Mitigation may be required to mitigate impacts. Mitigation measures should be developed in consultation with Georgian Island First Nation.	Potential impacts from construction activities on terrestrial and marine archaeological sites/resources that may be present. Areas of archaeological potential, as determine by the Stage 1 terrestrial and marine Archaeological Assessments, within the refined alternative alignment that will be impacted by construction activities should be subject to Stage 2 Archaeological Assessment to determine if archaeological resource/sites are present. If archaeological resources/sites are present, then subsequent Stage 3 Archaeological Assessment and Stage 4 Archaeological Mitigation may be required to mitigate impacts. Mitigation measures should be developed in consultation with Georgian Island First Nation.
Visual and aesthetics	Potential visual and aesthetic impacts, especially on the mainland side.	Potential visual and aesthetic impacts, especially on the mainland side.	Potential visual and aesthetic impacts, especially on the mainland side.
Land acquisition and residential/business displacement	No land acquisitions required. Land on both sides of the proposed Fixed Link (Georgina Island and mainland) is currently owned by the GIFN.	No land acquisitions required. Land on both sides of the proposed Fixed Link (Georgina Island and mainland) is currently owned by the GIFN.	No land acquisitions required. Land on both sides of the proposed Fixed Link (Georgina Island and mainland) is currently owned by the GIFN.

Criteria	Refined Alternative Alignment #1	Refined Alternative Alignment #2	Refined Alternative Alignment #3
Human Occupation / Air Quality	Road alignment is located within 500 m of 38 sensitive receptors, the most out of all alternatives assessed. Four (4) receptors on the mainland are located southeast and south southeast of the road alignment, within the prevailing wind direction during the summer months (i.e., July through September). Twenty-one (21) receptors are located on the Island within 500 m of the road alignment and within the north and north-northeast wind direction, which were also notable during the summer months. Four (4) receptors on the mainland are located southeast of the road alignment, within the prevailing wind direction during the winter months. No sensitive receptors are located on the Island within 500 m of the road alignment and within the prevailing wind direction (southeast) during the winter months (i.e., January through March). Road alignment option has the potential to impact a total of 25 sensitive receptors based on prevailing wind direction during the summer and winter months. Construction activities may impact sensitive receptors within 500 m of the road alignment. A construction best management practices plan (BMPP) for dust should be implemented to minimize fugitive dust impacts.	Road alignment is located within 500 m of 34 sensitive receptors, the fewest of all alternatives assessed. Road alignment is expected to impact the fewest number of receptors. Four (4) receptors on the mainland are located southeast and south southeast of the road alignment, within the prevailing wind direction during the summer months. Eighteen (18) receptors are located on the Island within 500 m of the road alignment and within the north and north northeast wind direction, which were also notable during the summer months. Four (4) receptors on the mainland are located southeast of the road alignment, within the prevailing wind direction during the winter months. No sensitive receptors are located on the Island within 500 m of the road alignment and within the prevailing wind direction (southeast) during the winter months. Road alignment option has the potential to impact a total of 22 sensitive receptors based on prevailing wind direction during the summer and winter months. Construction activities may impact sensitive receptors within 500 m of the road alignment. A construction BMPP for dust should be implemented to minimize fugitive dust impacts.	Road alignment is located within 500 m of 36 sensitive receptors. Eleven (11) receptors on the mainland are located southeast and south southeast of the road alignment, within the prevailing wind direction during the summer months. Nineteen (19) receptors are located on the Island within 500 m of the road alignment and within the north and north northeast wind direction, which were also notable during the summer months. Eleven (11) receptors on the mainland are located southeast of the road alignment, within the prevailing wind direction during the winter months. No sensitive receptors are located on the Island within 500 m of the road alignment and within the prevailing wind direction (southeast) during the winter months. Road alignment option has the potential to impact a total of 30 sensitive receptors based on prevailing wind direction during the summer and winter months, the highest of all alternatives assessed. Construction activities may impact sensitive receptors within 500 m of the road alignment. A construction best management practices plan for dust should be implemented to minimize fugitive dust impacts.
Noise and Vibration	This alignment is closest to the camp sites located on the small islands which could be impacted significantly. Construction activities may impact the nearby noise sensitive receptors within 500 m of the Project. It is recommended to develop a noise and vibration monitoring plan to reduce the impact of the Project during construction.	This alignment is farther to the camp sites on the small islands than in Refined Alternative Alignment #1. Construction activities may impact the nearby noise sensitive receptors within 500 m of the Project. It is recommended to develop a noise and vibration monitoring plan to reduce the impact of the Project during construction.	The same setback distance to the camp sites on the small islands as in Refined Alternative Alignment #2. Construction activities may impact the nearby noise sensitive receptors within 500 m of the Project. It is recommended to develop a noise and vibration monitoring plan to reduce the impact of the Project during construction.
Technical Factors Rating:	Somewhat preferred from a technical perspective	Preferred alignment from a technical perspective	Somewhat preferred from a technical perspective
Transportation Impact	On the mainland side, lane configuration for the Fixed Link at the Black River Road intersection is recommended: two-way stop control with exclusive eastbound and southbound left turn lanes and an exclusive westbound right turn lane. The exact location of the intersection will be confirmed during Detail Design. On the island side, the Fixed Link will tie into the west leg of the Chief Joseph Snake Road and Bear Road intersection. The recommended control type is an all-way stop. This is the longest alignment; however, differences in travel time would be negligible (i.e., less than 20 seconds).	On the mainland side, lane configuration for the Fixed Link at the Black River Road intersection is recommended: two-way stop control with exclusive eastbound and southbound left turn lanes and an exclusive westbound right turn lane. The exact location of the intersection will be confirmed during Detail Design. On the island side, the Fixed Link will tie into the west leg of the Chief Joseph Snake Road and Bear Road intersection. The recommended control type is a two-way stop. This is the second longest alignment; however, differences in travel time would be negligible (i.e., less than 20 seconds).	On the mainland side, lane configuration for the Fixed Link at the Black River Road intersection is recommended: two-way stop control with exclusive eastbound and southbound left turn lanes and an exclusive westbound right turn lane. The exact location of the intersection will be confirmed during Detail Design. On the island side, the Fixed Link will tie into the west leg of the Chief Joseph Snake Road and Bear Road intersection. The recommended control type is a two-way stop. This is the shortest alignment and differences in travel time would be negligible (i.e., less than 20 seconds).

Criteria	Refined Alternative Alignment #1	Refined Alternative Alignment #2	Refined Alternative Alignment #3
Marine navigation	To be maintained through bridge section.	To be maintained through bridge section.	To be maintained through bridge section.
Impact on existing infrastructure (water intakes, sewage outfalls, servicing corridors, etc.)	Locations of existing infrastructure and utilities to be confirmed in future studies and as the design progresses. Mitigation impacts to existing infrastructure and utilities will be proposed at a later stage of the Project.	Locations of existing infrastructure and utilities to be confirmed in future studies and as the design progresses. Mitigation impacts to existing infrastructure and utilities will be proposed at a later stage of the Project.	Locations of existing infrastructure and utilities to be confirmed in future studies and as the design progresses. Mitigation impacts to existing infrastructure and utilities will be proposed at a later stage of the Project.
Geotechnical considerations (rock, swamp, stability of marine bed, bridge foundations, impact on coastal process, etc.)	Preliminary geotechnical investigation to be completed as part of future feasibility study to confirm geochemical constraints. New road connection crosses PSW on Georgina Island (organic soil) and road upgrading crosses PSW on the mainland side (organic soil). No alignment preference in light of the limited available information, which indicates relatively similar subsurface conditions along the three alignment options.	Preliminary geotechnical investigation to be completed as part of future feasibility study to confirm geochemical constraints. Road upgrading crosses PSW on the mainland side (organic soil). No alignment preference in light of the limited available information, which indicates relatively similar subsurface conditions along the three alignment options.	Preliminary geotechnical investigation to be completed as part of future feasibility study to confirm geochemical constraints. Road upgrading crosses significant wetland on the mainland side (organic soil). No alignment preference in light of the limited available information, which indicates relatively similar subsurface conditions along the three alignment options.
Cost Factors *rating:*	Preferred alignment from a cost perspective	Somewhat preferred from a cost perspective	Somewhat preferred from a cost perspective
Overall cost of construction, operation, and maintenance	Low	Moderate – High	Moderate
Recommended Route Alignment	Least preferred alignment	Most preferred alignment	Somewhat preferred alignment

12.1.3 Alternative Design Options for Preferred Alignment (2024)

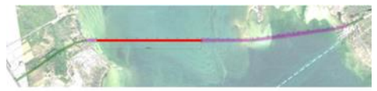
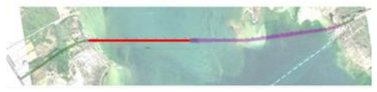
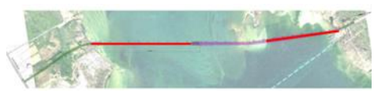
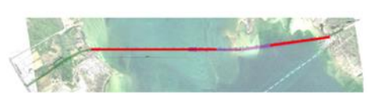
Refined Alternative Alignment #2, which originated on the West Property and mostly avoided the sand islands and wetlands had been selected as the preferred alignment and thus was included as the proposed design option for the Project earlier in the development of the draft DPD. However, during the comment period and subsequent engagement with stakeholders including the public and the LSRCA, it was determined that further refinements were required to further minimize environmental and social concerns.

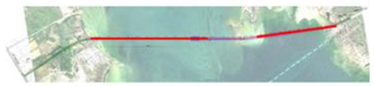
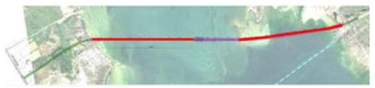
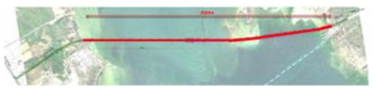
As a result, the Project team proposed alternatives to the design submitted in the IPD (i.e., the causeway-bridge-causeway; referred to herein as “Option 1”), and refined the preferred alignment to accommodate modified designs that address the comments received and eliminate or mitigate the concerns. The design options proposed are summarized in **Table C-5**.

12.1.3.1 Results of the Alternative Design Options for the Preferred Alignment

Option 3B (**Figure C-8**) was selected as the ***preferred design***. The newly proposed alignment and design approach for the Fixed Link described in this DPD has been optimized to minimize the impact on the environment and the ecosystem, while maintaining the fiscal viability and feasibility of the project.

Table C-5 Alternative Design Evaluation

Option	Segment Lengths (m)	Causeway footprint on lake bottom (m^2)	Technical Comments	Ecology Comments	Ecology Ranks	Coastal Comments	Coastal Ranks
1	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1050 m (high-level) Causeway: 1450 m	40,300 	Base design from IPD	Design includes three (3) equalization culverts (water flow) and three (3) wildlife culverts (fish passage) within causeway. High-level bridge typically spans low sensitivity aquatic ecology area. Causeway crosses moderate sensitivity aquatic ecology and moderate and high concern terrestrial ecology areas. Causeway length >400 m could trigger additional federal IA requirement	6	Potential for sedimentation on the west of the mainland causeway and erosion on the east of the mainland causeway. Potential for sedimentation on the east of the island causeway. Culverts on the island causeway would improve the circulation between sand islands and causeway.	6
2	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1050 m (high-level) Causeway: 1450 m	40,300 	Potential additional footprint on shore due to increased fill height on approach to bridge.	Design includes three (3) equalization culverts (water flow) and three (3) wildlife culverts (fish passage) within causeway. Design reduces impact to moderate sensitivity aquatic ecology and moderate and high concern terrestrial ecology areas at south shore by replacing short length of causeway with bridge structure. Main causeway is lengthened by same amount but within low sensitivity aquatic ecology and low concern terrestrial ecology areas. Causeway length >400 m could trigger additional IA requirement	5	This option would increase sedimentation compared to base design by having the causeway in the deeper portion of the lake and no sedimentation on mainland shoreline compared to the base design.	5
3	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1050 m (high-level) + 700 m (low level) Causeway: 750 m	20,900 	Potential additional footprint on shore due to increased fill height on approach to bridge. Low-level bridge profile set approximately 6m above high-water line. Assume 60m spacing for bridge spans/piers.	Greatly reduces impact to moderate sensitivity aquatic ecology compared to base design and would also reduce impacts to moderate and high concern terrestrial ecology areas at north shore and between sand islands and north shore by replacing portion of the causeway with low-level bridge structure. Causeway length >400 m could trigger additional federal IA requirement.	4	This option would increase sedimentation compared to base design by having the causeway in the deeper portion of the lake and less sedimentation on northern section of the island causeway as the bridge would facilitate the sediment passage.	4
3A	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1500 m (high-level) + 500 m (low level) Causeway: 500 m	20,900 	Potential additional footprint on shore due to increased fill height on approach to bridge. Low-level bridge profile set approximately 6 m above high-water line. Assume 60 m spacing for bridge spans/piers.	Greatly reduces impact to moderate sensitivity aquatic ecology compared to base design and would also reduce impacts to moderate and high concern terrestrial ecology areas at north shore and between sand islands and north shore by replacing portion of the causeway with low-level bridge structure. Causeway length >400 m could trigger additional federal EA requirement.	3	Optimal option from coastal perspective. Better option from a flow circulation perspective. This option would limit sedimentation compared to Option 3.	1
3B	Approach roadway: 900 m (south) + 100 m (north)	20,900	Potential additional footprint on shore due	Greatly reduces impact to moderate sensitivity aquatic ecology compared to base design and would also reduce impacts to moderate and high concern terrestrial ecology areas at north	2	This option would MAINTAIN sedimentation compared to base design by having the causeway	2

Option	Segment Lengths (m)	Causeway footprint on lake bottom (m^2)	Technical Comments	Ecology Comments	Ecology Ranks	Coastal Comments	Coastal Ranks
	Bridge: 1500 m (high-level) + 500 m (low level) Causeway: 500 m		to increased fill height on approach to bridge. Low-level bridge profile set approximately 6m above high-water line. Assume 60 m spacing for bridge spans/piers.	shore and between sand islands and north shore by replacing portion of the causeway with low-level bridge structure. Causeway length >400 m could trigger additional federal IA requirement.		in the deeper portion of the lake and facilitate the sediment transport through northern bridge.	
4	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1050 m (high-level) + 1050 m (low level) Causeway: 400 m	11,100 	Potential additional footprint on shore due to increased fill height on approach to bridge. Low-level bridge profile set approximately 6 m above high-water line. Assume 60 m spacing for bridge spans/piers.	Optimal Option from Ecology perspective. This option significantly reduces impact to moderate sensitivity aquatic ecology compared to base design and would also significantly reduce impacts to moderate and high concern terrestrial ecology areas at north shore and between sand islands and north shore by replacing portion of the causeway with low-level bridge structure. Causeway length <400m would potentially avoid additional federal IA requirement.	1	This option would increase sedimentation compared to Option 3B by having the causeway in the deeper portion of the lake	3
5	Approach roadway: 900 m (south) + 100 m (north) Bridge: 1050 m (high-level) + 1450 m (low level) Causeway: 0	0 	The option would include a constant bridge from the mainland to the island. Stormwater would not be able to be treated prior to outletting into the lake. Low-level bridge profile set approximately 6 m above high-water line. Assume 60 m spacing for bridge spans/piers.	Optimal Option but not considered as option is above affordability cap	N/A	Optimal Option but not considered as option is above affordability cap	N/A

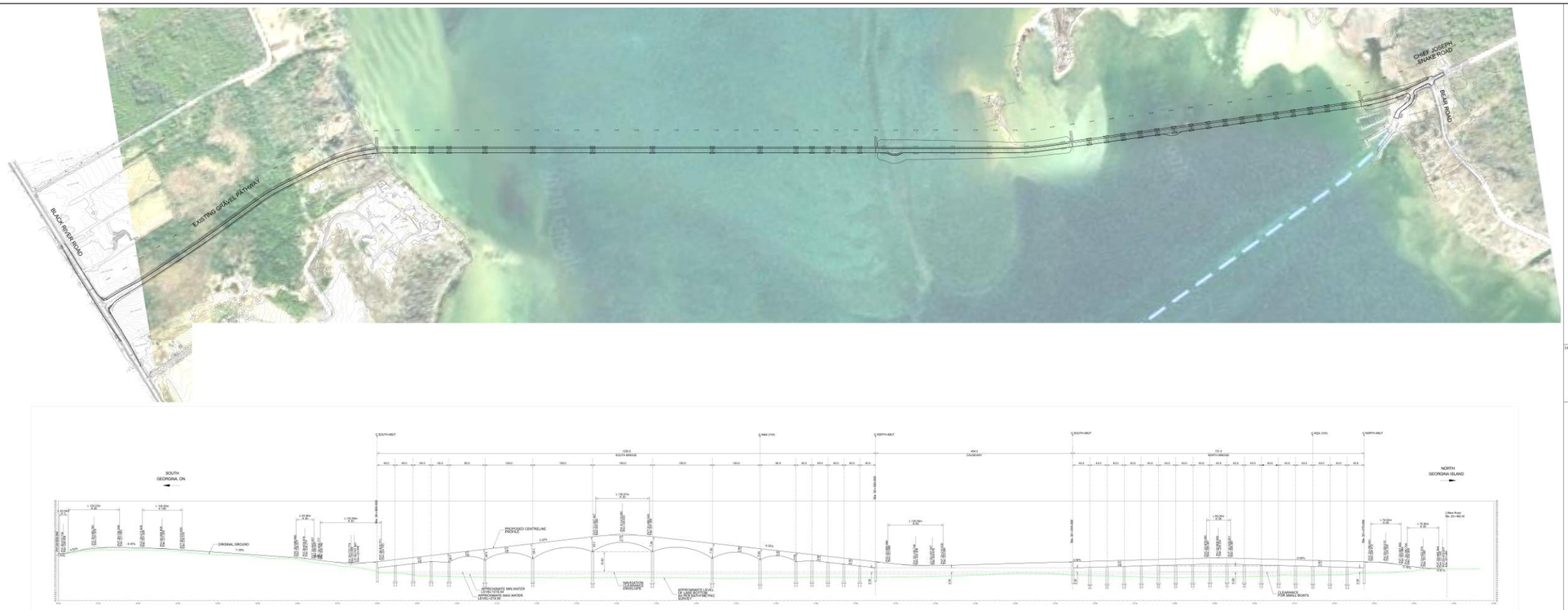


Figure C-8 Conceptual Design for Option 3B (2024)

12.2 Alternatives to the Project

Alternatives to the project that the proponent is considering, that are technically and economically feasible and directly related to the project.

The Agency recognizes that a proposed project may be in the early stages of planning when a Detailed Project Description is being prepared. Proponents may not have made final decisions and several alternatives may exist for project components (e.g., placement of infrastructure, technologies to be employed). In these situations, proponents are strongly encouraged to identify the alternatives under consideration in the Detailed Project Description. Proponents should contact the Agency for further guidance in this area prior to the submission of the Detailed Project Description.

Alternative means are the various ways, including through the use of best available technologies, that would allow a designated project and its physical activities to be carried out.

Alternatives to the project are functionally different ways to meet the need for the project and achieve its purpose.

Various alternatives to the Project were explored through studies and preliminary analyses with GIFN and presented in the Proposed Fixed Link Study – Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008) (**Appendix A**).

The seven potential alternatives from this preliminary evaluation included:

1. **Do nothing** – maintain the status quo
2. **Improve existing ferry and ice road operations** – including but not limited to larger ferry (capacity), improved ferry schedule (frequency), use of ice breakers and/or bubble system (bottom-lying pipe used to release air bubbles along the length of the passage), creating a priority wait line for members of the GIFN, electric ferry, increasing the ferry frequency, having multiple ferries in operation, etc.
3. **Existing ferry and/or hovercraft** – maintain existing ferry service and/or use hovercraft as alternative transport mode
4. **Existing ferry and/or helicopter** – maintain existing ferry service and/or use helicopter as alternative transport mode
5. **Existing ferry and cable car** – maintain existing ferry service and use a passenger cable car system as an alternative transportation mode
6. **Road link tunnel** – Fixed Link via a tunnel under Lake Simcoe
7. **Road link bridge and/or causeway combination** – Fixed Link via a pontoon or pier bridge structure and/or causeway combination.

Following the 30-day public review of the IPD, three additional potential alternatives were proposed, which included:

8. **A bridge** – e.g., one with a greater emphasis on active transportation, or a covered bridge to reduce need for maintenance such as de-icing and snow clearing
9. **Methods to maintain an open passage year–round for the existing ferry** – e.g., ice breakers, underwater bubblers

10. **A bridge and tunnel combination** – Fixed Link via a pontoon or pier bridge structure and/or tunnel combination.

As a result, the above-listed ten potential alternatives to the Project were all further evaluated, and the outcome of this analysis is included in Table C-6.

The seventh alternative (Road link bridge and/or causeway combination) was selected as the preferred alternative.

12.2.1 Do Nothing – Not a Preferred Alternative

The GIFN did not consider doing nothing as a preferred alternative because the Aazhaawe Ferry is nearing the end of its lifecycle and would ultimately leave GIFN and cottagers on Georgina Island with no alternative to cross Lake Simcoe. Although cost-effective in the short-term, continued reliance on a ferry nearing the end of its lifecycle would not solve the issues involving food security, access, health and safety, and more. The Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008) describes the option to do nothing as not adequately addressing the transportation needs of GIFN. The report states that an ideal solution would provide a reliable all-weather transportation link from Georgina Island to the mainland, which would deliver positive benefits in health and safety, economic development, and employment for the community. As such, the “do nothing” option does not satisfy the purpose and rationale for the Project.

12.2.2 Improve Existing Ferry and Ice Road Operations – Not a Preferred Alternative

The GIFN did not consider continuing and improving existing ferry operations and relying on ice roads during winter months as a preferred alternative. Reliance on a ferry is unsustainable, especially considering that the ferry is nearing the end of its lifecycle and continues to be a costly measure for travel. The Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008) describes the option to improve existing ferry and ice road operations and described the issue of pack ice and corridor movement as being an ongoing issue. Health, safety, food security and general access issues in winter months would continue to persist. Furthermore, no system exists which could better institute the ice road system. Due to ice conditions and the depth of the channel, a bubble system for ice road transportation would not be feasible. Therefore, this alternative is not technically feasible and has potential impacts on aquatic habitat and existing recreation. This alternative does not fully address the purpose and rationale for the Project.

12.2.3 Existing Ferry and/or Hovercraft – Not a Preferred Alternative

The ‘existing ferry and/or hovercraft’ was not considered a preferred alternative. Hovercraft can operate over both water and land, including ice, and would be able to provide year-round service, however hovercraft have limited combined passenger and vehicle capacity (assuming relatively minimal additional infrastructure requirements) (Neegan Burnside Ltd., 2008). The provision of a hovercraft passenger service is usually only economically viable on high demand routes where travel speed is important. This mode of transportation includes extremely high capital and specialized operations and maintenance staff that are not available to Georgina Island (Neegan Burnside Ltd., 2008). Therefore, this alternative is not technically or financially feasible and may have potential impacts on the natural aquatic environment.

12.2.4 Existing Ferry and/or Helicopter – Not a Preferred Alternative

The ‘existing ferry and/or helicopter’ was not considered a preferred alternative. Helicopter can provide year-round service however has limited passenger capacity and no vehicle capacity. The provision of helicopter passenger service is very expensive due to the high capital and operating/maintenance costs (Neegan Burnside Ltd., 2008). Therefore, this alternative is not technically or financially feasible and may have potential impacts on the natural environment as a result of additional infrastructure requirements (Neegan Burnside Ltd., 2008). As this alternative has no vehicle capacity it does not fully address the purpose/rationale for the Project.

12.2.5 Maintain Existing Ferry and Cable Car – Not a Preferred Alternative

The ‘existing ferry and cable car’ was not considered a preferred alternative. Although the cable car can provide year-round service it has no vehicle capacity and the speed of transportation is relatively slow (Neegan Burnside Ltd., 2008). The provision of a cable car service is expensive due to the high and specialized operating/maintenance costs; therefore, this alternative is not technically or financially feasible and may have potential impacts on the natural environment as a result of infrastructure requirements (Neegan Burnside Ltd., 2008). As this alternative has no vehicle capacity it does not fully address the purpose/rationale for the Project.

12.2.6 Road Link Tunnel – Not a Preferred Alternative

The ‘road link (tunnel)’ was not considered a preferred alternative. The provision of a Fixed Link through a tunnel to the island is very expensive due to the extremely high capital costs (Neegan Burnside Ltd., 2008). Therefore, this alternative is not financially feasible and may have potential impacts on the natural environment. On the other hand, the tunnel must be dug significantly deep under the lakebed, 8 to10 m, due to the proposed Project location in Lake Simcoe. Excavation for the tunnel cannot be done with open cut processes due to the aquatic nature of the Project location and would require an auger to undertake to excavate for the tunnel, adding significant cost to the Project. This alternative does not fully address the purpose and rationale for the Project.

12.2.7 Road Link Bridge and/or Causeway Combination – PREFERRED ALTERNATIVE

The ‘road link (bridge and/or causeway combination)’ was considered the ***preferred alternative*** which has been carried forward. This is based on the preliminary technical evaluation and was the preferred option gathered from the community survey (Neegan Burnside Ltd., 2008). The provision of a Fixed Link through a bridge/causeway combination fully addresses the technical needs of the GIFN and would be financially viable. As well, this option requires minimal specialization for operations. With the implementation of appropriate mitigation measures this alternative will have limited impacts on the natural and socioeconomic/cultural environment.

A roadway network including a combination of bridge and causeway would provide more reliable health care services to GIFN including quicker ambulance service (especially during winter months), more reliable scheduling to accommodate visiting health practitioner travel and improved food security and easier and safer general access to Georgina Island in winter months. Equally important is that the combination of a bridge and causeway would dramatically improve the safety of accessing the island from the mainland during winter months. Constructing a causeway along the Sand Islands takes advantage of local geography to reduce

the length of the in-water bridge, therefore leading to fewer environmental impacts and greater cost-savings than using a bridge alone.

12.2.8 A Bridge – Not a Preferred Alternative

The ‘bridge’ was not considered a preferred alternative. Various types of bridges were explored, including covered bridge and uncovered bridge. The covered bridge option poses a number of structural challenges, including the additional load required which will be much heavier and require a larger foundation. A covered bridge much be constructed to withstand the lake’s winds, which would require even stronger/larger foundations. A bridge also includes a number of structural challenges mainly due to the low depth of the Lake Simcoe waters near the shorelines. A bridge alone will not allow the Fixed Link to meet the minimum clearance requirements for navigation. Due to the current slope levels on the shorelines on the island and mainland sides, stockpiling and backfilling will be required, which can impact existing aquatic and terrestrial habitat and species. Therefore, this alternative does not fully address the purpose and rationale for the Project.

12.2.9 Maintain an Open Passage Year-Round for the Ferry – Not a Preferred Alternative

The ‘maintaining an open passage year-round for the ferry’ was not considered a preferred alternative. Various methods to maintaining an open passage for the ferry were explored, such as ice breakers and underwater bubblers; and were determined to not meet the objective of the Project. This option will still have members of the GIFN and other island goers at the mercy of weather conditions, such as high winds and extreme snow fall. The issue of pack ice and corridor movement will remain an ongoing issue. Health, safety, food security and general access issues in winter months would continue to persist. Furthermore, no system exists which could better institute the ice road system. Due to ice conditions and the depth of the channel, a bubble system for ice road transportation would not be feasible nor cost effective. Therefore, this alternative is not technically feasible and has potential impacts on aquatic habitat and existing recreation. This alternative does not fully address the purpose and rationale for the Project.

12.2.10 A Bridge and Tunnel Combination – Not a Preferred Alternative

The ‘bridge and tunnel combination’ was not considered a preferred alternative. Challenges described in the ‘bridge’ and ‘road link tunnel’ options apply to this option as well. Please refer to the previous sections.

Table C-6 Evaluation of Potential Alternatives to the Project

#	Potential Alternatives to the Project	Health and Safety Impacts of the Alternative	Social Impacts of the Alternative	Economic Impacts of the Alternative	Environmental Impacts of the Alternative	Cost and Viability of Undertaking the Alternative	Result of Evaluation
1	Do Nothing – Maintain Use of Existing Ferry	Does not address the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Does not address the need of the Project to improve the social conditions of GIFN members with better access to emergency services and food security.	Does not address the need of the Project to improve the economic conditions of GIFN members with better access to mainland employment opportunities.	Limited environmental impacts in maintaining use of existing ferry, aside from existing potential impacts associated with this mode of travel (e.g., fuel leak).	The existing ferry can provide seasonal service, during months without ice build-up in Lake Simcoe. However, the existing ferry is nearing the end of its lifecycle, and it is not sustainable for future generations to continue to rely on a ferry as a mode of transportation. Cost-effective by maintaining status quo. Conclusion: Does not address the need for the Project.	Not a Preferred Alternative
2	Improve Existing Ferry (larger capacity ferry and/or improved frequency in ferry schedule) + Use of Ice Road Operations in Winter Months	Does not address the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Somewhat addresses the need of the Project to improve the social conditions of GIFN members by providing slightly better access to emergency services and food security, but not my much.	Somewhat addresses the need of the Project to improve the economic conditions of GIFN members by providing slightly better access to mainland employment opportunities, but not by much.	Limited environmental impacts in maintaining use of existing ferry, aside from existing potential impacts associated with this mode of travel (e.g., fuel leak).	The existing ferry can provide seasonal service, during months without ice build-up in Lake Simcoe. However, the existing ferry is nearing the end of its lifecycle, and it is not sustainable for future generations to continue to rely on a ferry as a mode of transportation. A larger capacity ferry, and/or an improved schedule to allow for increased frequency of the ferry service would not address the underlying access issues associated with using a ferry as a mode of transportation. Using an ice road during winter months is not reliable as a mode of transportation, and still negatively impacts the health and safety of GIFN members crossing Lake Simcoe during winter months, with the potential for accidents. Costs would increase with improving existing ferry operations by procuring a larger ferry, and/or having multiple ferries to improve the schedule of the service. Conclusion: Not technically feasible, and does not address the need for the Project.	Not a Preferred Alternative

#	Potential Alternatives to the Project	Health and Safety Impacts of the Alternative	Social Impacts of the Alternative	Economic Impacts of the Alternative	Environmental Impacts of the Alternative	Cost and Viability of Undertaking the Alternative	Result of Evaluation
3	Maintain Use of Existing Ferry + New Hovercraft	Somewhat addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe; however, there is limited passenger and vehicle capacity.	Somewhat addresses the need of the Project to improve the social conditions of GIFN members by providing better access to emergency services and food security; however, there is limited passenger and vehicle capacity.	Somewhat addresses the need of the Project to improve the economic conditions of GIFN members by providing better access to mainland employment opportunities; however, limited there is limited passenger and vehicle capacity.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the development of new infrastructure that would be required to support a hovercraft as a mode of transportation.	A hovercraft can provide year-round service and operate over land, water and ice; however, there is limited passenger capacity and vehicle capacity in using a hovercraft as a mode of transportation. There are high costs associated with using a hovercraft as a mode of transportation (i.e., capital cost, operating cost, and maintenance cost). Hovercrafts are only financially viable on high-demand travel routes where travel speed is important. Conclusion: Not technically or financially feasible.	Not a Preferred Alternative
4	Maintain Use of Existing Ferry + New Helicopter	Somewhat addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe; however, there is limited passenger capacity and no vehicle capacity.	Somewhat addresses the need of the Project to improve the social conditions of GIFN members by providing better access to emergency services and food security; however, there is limited passenger capacity and vehicle no capacity.	Somewhat addresses the need of the Project to improve the economic conditions of GIFN members by providing better access to mainland employment opportunities; however, limited there is limited passenger capacity and vehicle capacity.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the development of new infrastructure that would be required to support a helicopter as a mode of transportation.	A helicopter can provide year-round service; however, there is limited passenger capacity and no vehicle capacity in using a helicopter as a mode of transportation. There are high costs associated with using a helicopter as a mode of transportation (i.e., capital cost, operating cost, and maintenance cost). Conclusion: Not technically or financially feasible.	Not a Preferred Alternative
5	Maintain Use of Existing Ferry + New Cable Car	Somewhat addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe; however, there is limited passenger capacity and no vehicle capacity.	Somewhat addresses the need of the Project to improve the social conditions of GIFN members by providing better access to emergency services and food security; however, there is limited passenger capacity and vehicle no capacity.	Somewhat addresses the need of the Project to improve the economic conditions of GIFN members by providing better access to mainland employment opportunities; however, limited there is limited passenger capacity and vehicle capacity.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the development of new infrastructure that would be required to support a cable car as a mode of transportation.	A cable car can provide year-round service; however, there is limited passenger capacity and no vehicle capacity in using a helicopter as a mode of transportation. There are high costs associated with using a helicopter as a mode of transportation (i.e., capital cost, operating cost, and maintenance cost). Conclusion: Not technically or financially feasible.	Not a Preferred Alternative
6	Fixed Link via tunnel under Lake Simcoe	Addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Addresses the need of the Project to improve the social conditions of GIFN members, by providing reliable and consistent access to emergency services and food security.	Addresses the need of the Project to improve the economic conditions of GIFN members, by providing reliable and consistent access to mainland employment opportunities.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the excavation and development of the tunnel.	A tunnel must be dug significantly deep under the lakebed due to the project location in Lake Simcoe. An open cut process for excavation cannot be undertaken due to the aquatic nature of the project location, and would require an auger to excavate the tunnel.	Not a Preferred Alternative

#	Potential Alternatives to the Project	Health and Safety Impacts of the Alternative	Social Impacts of the Alternative	Economic Impacts of the Alternative	Environmental Impacts of the Alternative	Cost and Viability of Undertaking the Alternative	Result of Evaluation
						There are high costs associated with using a tunnel as a mode of transportation (i.e., capital cost and construction cost via an auger) Conclusion: Not technically or financially feasible.	
7	Fixed Link via road and causeway combination	Addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Addresses the need of the Project to improve the social conditions of GIFN members, by providing reliable and consistent access to emergency services and food security.	Addresses the need of the Project to improve the economic conditions of GIFN members, by providing reliable and consistent access to mainland employment opportunities.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the development of new infrastructure for a bridge, as stockpiling and backfilling would be required.	A roadway network including a combination of bridge and causeway would provide more reliable health care services to GIFN including quicker ambulance service (especially during winter months), more reliable scheduling to accommodate visiting health practitioner travel and improved food security and easier and safer general access to Georgina Island in winter months. Equally important is that the combination of a bridge and causeway would dramatically improve the safety of accessing the island from the mainland during winter months. Constructing a causeway along the Sand Islands takes advantage of local geography to reduce the length of the in-water bridge, therefore leading to fewer environmental impacts and greater cost-savings than using a bridge alone. Conclusion: Addresses the need of the project, and is technically and financially viable.	Preferred Alternative
8	Fixed Link via a bridge	Addresses the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Addresses the need of the Project to improve the social conditions of GIFN members, by providing reliable and consistent access to emergency services and food security.	Addresses the need of the Project to improve the economic conditions of GIFN members, by providing reliable and consistent access to mainland employment opportunities.	Potential for environmental impacts to existing aquatic and terrestrial habitats, resulting from the development of new infrastructure for a bridge, as stockpiling and backfilling would be required.	There are structural and foundation challenges in solely using a bridge as a mode of transportation, due to the low depth of water near the shoreline of Georgina Island and the mainland. Multiple bridge types were explored, and a covered bridge option would require a larger foundation. A bridge would also not allow for the Fixed Link to meet minimum clearance required for navigation. Conclusion: Not technically feasible.	Not a Preferred Alternative

#	Potential Alternatives to the Project	Health and Safety Impacts of the Alternative	Social Impacts of the Alternative	Economic Impacts of the Alternative	Environmental Impacts of the Alternative	Cost and Viability of Undertaking the Alternative	Result of Evaluation
9	Open Passage Year-Round (via ice breakers or underwater bubblers)	Does not address the need of the Project to improve the health and safety of GIFN members crossing Lake Simcoe.	Somewhat addresses the need of the Project to improve the social conditions of GIFN members by providing slightly better access to emergency services and food security, but not my much.	Somewhat addresses the need of the Project to improve the economic conditions of GIFN members by providing slightly better access to mainland employment opportunities, but not by much.	Potential for environmental impacts to existing aquatic habitats, resulting from the use of icebreakers and/or underwater bubblers.	A ferry equipped with icebreakers could provide the ferry with year-round passage; however, this mode of transportation would not protect passengers from weather conditions during winter months (i.e., high winds and extreme snow fall). An improved ferry system would not address the underlying access issues associated with using a ferry as a mode of transportation. An underwater bubbler would not be possible due to the ice conditions and depth of the channel in Lake Simcoe where the project is proposed. Conclusion: Not technically feasible, and does not address the need for the Project.	Not a Preferred Alternative
10	Fixed Link via bridge and tunnel combination	See row #6: '*Fixed Link via tunnel under Lake Simcoe'*, and row #7: '*Fixed Link via bridge'* of this table.	See row #6: '*Fixed Link via tunnel under Lake Simcoe'*, and row #7: '*Fixed Link via bridge'* of this table.	See row #6: '*Fixed Link via tunnel under Lake Simcoe'*, and row #7: '*Fixed Link via bridge'* of this table.	See row #6: '*Fixed Link via tunnel under Lake Simcoe'*, and row #7: '*Fixed Link via bridge'* of this table.	See row #6: '*Fixed Link via tunnel under Lake Simcoe'*, and row #7: '*Fixed Link via bridge'* of this table. Conclusion: Not technically or financially feasible.	Not a Preferred Alternative

12.3 Ferry Alternative Report

To supplement the assessment of 'Alternatives to' the Project as identified in Section 12.2, GIFN contracted a consultant to undertake a dedicated Ferry Alternative Report. A summary of requirements for an acceptable marine-based solution, addressing the concerns of the GIFN, was provided to the community by BMT. One of the key concerns was to ensure the evaluation of ferry alternatives allowed for a 100-year comparison of the Fixed Link to a water-based alternative. To meet the current needs of the community, a three-vessel solution was recommended. BMT recommended the following solution for consideration:

- Retrofit the current Aazhaawe vessel to last through to 2049 and operate as a second vessel when demand requires extra capacity
- Purchase an electric, ice breaking ferry to operate through to 2080.
    - Requires significant shoreside civil, structural, and electrical infrastructure upgrades.
- Replace the Aazhaawe vessel in 2049 to last through to 2099
    - The assumption is that this vessel will be replaced with the most advanced technology available.
- Acknowledge that newly acquired vessel will need to be replaced in 2080 to meet the needs of the community.
- Acquire an emergency response vehicle every 50 years (2050, 2100)

Upon review of the draft report, the community determined that a Fixed Link alternative remained the best option for the community for the following reasons:

1. Given the seven generations financial comparison evaluation, there was minimal difference in cost between the two projects. It was noted that the timing of the costs is quite different, the community certainty with Fixed Link costs being up front was more beneficial for the community.
2. The required number of certified operators for a three-vessel system was considered too high given the current human resourcing issues facing the transportation system today.
3. The general health and safety concerns are improved but not eliminated with the three-vessel system.
4. The long-term stability and presence of an all weather, 24/7 transportation alternative was overwhelmingly preferred by the community

The complete Ferry Alternative Report (2025) will be available during the Detail Design Phase.

12.4 Community Referendum Vote (2025)

In October 2025, the GIFN community members took part in a vote to guide the next steps for the project. More than one-third of eligible members cast ballots, reflecting strong participation and interest in Georgina Island's future.

Members were asked to choose between two transportation options for the community's long-term connection:

- a Fixed Link (bridge or causeway) providing a permanent connection to the mainland, or
- a Water-Based Option maintaining marine transportation as the primary mode of travel with opportunities for future service and infrastructure improvements.

Of those who voted, approximately 64% supported pursuing a Fixed Link future. This outcome provides Chief and Council with a clear mandate to move forward with the next phase of technical design, financial planning, and engagement.

PART D. LOCATION INFORMATION AND CONTEXT

13. PROJECT LOCATION

13.1 Proposed Geographic Coordinates

Its proposed geographic coordinates including, for linear development projects, the proposed locations of major ancillary facilities that are integral to the project, and a description of the spatial boundaries of the proposed study corridor.

Coordinates should be provided in a form suitable for use in Geographic Information System (GIS) (e.g., longitude/latitude) using international standard representation.

Coordinates should be appropriate for the project type, for example, for the centre of a facility, for the boundaries of a proposed mine site, or for beginning and end points and path of a linear project.

The Project consists of a bridge-causeway-low-level bridge fixed link structure between Georgina Island and the mainland in the Town of Georgina, Ontario. From north (Georgina Island) to south (mainland), the Fixed Link crosses Lake Simcoe; thus, the study area includes the waters of Lake Simcoe between the mainland and southwest tip of Georgina Island.

For the terrestrial portions, on Georgina Island, the study area encompasses the southwest tip of the island, where the Fixed Link will connect to the island from Chief Joseph Snake Road. On the mainland, the study area includes the land area from just east of Sibbald Point Provincial Park, to just south of Black River Road, and east to Hadden Road. To ensure that the Fixed Link is a part of to the transportation network on the mainland, a roadway will be constructed to run from the bridge connect the Fixed Link to Black River Road through the GIFN West Property.

The following lists the spatial boundary coordinates of the study area limits, shown in **Figure C-3.**

List of coordinates:

- North: 44° 21’ 23” N; 79° 18’ 16 W
- Northeast: 44° 21’ 37” N; 79° 17’ 36” W
- Northwest: 44° 20’ 48” N; 79° 18’ 40” W
- West: 44° 20’ 09” N; 79° 19’ 00” W
- Southeast: 44° 19’ 31” N; 79° 16’ 55” W

- Southwest: 44° 18’ 51” N; 79° 19’ 46” W

13.2 Site Maps

Site maps produced of an appropriate scale in order to determine the project’s proposed general location and the spatial relationship of the project components.

Site maps are also to be provided to the Agency as electronic geospatial data file(s) compliant with the ISO 19115 standard.

As mentioned in **Section 12.1**), Refined Alignments #2 was selected as the preferred alignment at the draft DPD stage. The proposed Project’s general location is within the study area shown in Figure C-3. The Project will provide access from southwest shore of Georgina Island to the mainland.

13.3 Legal Land Description

The legal description of land to be used for the project, including, if the land has already been acquired, the title, deed or document and any authorization relating to a water lot. The level of detail should be appropriate for the project type.

Georgina Island

The GIFN has three reserves, with the main one being the Chippewas of Georgina Island First Nation Indian Reserve (Georgina Island No.33), which consists of a small parcel of land (1.3 ha) near Virginia Beach (Georgina Island No. 33A), and three islands on the southern shores of Lake Simcoe: Georgina Island, Snake Island, and Fox Island.

In Canada, there are four types of property rights regimes in operation on reserves – customary rights, the independent land codes developed under the *First Nations Land Management Act*, leases, and Certificates of Possession (CPs). **Figure D-2** indicates current ownership of land on Georgina Island used for the Project, which are broken down to either Band Lands or CP Lands. Band Lands, in the context of the GIFN terminology, are lands set aside in the *Indian Act* and subject to the *Land Management Act* and are controlled by the First Nation.

The parcels of land on Georgina Island are owned by the GIFN and are part of the GIFN’s reserve land, and whose title is vested in His Majesty the King in right of Canada. The GIFN provides CPs to community members as stewards to that piece of land within the communal allotment. The CP is evidence of the lawful possession of an individual tract of reserve land (the band council must allot the land to the applicant and the Minister of Crown – Indigenous Relations must approve the allotment). The CP holder can lease that land to both GIFN and non-GIFN parties; thus, there are some private leases to non-GIFN cottagers as well.

On Georgina Island, the Fixed Link will connect to the island at the existing intersection of Chief Joseph Snake Road and Bear Road.

On the other hand, GIFN owns several properties in fee simple on the mainland. For instance, the two properties considered during the alignment evaluation process (i.e., the West and Bayvista Properties) are owned by GIFN and are currently in the Additions to Reserve process with ISC. These are located separately from Georgina Island No. 33A (ATRIS, n.d.; CIRNAC,

2024; CIRNAC, n.d.; Georgina Island Fixed Link Secretariat, 2021). The West Property is divided into four parcels, legally recognized as the following:

- *East Part Lot 9, Concession 8, Georgina Being Part 1 65R-37393* (see **Section 14.1.2.1.2.1**), which is a 15 ha roughly rectangular land parcel;
- *7522 Black River Road* in Georgina Ontario (see **Section 14.1.2.1.2.2**), which is a 6-ha rectangular land parcel;
- *Part Lot 10, Concession 8, Georgina as in B34937B, S/T B34937B, If Any; Georgina* (see **Section 14.1.2.1.2.3**), which is a 6.3 ha rectangular parcel; and,
- *Part Lot 10, Concession 8, as in R299178; Georgina,* which is a 0.7 ha rectangular land parcel (see **Section 14.1.2.1.2.4**).

For more information, refer to **Figure D-1** for a high-level overview of GIFN land ownership on the islands and mainland, **Figure D-2** for GIFN owned lands on Georgina Island used for the Project, and **Figure D-65** for GIFN's Land Use Plan on Georgina Island.

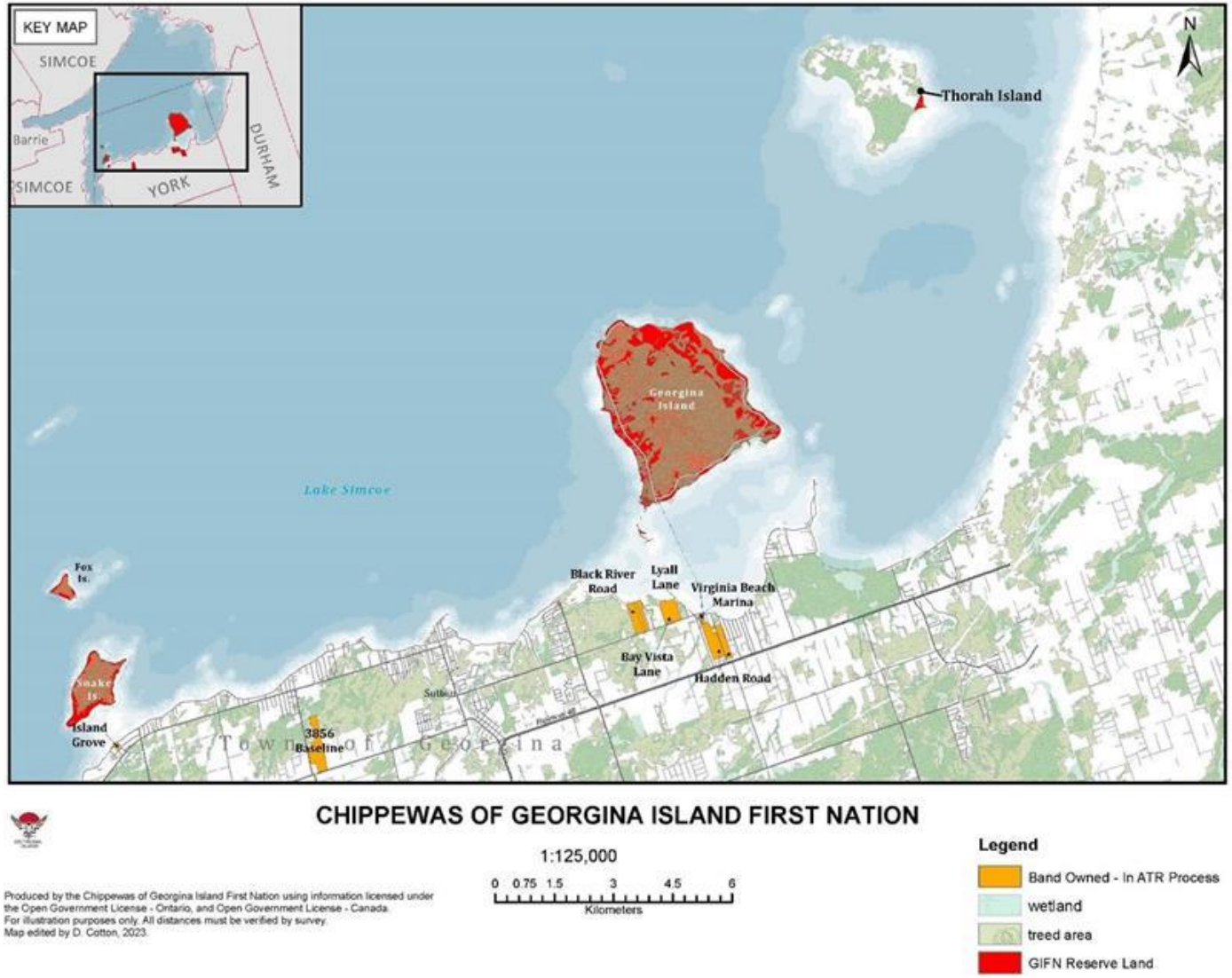
Mainland

In addition to the Georgina Island No. 33A, which is part of GIFN's reserve land, GIFN owns several properties in fee simple on the mainland. This includes the West and Bayvista Properties that were considered in the alternative alignment evaluations (see **Section 12**). Based on the results, the West Property was selected as the mainland location for the Project. The legal description of the lands on the mainland used for the Project that are owned by GIFN are described in **Table D-1**.

Lakebed

The MNR has confirmed that a search of MNR records provided no ownership results (i.e., no land survey or patent) of the lakebed. Based on preliminary investigations, the lake bottom between the shore and the mainland may belong to the upland owner, in this case the GIFN.

Figure D-1 GIFN Land Ownership – All Island and Mainland Properties



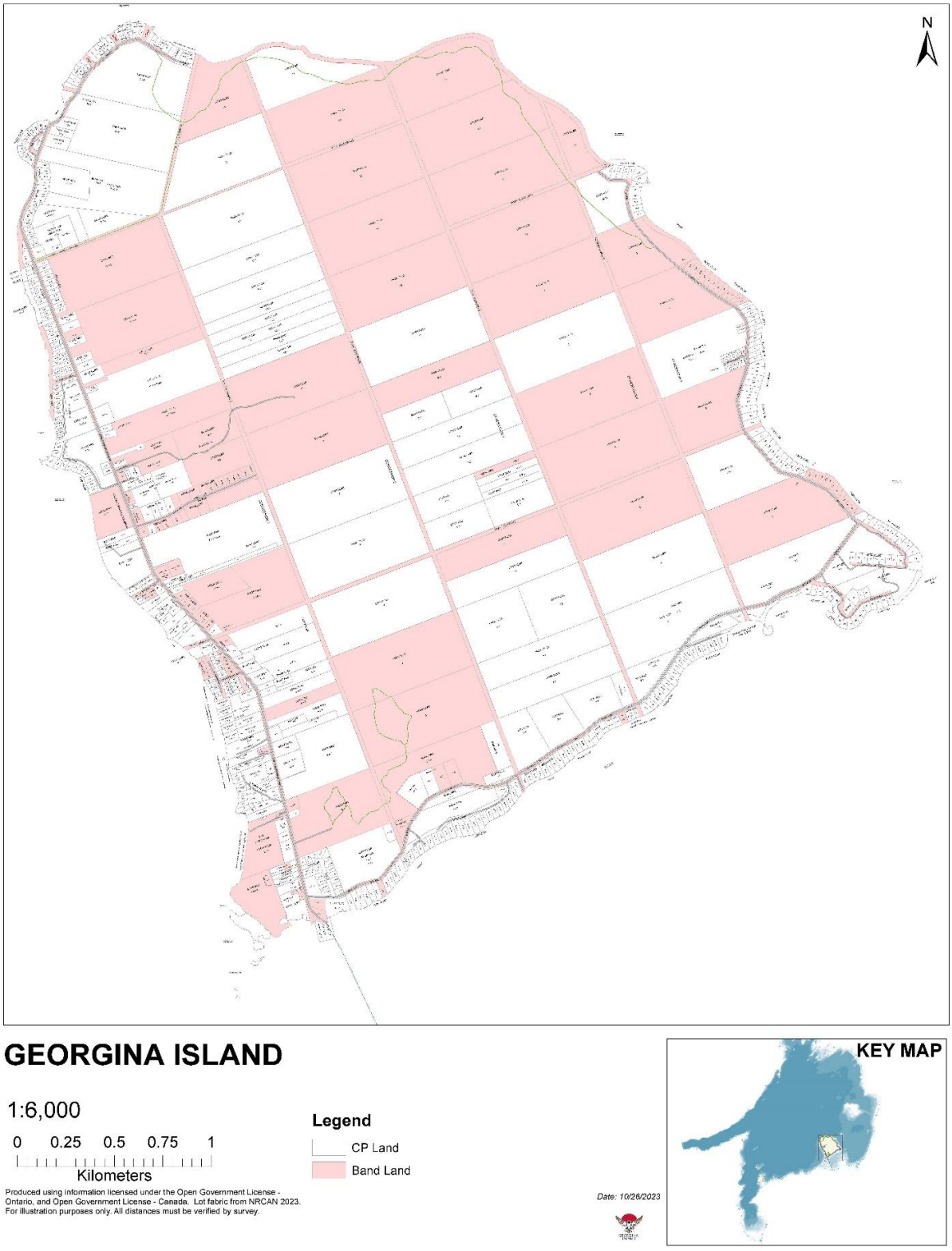


Figure D-2 GIFN Land Ownership – Georgina Island

In addition, **Table D-1** provides the legal description of lands that will be used for the Project, including, if the land has already been acquired, the title, deed or document and any authorization relating to reserve lands.

Table D-1: Legal Land Description

PIN	Description
1063985	LOT 1-1-20 CONCESSION 1, 71168 CLSR ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
1063986	LOT 1-4 CONCESSION 1, 64387 CLSR ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
1063973	LOT 1-5-16 CONCESSION I, 5811R RSO ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
1213219	ROAD BROKEN FRONT CONCESSION, T124 CLSR ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
1063982	LOT 1-1-2 CONCESSION 1, 2057 RSO ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
1208838	UNNAMED ISLAND # 1, 103065 CLSR ON, CHIPPEWAS OF GEORGINA ISLAND FIRST NATION
35280056	WATER LT LOCATION DT157 IN LAKE SIMCOE IN FRONT OF LT 25 PL 191 AND RO AD ALLOWNACE BTN CONCESSION 7 & 8 (GEORGINA) PT 1 65R7476; GEORGINA

13.4 Proximity to Residences and Affected Communities

The project's proximity to any permanent, seasonal or temporary residences and proximity to the nearest affected communities.

Both Indigenous and non-indigenous communities are in proximity to the Project activities. The locations of permanent residences, temporary land uses (i.e., cottages) and sensitive human receptors (i.e., community buildings) are described below and identified in **Figure D-3**.

13.4.1 Georgina Island and Neighbouring Islands

GIFN land ownership includes Georgina Island (1,295 ha), Snake Island (133 ha), Fox Island (19 ha), Sand Island (4 ha) and Gravel Island (0.4 ha).

According to the 2019 Fixed Link Socio-Economic Study (**Appendix B**), approximately 179 GIFN band members live on Georgina Island. The study also indicated that the GIFN community buildings and most residential structures on Georgina Island are centralized on the eastern and western shores, with ample distance away from the Project. The majority of the community's homes and community buildings are located on the west side of the island, along Chief Joseph Snake Road. Cottages occupy lots along the northwest, south and eastern portions of the island; some of these are leased by non-GIFN cottagers. Specifically, the cottages closest to the Project are located along the southern shore of Georgina Island along

Larry's Lane. GIFN community buildings are concentrated in the area of Root Road. The GIFN community centre, administration office, school, medical clinic, and water treatment plant are located along Chief Joseph Snake Road. The Aazhaawe Simcoe Ferry Landing, located in the southwest corner of the island, is the main access point for residents, cottagers, and visitors. Two community buildings are within the island portion of the study area: the ferry terminal and the Public Works (**Figure D-65**).

Snake, Fox and Sand Islands are "surrendered lands" and are currently leased to non-GIFN cottagers. According to the GIFN website, there are about 227 cottage leases on Snake Island and approximately 64 lots on Fox Island. GIFN land ownership plans and Land Use Plan for these islands are depicted in the figures included in **Section 13.3**. Seasonal residences are leased to members of the public under agreement with GIFN on all islands.

13.4.2 Mainland

The northern shore of the Town of Georgina is within the Protected Countryside Area of the Greenbelt Plan (Government of Ontario, 2017). The Hamlet of Virginia is in the southeast portion of the study area and is predominantly residential. The Protected Countryside lands – apart from Sibbald Point Provincial Park and the Hamlet of Virginia – also make up the Natural Heritage System. The Lee Farm Lane is located left of the West Property, whereas Bayvista Lane traverses through the left area of the Bayvista Property. Both roads connect to Black River Road. Several residential areas have been identified near the study area. The closest residential zones are located along Black River Road and Virginia Boulevard, just under 200 meters southeast of the Bayvista Property (see **Section 15.3** for the social context of the study area and **Section 14.11** for land use).

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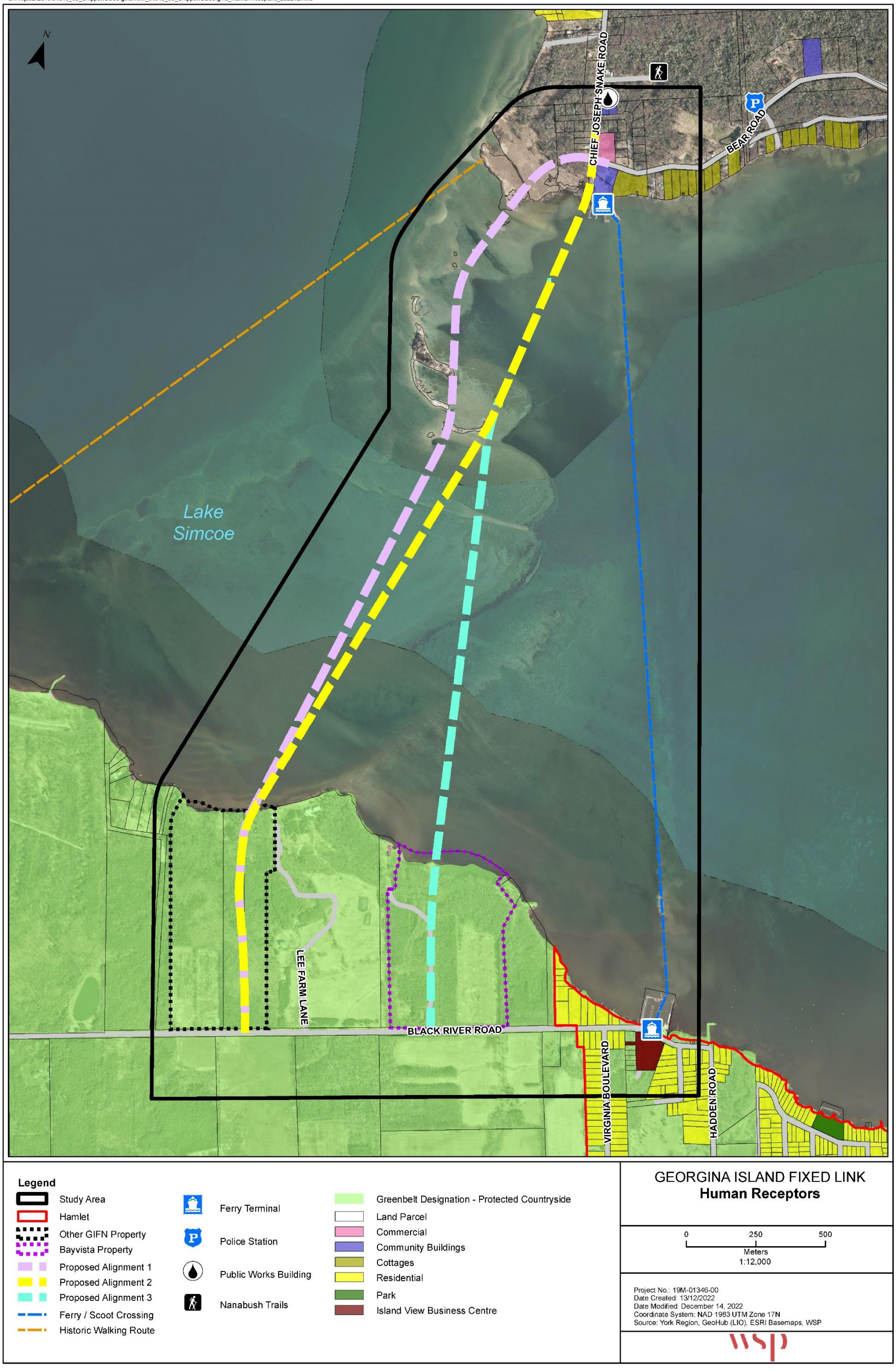

Figure D-3 Existing Human Receptors within Study Area

13.5 Proximity to Indigenous Lands

The project's proximity to:

- land used for traditional purposes by Indigenous peoples of Canada;
- land in a reserve as defined in subsection 2(1) of the *Indian Act*,
- First Nation land as defined in subsection 2(1) of the *First Nations Land Management Act*;
- land that is subject to a comprehensive land claim agreement or a self-government agreement; and,
- any other land set aside for the use and benefit of Indigenous peoples of Canada.

Georgina Island is entirely considered reserve lands under the Williams Treaty (1923), as described in **Section 13.3**. Other GIFN-owned properties are located along the mainland of Lake Simcoe, between the Virginia Beach Wetland Complex and Sibbald Point Provincial Park, i.e., Bayvista Property and the West Property (**Figure D-1**). Therefore, the Project is expected to be located on GIFN-owned lands subject to *First Nations' Land Management Act*.

As detailed in the Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008), GIFN entered into a Framework Agreement on First Nation Land Management in 1996 with Her Majesty the Queen in Right of Canada. Under this arrangement, the GIFN community voted, on February 5, 1997, to opt out of the land management provisions of the *Indian Act* and into its own land regime.

The closest mapped reserve lands to the Project belong to the Chippewas of Rama First Nation, a member Nation of the Williams Treaties First Nations (WTFN). The Chippewas of Rama First Nation's reserve lands are located approximately 30 km north of GIFN (CIRNAC, 2024), downstream of the proposed Project on Lake Couchiching and Lake St. John, which are both in a different quaternary watershed than Lake Simcoe (MNRF, 2024).

As described in **Section 4.34.3.1**, GIFN has received a Letter of Support for the Project from each of the other member Nation of the WFTN. See **Appendix F** for copies of these letters.

13.6 Proximity to Federal Lands

The project's proximity to any federal lands.

Besides GIFN's reserve lands (**Figure D-1**), which are federal lands within the meaning of the IAA, there are no known federal lands within the study area or in close proximity to the Project.

According to the Directory of Federal Real Property mapping, the lakebed is not considered federal Crown land (Treasury Board of Canada Secretariat, n.d.). Other than the First nation reserve lands, the nearest federal property is the Pefferlaw River Small Craft Harbour, which is east of the Project site on the mainland, approximately 8 km southeast of the Project site's island area and 7 km east of the Project site's mainland area. The closest federal buildings are the Pefferlaw Post Office, which is approximately 7 km and 9 km southeast of the Project site's mainland and island areas, respectively, and the Sutton Post Office , which is situated around

7 km and 8 km southwest of Project site's mainland and island areas, respectively (Treasury Board of Canada Secretariat, n.d.).

14. DESCRIPTION OF THE PHYSICAL AND BIOLOGICAL ENVIRONMENT

A description of the physical and biological environment of the project's location based on information that is available to the public.

The description of the physical and biological environment for the Project is based on information that is available to the public, as well as additional data collected through studies to support the planning and design of the Project (see **Sections 5.3, 5.4** and **5.5** for list of Project-specific studies and nearby assessments). The description of the physical and biological environment is organized into the following sections:

- Bedrock and soils
- Natural environment
- Hydrogeology
- Drainage
- Atmospheric environment
- Acoustic environment
- Coastal environment

Section 20 provides an overview of potential Project effects on the physical and biological environment, using the same organization of sections, noting that **Section 19** specifically discusses potential impacts to fish and fish habitat, SAR, and migratory birds, which are protected under federal government mandates. For the list of completed, ongoing, and future studies for the Project, refer to **Section 5.4.**

14.1 Bedrock and Soils

14.1.1 Bedrock

The bedrock beneath the Georgina area is mainly composed of Paleozoic limestone of the Middle Ordovician Simcoe Group in the north, and shale of the Upper Ordovician Blue Mountain in the south (LSRCA, 2010). Over the past 135,000 years, this bedrock has been covered by sediments deposited by glacial, fluvial, and lacustrine processes. The Simcoe Group, which makes up the Middle Ordovician deposits, includes five formations, but only the Lindsay Formation is present within the Black River sub watershed, where the study area is located. This formation, which is 67 meters thick and rich in fossils, suggests a depositional environment ranging from shallow to deep marine. The younger Upper Ordovician deposits in the sub watershed belong to the Georgian Bay-Blue Mountain Formation. This formation, which lies above the Lindsay Formation, consists of blue-grey, poorly fossiliferous, non-calcareous shale up to 60 meters thick (LSRCA, 2010).

A desktop study of the geotechnical conditions in the study area has been completed based on information from the following sources:

- Publicly available geological maps and data sets;
- Previous geotechnical studies completed within the region; and
- MASW surveys completed at selected locations along the proposed alignments, as shown in **Figure D-4**

Previous geotechnical studies available at the time of the DPD preparation were more than 1.5 km away from the proposed alignments. As such, they were mainly used to calibrate data collected from other sources, primarily through assessment of the most probable soil type. This was coordinated with available information on surficial soils from the geological maps.

The MASW survey results were considered the main source of information on the subsurface conditions along the alignments in this preliminary phase. The MASW survey results can be found in **Appendix X**.

The available sources indicated that the preliminary ground stratigraphy along different stretches of the refined alternative alignments consisted of the following main soil/bed rock layers in descending order (**Figure D-5**):

- Compact to Dense Sand (average thickness of about 7 m), Hard Till/Very Dense Sand (average thickness of about 4 m), and Limestone Bedrock for the South (Mainland) Causeway – Refined Alternative Alignment #2;
- Compact Sand (average thickness of about 4 m), Hard Till/Very Dense Sand (average thickness of about 9 m), and Limestone Bedrock for the South (Mainland) Causeway – Refined Alternative Alignment #3;
- Stiff Clay/Compact Sand (average thickness of about 9 m), Dense Sand/Very Stiff to Hard Till (average thickness of about 4 m), and Limestone Bedrock for the Bridge – Refined Alternative Alignment #2;
- Firm Clay/Loose to Compact Sand (average thickness of about 4 m), Dense Sand/Very Stiff to Hard Till (average thickness of about 9 m), and Limestone Bedrock for the Bridge – Refined Alternative Alignment #3; and
- Compact Sand (average thickness of about 8 m), Dense Sand/Very Stiff to Hard Till (average thickness of about 7 m), and Limestone Bedrock for the North (Georgina Island) Causeway.

As noted above, these ground profiles are based on limited information and hence should be treated with caution and could be subject to verification/refinement as part of the Project specific geotechnical investigation program.

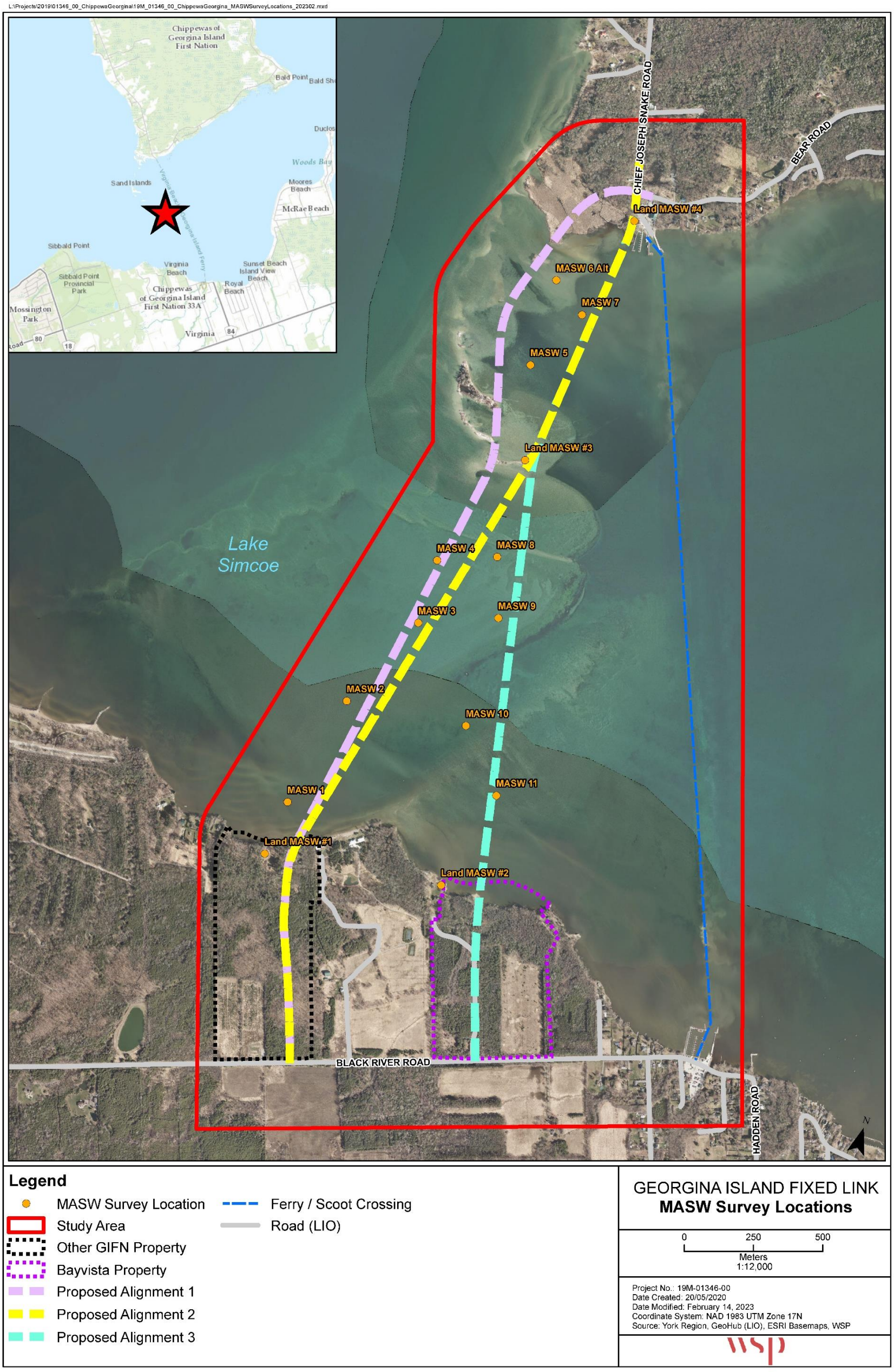

Figure D-4 Layout of MASW Surveys Performed Along the Refined Alternative Alignments

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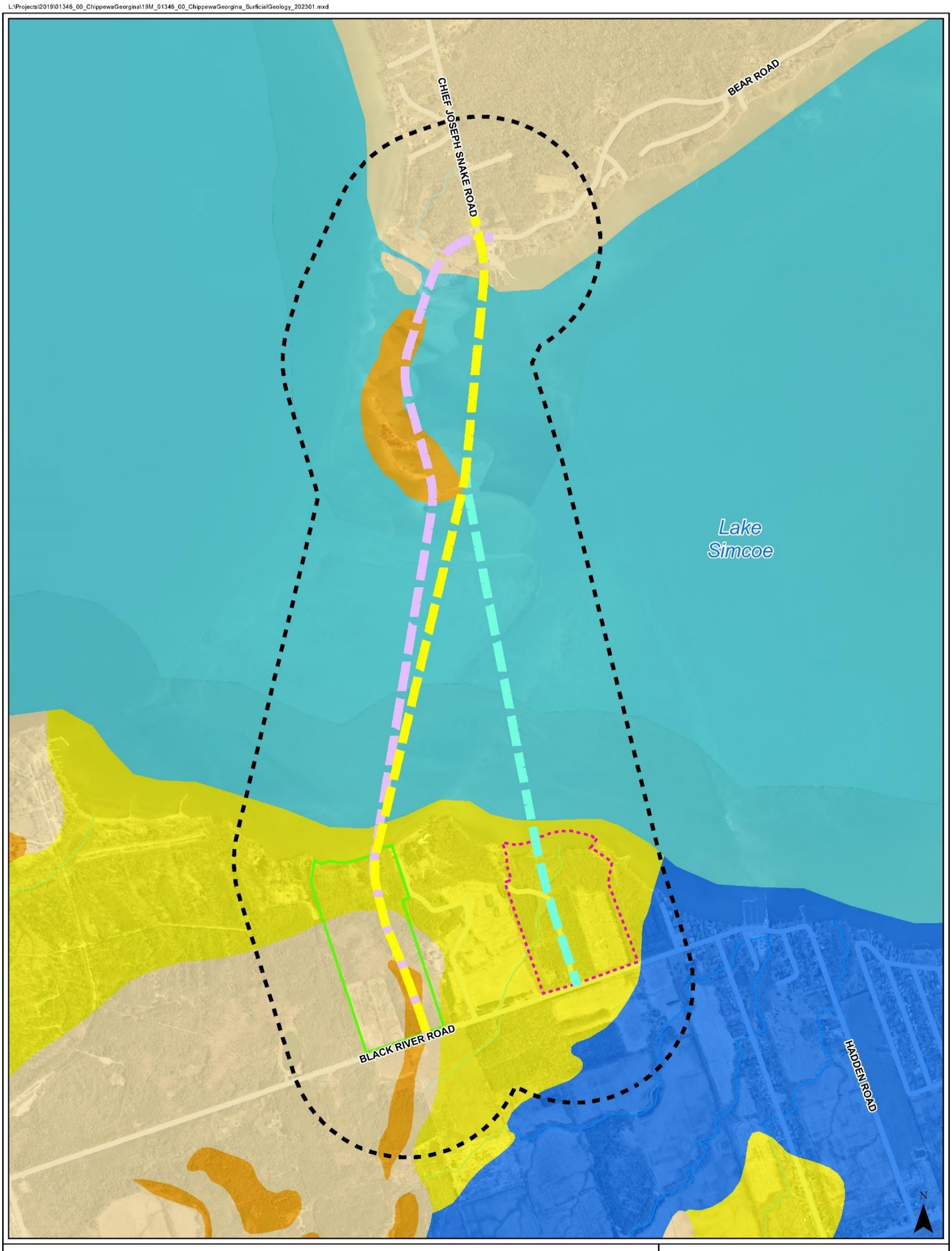

Figure D-5 Surficial Geology of the Project Study Area

14.1.2 Soils

Five Phase I ESAs were undertaken in 2020 to identify environmental concerns associated with the current and historical activities at the mainland properties that were being considered as options for where the alternative alignments could be expected to terminate on the mainland side.

Based on the review of relevant background, historical, and environmental information obtained from various public and private resources, the area covered by these sites were described as follows:

- The ground surface slopes down to North;
- Surface water drainage is anticipated to infiltrate the ground surface;
- Regional surface water drainage is expected to flow overland to the north toward Lake Simcoe immediately north of the five sites;
- Based on the topography and proximity to Lake Simcoe, the inferred shallow groundwater flow is northerly;
- According to the Physiography of Southern Ontario mapping (Chapman & Putnam, 2007), the five sites are within the Simcoe Lowlands physiographic region, characterized by sand plains. The Simcoe Lowlands are a series of “steep sided, flat-floored valleys” that were historically submerged by Lake Algonquin (Sutton, 1999);
- The area’s overburden is mapped as till and coarse-textured glaciolacustrine deposits (OGS, 2010); and,
- The area’s bedrock is mapped as limestone of the Lindsay formation (OGS, 2007) (Cambium Aboriginal Inc., 2020) (Cambium Aboriginal Inc., 2019e; Cambium Aboriginal Inc., 2019d; Cambium Aboriginal Inc., 2019b; Cambium Aboriginal Inc., 2019a). (Cambium Aboriginal Inc., 2020)

In addition to the information above, the Soil Survey of York County Map (Hoffman & Richards, 1995) indicated that the soils in the general area covered by the five Phase I ESAs on the mainland are categorised as Tecumseth Soil Series (code: Tsl), Granby Soil Series (code: Gsl), and Monaghan Soil Series (code: Moc). The soils are described as follows:

- **Tecumseth Soil Series**: sandy loam soil type with imperfect drainage. Neutral to slightly alkaline soil surface with well-sorted grey, calcareous sand, or stratified sand and gravel. This soil series is used chiefly for general farming; however, due to the sandy materials, fertilizers may be required.
- **Granby Soil Series**: sandy loam soil type, with poor drainage. Neutral to slightly alkaline soil surface with well sorted, slightly calcareous sandy outwash. This soil series is used for permanent pastures, trees, or short-season crops.
- **Monoghan Soil Series**: Clay loam soil type with imperfect drainage. Neutral soil surface acidity with brown, calcareous gritty clay till. This soil series is mainly used for general farming and dairy production.

On the other hand, the soils in the island portion of the Study area are classified as Ottonabee Soil Series, which has a sandy loam soil type and good drainage. The soil surface is characterized as slightly to medium alkaline with medium textured grey stony, strongly calcareous till (Hoffman & Richards, 1995). This soil series is used for limited agricultural and dairy production activities due to lower level of natural fertility.

The following sections provide a description of the findings of the Phase I ESA reports (see **Appendix M**).

14.1.2.1 The Bayvista Property (1 Bayvista Lane)

The Phase I ESA was undertaken at 1 Bayvista Lane to identify environmental concerns associated with current and historical activities at the site and surrounding properties, for the purpose of a property transaction (Cambium Aboriginal Inc., 2020). A review of the historical site imagery indicated that the site has undergone no significant changes since 1959. The northern portion of the site appears to have been developed, as evidenced by the presence of a cottage in 1959. Additionally, the rest of the site was observed to be vacant, agricultural land. The surrounding properties were primarily woodland to the east, with dwellings present along the shoreline to the east and west (Cambium Aboriginal Inc., 2020). Based on the findings of the records review and site visit, no actual and/or potential on-site sources of environmental concern were identified. The Phase I ESA identified no evidence of a potential or actual environmental concern associated with the Site; therefore, it was concluded that a Phase II ESA is not required (**Appendix M**) (Cambium Aboriginal Inc., 2020).

14.1.2.2 The West Property (Black River Road)

The West Property is broken into 4 different parcels and therefore, four Phase I ESAs were undertaken, see Figure D-6Figure D-6 and Figure D-7Figure D-7. The results of the Phase I ESA for each parcel are detailed in the following sections.

14.1.2.2.1 BLACK RIVER ROAD – PART 1

This parcel is roughly 15 ha and consists of a rectangular land parcel that is currently zoned residential; see Figure D-6. The site is developed with a single-storey cottage, constructed in approximately the 1950s, with the remainder of the property covered in dense woodland. A review of the historical site imagery indicated that the site has undergone no significant changes since 1959. The northern portion of the site appears to have been developed, as evidenced by the presence of a cottage in 1959. Additionally, the rest of the site was inferred to be either agricultural use or dense woodland. The surrounding properties were primarily woodland, with dwellings present along the shoreline to the east and west (Cambium Aboriginal Inc., 2019d).

Based on the findings of the records review and site visit, no actual and/or potential on-site sources of environmental concern were identified. The Phase ESA identified no evidence of a potential or actual environmental concern associated with the Site; therefore, it was concluded that a Phase II ESA is not required (**Appendix M**) (Cambium Aboriginal Inc., 2019d).

14.1.2.2.2 BLACK RIVER ROAD – PART 2: 7522 BLACK RIVER ROAD

This parcel is 6 ha and consists of a rectangular land parcel that is developed with two single-story dwellings and one single-story storage shed; see Figure D-7. A review of the historical site imagery indicated that the site has undergone no significant changes since 1959. The northern portion of the site appears to have been developed, as evidenced by the presence of a cottage in 1959. Additionally, tree cover south of the cottage was observed to increase since 1959. The surrounding properties were primarily woodlands, with dwellings present along the shoreline to the east and west (Cambium Aboriginal Inc., 2019e).

Based on the findings of the records review and site visit, no actual and/or potential on-site sources of environmental concern were identified. The Phase I ESA identified no evidence of a potential or actual environmental concern associated with the Site; therefore, it was concluded that a Phase II ESA is not required (**Appendix M**) (Cambium Aboriginal Inc., 2019e).

14.1.2.2.3 BLACK RIVER ROAD – PART 3

This parcel is 6.3 ha and consists of a rectangular land parcel that is currently zoned as residential; see Figure D-7. The site is developed with two single-story dwellings constructed in approximately the 1950s. A review of the historical site imagery indicated that the site has undergone no significant changes since 1959. The northern portion of the site appears to have been developed, as evidenced by the presence of a cottage in 1959. Additionally, the rest of the site was observed to be mostly dense woodlands. The surrounding properties were primarily woodlands, with dwellings present along the shoreline to the east and west (Cambium Aboriginal Inc., 2019a).

Based on the findings of the records review and site visit, no actual and/or potential on-site sources of environmental concern were identified. The Phase I ESA identified no evidence of a potential or actual environmental concern associated with the Site; therefore, it was concluded that a Phase II ESA is not required (**Appendix M**) (Cambium Aboriginal Inc., 2019a).

14.1.2.2.4 BLACK RIVER ROAD – PART 4

This parcel is 0.7 ha and consists of a rectangular land parcel that is currently undeveloped; see Figure D-7. A review of the historical site imagery indicated that the site does not appear to have been developed from 1959 – 2018. In addition, the surrounding properties were primarily woodlands, with dwellings present along the shoreline to the east and west (Cambium Aboriginal Inc., 2019b).

Based on the findings of the records review and site visit, no actual and/or potential on-site sources of environmental concern were identified. The Phase I ESA identified no evidence of a potential or actual environmental concern associated with the Site; therefore, it was concluded that a Phase II ESA is not required (**Appendix M**) (Cambium Aboriginal Inc., 2019b).

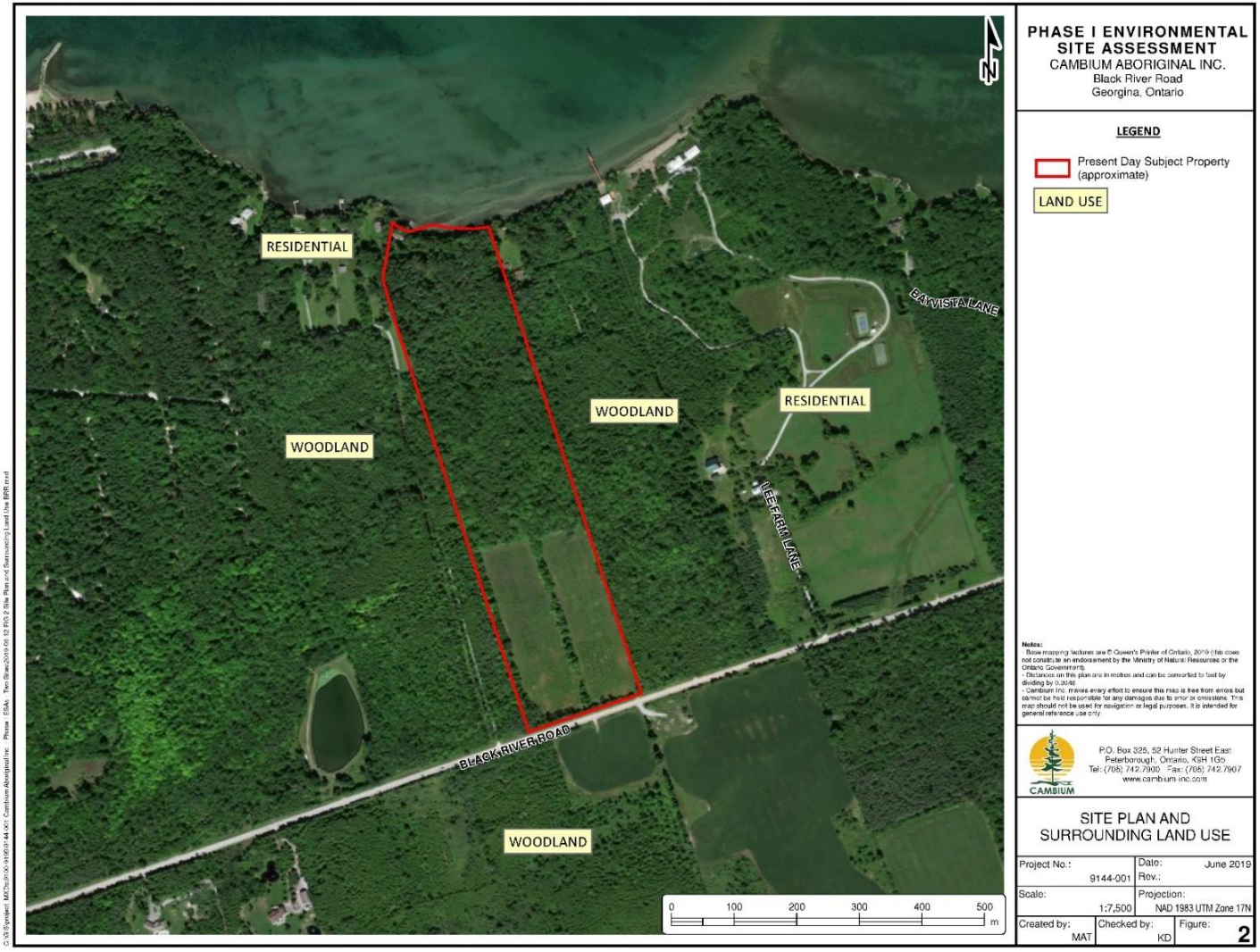

Figure D-6 Black River Road Part 1, Phase I ESA Site (Cambium Aboriginal Inc., 2019d)

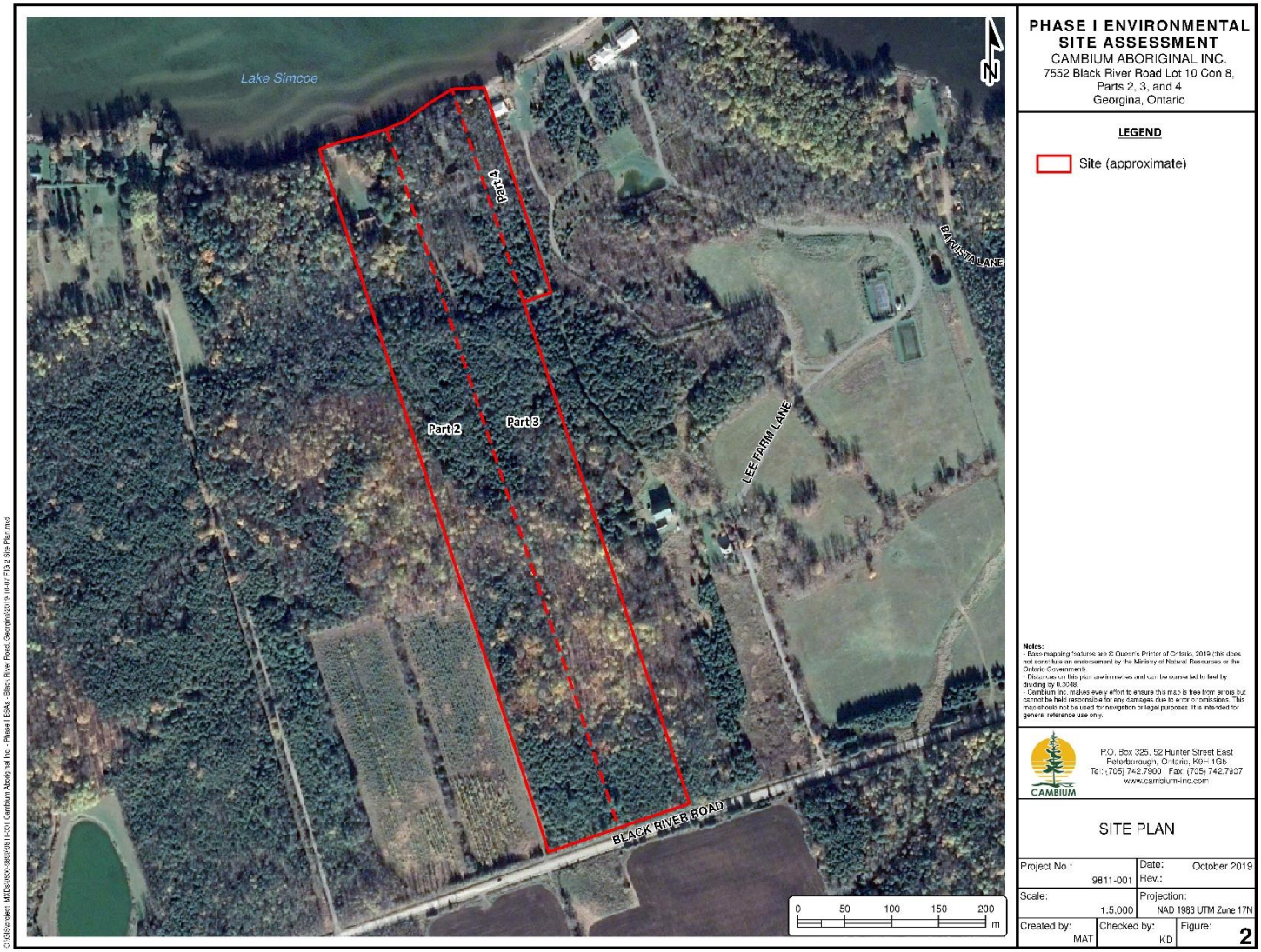

Figure D-7 Black River Road Parts 2, 3 & 4, Phase I ESAs Sites (Cambium Aboriginal Inc., 2020)

14.2 Natural Environment

14.2.1 Overview

Following the submission of the IPD in April 2022, the Project Team initiated a detailed ecological field work program to document the natural environment existing conditions within the study area. This field program was intended to address questions raised by review agencies, inform the selection of a preferred alignment and input to this DPD. Both the aquatic and terrestrial field programs were undertaken by Cambium Inc. (Cambium), in partnership with CIPS, and with oversight provided by WSP's ecology team. The study area and two initial alterative alignments defined in the IPD were used to guide the 2022 field program development. This study area is shown in **Figure D-8**.

Additional aquatic field studies that focused on the preferred alignment were completed in 2023. Additional terrestrial field studies were also completed in 2023, to address gaps from the 2022 field investigations.

The specific focus and descriptions of the aquatic and terrestrial surveys and existing conditions is provided in more detail in the sections that follow, and are based on the GIFL Aquatic and Terrestrial Existing Conditions Reports that have been prepared by Cambium, specifically:

- Georgina Island Fixed Link Project – Aquatic Existing Conditions Report (Cambium February 17, 2023), see **Appendix T1**.
- Georgina Island Fixed Link Project – Aquatic Existing Conditions Report for the Preferred Alignment (Cambium October 27, 2023), see **Appendix T2**.
- Georgina Island Fixed Link Project – Terrestrial Existing Conditions Report (Cambium November 3, 2023), see **Appendix T3**.

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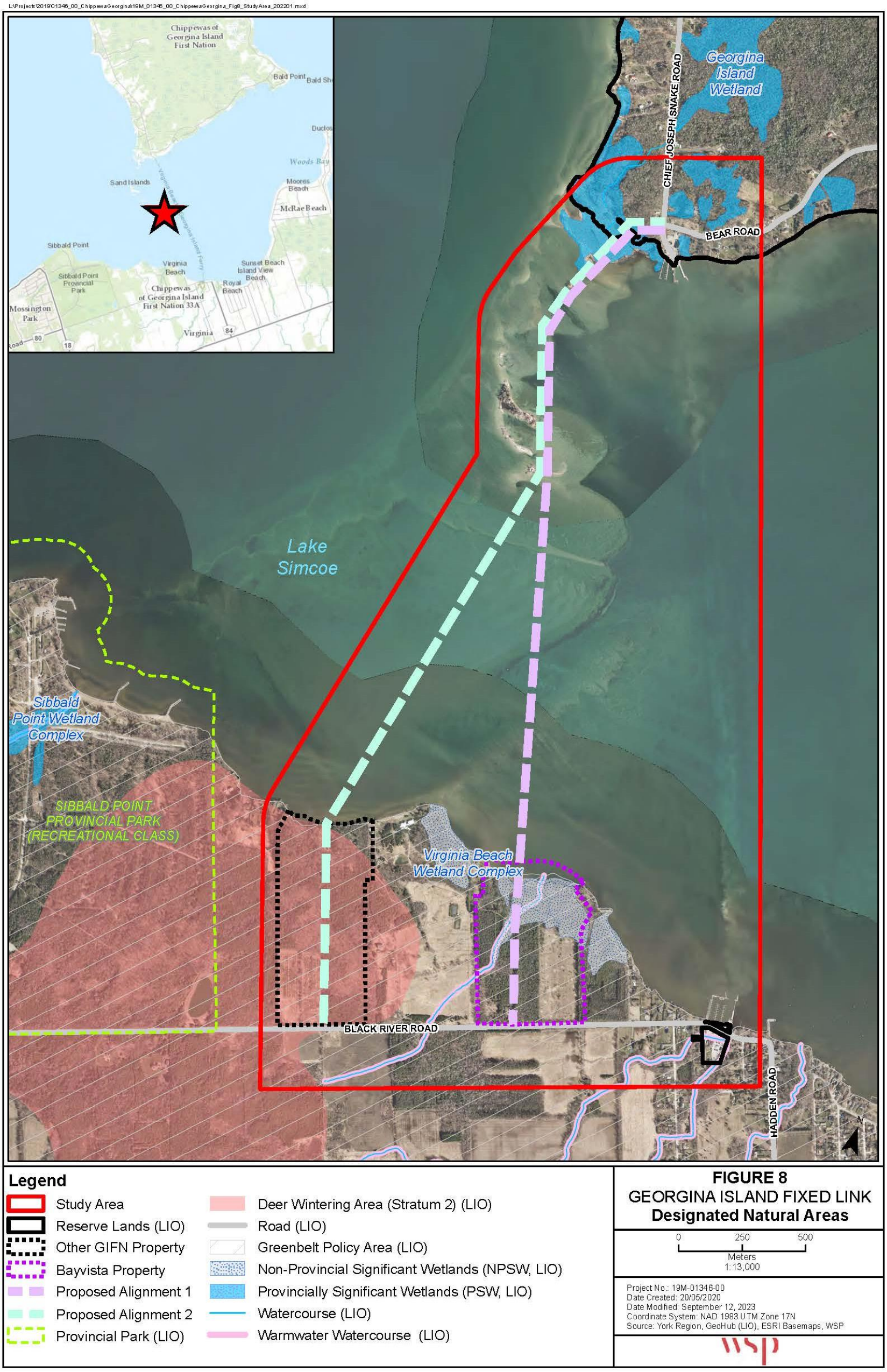


Figure D-8 Study Area and Designated Natural Areas

14.2.2 Fish and Aquatic Habitat

14.2.2.1 Approach and Data Collection Methods

14.2.2.1.1 BACKGROUND DATA REVIEW

A comprehensive background desktop assessment was completed by Cambium to inform the understanding of the local conditions and guide the 2022 / 2023 aquatic field program. This review included:

- Ontario Base Mapping and Orthoimagery via the online Natural Heritage Areas: Make-a-Map tool (Ministry of Natural Resources and Forestry, 2023)
- Natural Heritage Information Center (NHIC) database: Species at Risk (SAR) occurrence and Natural Area records via the online Natural Heritage Areas: Make-a-Map tool (Ministry of Natural Resources and Forestry, 2023)
- Aquatic SAR distribution maps (Fisheries and Oceans Canada, 2023)
- Aquatic Resource Area Summary Dataset (Ministry of Natural Resources and Forestry, 2023)
- Aquatic Resources Area Line Segment Dataset (Ministry of Natural Resources and Forestry, 2023)
- Fish Activity Area Dataset (Ministry of Natural Resources and Forestry, 2023)
- Fish ON-Line Tool (Ministry of Natural Resources and Forestry, 2023)
- Ministry of Transportation Environmental Guide for Fisheries (Ministry of Transportation, 2020)
- Ministry of Transportation Environmental to Guide to Fish and Fish Habitat (Ministry of Transportation, 2009)
- Ministry of Transportation Environmental Guide for Fisheries – Best Management Practices Manual (Ministry of Transportation, 2020)
- The Risk Management Framework for DFO Habitat Management (Fisheries and Oceans Canada, 2006)
- LSRCA Regulated Area Mapping (LSRCA, 2022)
- Lake Simcoe Protection Plan (Ministry of the Environment, Ministry of Natural Resources, LSRCA, 2008)
- Proposed Fixed Link Study – Preliminary Evaluation of Engineering and Environmental Alternatives (Neegan Burnside Ltd., 2008)
- Chippewas of Georgina Island First Nation Fish Habitat Management Plan (Ontario Fisheries Resource Centre, 2008)
- The Georgina, Fox, and Snake Islands Subwatershed Plan (LSRCA and Georgina Island First Nation, 2017)
- Lake Simcoe Fish Community Objectives (Ministry of Natural Resources, 2011)

Regulatory agencies were also contacted by Cambium via background information request letters. Agencies contacted include:

- Fisheries and Oceans Canada (DFO)
- Ministry of Natural Resources (MNR)
- Ministry of the Environment, Conservation, and Parks (MECP)
- Lake Simcoe Region Conservation Authority (LSRCA)

A summary of the responses, as well as copies of all correspondence, is provided in **Appendices T**1 and **T2**.

14.2.2.1.2 AQUATIC FIELD INVESTIGATIONS

As noted in the Cambium Reports in **Appendices T1 and T2**, aquatic ecology investigations were conducted in 2022 and 2023 by appropriately trained Cambium staff. The location of the 2022 field assessments within the study area was based on the original two proposed initial alternative alignments (**Figure D-8)**. Initial Alternative Alignment #1 connects Georgina Island with the Bayvista Property and Proposed Alignment 2 connects Georgina Island with the West Property.

The location of the 2023 field assessments within the study area was based on the new preferred alignment for the Project (Refined Alternative Alignment #2), which was selected following further evaluations of three new alignments as noted in **Section 12.1.2**.

The field assessments were completed in accordance with the Ministry of Transportation (MTO) Environmental Guide for Fish and Fish Habitat (the Guide) (MTO, 2009), with consideration to the 2020 pilot protocol entitled MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 3 (the Protocol) (MTO, 2020), with some modifications to meet the needs of the Project as noted below (Cambium 2023b).

The aquatic field investigations were completed on June 3, 10, 24, 29, 30, 2022 and on September 1, 6, 7 and 16, 2022. Additional field investigations were completed on April 11, 12, 14, 17, 19, 21, June 13, 14, and August 1, 2 and 3, 2023 (Cambium 2023a and 2023b).

14.2.2.1.2.1 Waterbody Assessments

For Lake Simcoe, the two initial alignment options were sub-divided into 12 sub-sections, referred to as ‘Assessment Sites’ and overlaid on ortho imagery (see **Appendix T1** - Figure 2). The preferred alignment was sub divided into eight sub-sections (see **Appendix T2** – Figure 2). The ROW boundaries (20 m width) were added along with areas of investigation extending 50 m outwards, as per Table 5-1 of the MTO Guide (MTO, 2020). Aquatic habitat mapping information (e.g., substrate type, aquatic vegetation, depths), bathymetry information, fish sampling locations and photograph locations were included on the ‘Assessment Site Sheets’ which are found in **Appendix T1** – Figures 3 to14 and in **Appendix T2** – Figures 3 to 10.

Field data for each Assessment Site was collected during both the spring and summer conditions in 2022 and 2023 and followed the data requirements of the MTO ‘Ponds / Lakes Field Collection Form’ (e.g., water quality and aquatic habitat information, fish sampling effort and results). For the two initial alignment options, the data collected by Cambium was then

transferred to 12 digital ‘Site Cards’ which were generated to match the locations of the 12 Assessment Site sub-sections noted above (see Site Cards 1 to 12, **Appendix T1**). For the preferred alignment, the data was transferred to eight digital ‘Site Cards’ (see Site Cards A to H, **Appendix T2**. These site cards also contain photographs of each Assessment Site.

Fish community sampling efforts in the lake were completed with the use of seine nets, fyke nets, minnow traps and a backpack electrofisher.

For more detailed information of the assessment methodology, see **Appendices T1** and **T2**.

14.2.2.1.2.2 Watercourse Assessments

The two watercourses crossed by the two initial alignments were also assessed by Cambium. Watercourse #1 is found on Georgina Island and Watercourse #2 is found on the Bayvista Property (see **Appendix T1** - Figure 2). The two watercourses are not crossed by the preferred alignment (see **Appendix T2** – Figure 2).

Similar to the ‘Assessment Sites’ that were generated for the waterbody assessment, figures were also generated for Watercourse #1 and #2 and show aquatic habitat information (e.g., fish sampling locations, photograph locations, permanency) that was collected during the field assessments (see **Appendix T1 -** Figures 15 and 16). The ROW boundaries (20 m width) were added to the figures along with zones of detailed investigation (i.e., 20 m upstream of the ROW, the ROW itself, and 50 m downstream) (Cambium 2023a).

Field data for each watercourse was collected during both the spring and summer conditions in 2022 and followed the data requirements of the MTO ‘Watercourse Field Collection Form’ (e.g., water quality and aquatic habitat information, fish sampling effort and results). The data collected by Cambium was then transferred to two digital ‘Site Cards’, which also contain photographs of each watercourse (see **Appendix T1** - Site Cards 15 and 16) (Cambium 2023a).

Fish community sampling efforts in the watercourses were completed with the use of a backpack electrofisher and minnow traps.

Detailed information is available in **Appendix T1**.

14.2.2.1.2.3 Spawning Surveys

Based on the background information and the 2022 field investigations, several areas along the two initial alignments and the preferred alignment were identified as having potential spawning habitat for Northern Pike (*Esox Lucius*), Muskellunge (*Esox masquinongy*) and Walleye (*Sander vitreus*) (see **Appendix T1** - Section 8.1). For Northern Pike and Muskellunge these areas include the nearshore and internal habitat associated with the Provincially Significant Georgina Island Wetland Complex (including Watercourse #1) and the aquatic habitat associated with Watercourse #2, which is located on the Bayvista Property. Potential Walleye spawning habitat was identified at an underwater cobble point on the Bayvista Property (Cambium 2023a).

Spawning surveys were completed in the early spring of 2023 in all three areas. The full methodology and results of these spawning surveys are documented in a report by Cambium (October 19, 2023) entitled *Georgina Island Fixed Link Project – Spawning Survey* which is found in the GIFL Aquatic Existing Conditions Report for the Preferred Alignment (see **Appendix T2** – Appendix D). Results of the surveys are also noted in the next sections.

14.2.2.2 Characterization of Aquatic Natural Features and Functions

14.2.2.2.1 STUDY AREA OVERVIEW, HISTORICAL CONTEXT AND LAKE SIMCOE FISHERY

Lake Simcoe is the main aquatic feature within the study area. Lake Simcoe is in the Severn River watershed and is part of the TSW. Lake Simcoe provides fish habitat for a range of coldwater, coolwater and warmwater fish species. Lake Simcoe occupies approximately 20% of the Lake Simcoe watershed and has 722 km^2 of fish habitat. Lake Simcoe is approximately 30 km long, 25 km wide, with an average depth of 15 m, a maximum depth of 41 m and a water volume of 11.6 km^2 (Neegan Burnside Ltd., 2008). Water levels and flows are managed by Parks Canada, an agency of ECCC.

In the southwestern corner of Georgina Island between the tip of the island and Doyle Beach, a major shoal formation extends over a significant part of this area, in places extending above the surface as the Sand Islands. Nearer to the mainland, depths are also very shallow, in the order of 0.6 m extending to the area adjacent to Sibbald Point Provincial Park. An area with a deeper channel exists in the central area between the Sand Island shoals and the mainland, and is thought to have depths of about 1.8 m. According to bathymetric data, the depths within a 20 m span of the existing ferry crossing route is in the order of 1.5 m (Neegan Burnside Ltd., 2008).

According to Negan Burnside Ltd. (2008), a total of 58 species have been documented in the Lake Simcoe watershed by the MNRF Lake Simcoe Fisheries Assessment Unit. This report also notes that coldwater species (e.g., Lake Trout, Lake Whitefish, Lake Herring and Rainbow Smelt) are frequently caught north of the Georgina Island and are not typically found along the southern shoreline, while a warm water to cool water fishery generally exists north of mainland shoreline between Duclos Point, south-west to Sibbald Point and south of Georgina Island (Neegan Burnside Ltd., 2008). Also, the south shoreline of Georgina Island is known to contain Muskellunge spawning and nursery habitat as well as Northern Pike spawning habitat (Neegan Burnside Ltd., 2008). The area of the Sand Islands and the south shore of Georgina Island has also been identified as Northern Pike spawning habitat on MNR fish activity mapping (Government of Ontario, 2022). The study area also includes three warmwater tributaries of Lake Simcoe on the mainland, and one tributary on the island.

The fish population within the lake has shifted from coldwater species, such as Lake Trout, Whitefish and Lake Herring, to species preferring warmer water such as Perch, Bass and Sunfish. These changes relate, in part, to changes in nutrient cycling and dissolved oxygen concentrations, siltation over spawning sites, shifts in available food items and the invasion of non-native species (Neegan Burnside Ltd., 2008).

The MNR, through comments received on the draft IPD, has noted that while the lake has been shifting from coldwater species to warm water species, several coldwater species continue to thrive in Lake Simcoe, including Lake Trout, Whitefish and Cisco, as further described below:

- Lake Trout are currently of concern in Lake Simcoe. It is anticipated that increased stocking efforts and other management techniques will result in a population rebound.
- Whitefish appear to be maintaining their populations. About 80% of total catch are wild and unclipped fish. Further, MNR continues to stock 140,000 Whitefish annually.

- Cisco have made a notable rebound without any stocking efforts. MNR reopened the Cisco fishing season in 2015.

The MNR also identified spawning areas for Lake Trout west of the ferry launch site on the mainland and has noted that these areas are important for the re-establishment of the Lake Simcoe coldwater fishery. Although this habitat was planned for further evaluation in 2022, through further communication between Cambium and MNR (email dated October 19, 2022, see **Appendix T1)**, it was established that investigations of this area for this Project are not considered necessary "Given the distance from the study area (i.e., >1km), exposure, and fetch (i.e., northwest toward prevailing winds), MNR agreed that potential impacts to the Lake Trout spawning site documented at Sibbald Point is unlikely, and investigations should focus on warm water species and their habitat utilizing the basin south of Georgina Island" (Shirley, 2022),

14.2.2.2.2 AQUATIC HABITAT AND FISHERY WITHIN THE STUDY AREA

The GIFL Aquatic Existing Conditions Report (**Appendix T1**) documents detailed existing aquatic habitat conditions and fishery along the two original proposed alignments in four different areas of the Lake Simcoe study area including the Sand Islands area, the nearshore areas of the Bayvista Property and the West Property and the open water areas in between these locations. The existing aquatic habitat conditions and fishery were also documented at the crossing locations of Watercourse #1 (on Georgina Island) and Watercourse #2 (on the Bayvista Property).

The GIFL Aquatic Existing Conditions Report for the Preferred Alignment (**Appendix T2**) documents detailed existing aquatic habitat conditions and fishery along the preferred alignment in three different areas of the Lake Simcoe study area including the area east of the Sand Islands, the West Property and the open water areas in between these locations. The report also appends a Spawning Survey Report that documents the 2023 spawning survey approach and results.

The GIFL Aquatic Existing Conditions Report for the Preferred Alignment (**Appendix T2**) indicates the study area contains shallower, eutrophic aquatic habitat conditions that would generally limit use by coldwater fish species from carrying out their life processes. However, the report also notes that "good quality habitat is present for a number of cool and warmwater species throughout the study area." (Cambium 2023b). A list of 28 fish species known to utilize the study area is found in Table 3 of **Appendix T2** (Cambium 2023b).

The following sections summarize the existing aquatic habitat and fisheries conditions along the two original proposed alignments (2022 surveys) and along the preferred alignment (2023 surveys). A subsequent section summarizes the results of the 2023 spawning survey.

14.2.2.2.2.1 Sand Islands Area (along the two original alignments)

The Sand Islands area in the vicinity of the two original proposed alignment options is shallow, with water depths generally under 1 m at the time of the Cambium surveys, with exception of a deeper in-water channel located in Assessment Site 1, which ranged in depth from 1.5 m to 2.5 m (**Appendix T1**, **Sections 4.3.1 to 4.3.4**). Substrates throughout all the sites were sand and silt dominant with small areas of cobble and gravel (several gravel bars were observed around the north, south and eastern sides of the northern Sand Island) (Cambium 2023a).

Aquatic vegetation throughout the Assessment Sites 1 to 4 includes dense stands of Cattail (Cattail Mineral Shallow Marsh, MAS2-1) including Soft-stemmed Bulrush (associated with the Georgina Island Wetland Complex located along the shoreline area), and weedbed communities consisting of milfoil (SAS1-4), wild celery (SAS1-5), pondweeds (SAS1-1) and stonewort SAS1-3 (a macro algae) (Cambium 2023a).

Fish species captured by Cambium within these areas include Banded Killifish (*Fundulus diaphanous*), Emerald Shiner (*Notropis atherinoides*), Largemouth Bass (*Micropterus salmoides*), Rock Bass (*Ambloplites rupestris*), Pumkinseed (*Lepomis Gibbosus*), Round Goby (*Neogobius melanstoma*) and Yellow Perch (*Perca flavescens*).

Shallow water habitat is found throughout the Sand Islands, with the dense areas of aquatic vegetation that provides higher quality fish habitat for a variety of cool and warm-water fish species. In particular, the stands of Wild Celery in Assessment Site 2 were thought to provide higher quality habitat for young-of-year (YOY) fish, foraging potential and thermoregulation. In Assessment Site 4 (west of the south island) a gravel bar and dense aquatic vegetation is found in direct proximity to the deeper lake basin and provides dense cover for baitfish and good foraging opportunities for adult sportfish species such as Largemouth and Smallmouth Bass (*Micropterus dolomieu*), Northern Pike and Walleye (*Sander vitreus*) (Cambium 2023a).

Evidence of Centrachidae spp. spawning (i.e., fresh excavations with polished substrates) was also observed on the eastern side of the middle Sand Island, although adult fish were not present. Although other areas within the Sand Island Assessment Sites contain potential Centrachidae spp. spawning habitat, and evidence of previous years (i.e., last years) was observed in some of these areas, very few older nests were active during the 2022 season, even though the field surveys were timed to try and align with the active spawning season (Cambium 2023a).

The area of the Sand Islands along the south shore of Georgina Island has been identified as Northern Pike spawning habitat on MNR fish activity mapping (Government of Ontario, 2022), which includes the Provincially Significant Georgina Island Wetland Complex. Through the field surveys in 2022, potential preferred / high candidate Northern Pike spawning (and Muskellunge spawning) habitat was found to exist, but more along the edges of this wetland and potentially within the smaller open water areas, channels and adjacent areas found within the wetland (including Watercourse #1 which may also act as a migratory corridor), as shown on Figure 17 contained within **Appendix T1** (Cambium 2023a). The interior of the wetland itself is likely not preferred by Northern Pike or Muskellunge as they “do not prefer and often avoid, homogenous stands of emergent cattail for spawning” (Casselman & Lewis, 1996).

14.2.2.2.2.2 Bayvista Property Nearshore Area (along the original alignment #1)

The nearshore zone of the Bayvista Property in the vicinity of the original proposed alignment option #1 is shallow, with water depths generally under 1 m at the time of the surveys (**Appendix T**, **Section 4.3.7**). Substrates throughout the sites were sand dominant with silt and smaller areas of cobble, gravel and some boulder inclusions. An area of cobble / angular substrates, confirmed to be anthropogenic in nature (i.e., the base of an old dock), was observed within the nearshore area. This area could be potential spawning habitat for broadcast spawning species, such as Walleye and in general the area provided good quality fish habitat (Cambium 2023a).

The aquatic vegetation was dominated by a Stonewort community (SAS1-3)). Riparian vegetation along the shoreline is composed of a mature Silver Maple Mineral Deciduous Swamp (SWD3-2) with abundant fallen trees and woody debris along shoreline that provide cover opportunities for fish in the nearshore area (Cambium 2023a).

Fish species captured within these areas include Banded Killifish, Emerald Shiner, Rock Bass, Pumpkinseed and Yellow Perch (Cambium 2023a).

14.2.2.2.2.3 West Property Nearshore Area (along the original alignment #2)

The nearshore zone of the West Property in the vicinity of the original proposed alignment #2 is shallow and low gradient, with water depths under 1 m at the time of the surveys (**Appendix T1**, **Section 4.3.6**). In-water habitat consisted mainly of a beach area with sand dominant sand substrate and a lack of cover opportunities for fish (e.g., vegetation, coarse substrate), except for some cobble and boulder clusters found just out from the shoreline. The fish habitat was described generally as homogenous, low gradient habitat and likely not productive for fish (Cambium 2023a).

Riparian vegetation along the shoreline is composed of mature deciduous and mixed forest found further back from the shoreline (Cambium 2023a).

Fish species captured within these areas include Emerald Shiner, Round Goby and Yellow Perch (Cambium 2023a).

14.2.2.2.2.4 Open Water Areas (along the Two original Proposed Alignments between the Sand Islands and the Mainland)

These sites (Assessment Sites 5 – 10) are open water, mainly homogenous aquatic communities that provide limited aquatic vegetation and cover opportunities for fish (**Appendix T1**, **Section 4.3.5**).

Water depths range from 1 to 2 m and substrates are sand dominant except for a gravel bar (with some cobble and boulders) found between Assessment Sites 8 and 10 (Cambium 2023a).

14.2.2.2.2.5 Watercourse #1 (within the Georgina Island Wetland Complex)

Watercourse #1 flows though the Georgina Island Wetland Complex where it outlets to Lake Simcoe (**Appendix T1**). Through this area the watercourse is directly connected to and affected by the water levels of Lake Simcoe. During the spring visit the creek appeared flooded (with very low flow velocity) and provided good cover and refuge opportunities for fish. However, during the summer visit, much lower depth and poor water quality (e.g., very low dissolved oxygen levels) was observed, suggesting that for periods of time during the summer months, this area of the watercourse may not be usable by fish (Cambium 2023a).

Morphology is flat dominant and substrates within the channel comprised mainly of soft, deep detritus. Aquatic vegetation and cover are mainly dense Cattail (the matts of which define the channel), along with Yellow Water Lily, Yellow Iris and abundant Duckweed during summer period (Cambium 2023a).

The watercourse could provide spawning habitat for Northern Pike and Muskellunge, or provide a migratory corridor to more suitable spawning habitat within the wetland. The watercourse is a permanent (in the wetland area), warmwater system that likely provides seasonal fish use due

to water quality issues noted above. Two fish species were captured in 2022 and include Creek Chub (*Semotilus atromaculatus*) and Banded Killifish (Cambium 2023a).

14.2.2.2.2.6 Watercourse #2 (within the Bayvista Property)

Watercourse #2 is an intermittent system that flows dispersed through a wide (up to 100 m) Silver Maple Mineral Deciduous Swamp (SWD3-2) and floodplain with abundant emergent vegetation (e.g., Reed Canary Grass, Bebb's Sedge) (**Appendix T1**). A Forb Mineral Meadow Marsh (MAM2-10) is found in the upper reach. There is some channel definition at the outlet area to Lake Simcoe and at the crossing of Bayvista Lane (e.g., scouring at the three corrugated steel pipe [CSP] culverts). Substrates are detritus dominant along with sand and muck (Cambium 2023a).

During the spring 2022 visit, the whole wetland area was flooded (standing water) and schools of Emerald Shiner were observed within the wetland and five other species of fish (Brook Stickleback [*Culaea inconstans*], Brown Bullhead [*Ameiurus nebulosus*], Central Mudminnow [*Umbra limi*], Round Goby and Yellow Bullhead [*Ameiurus natalis*]) were captured at the Bayvista Lane crossing. During the summer 2022 visit, the entire wetland and watercourse was dry at the time of the surveys. It was noted that during the spring flooding, the dense emergent vegetation could provide spawning habitat for Northern Pike, since the depth, accessibility and flow retention provided suitable opportunity at the time of that survey. The watercourse is an intermittent, warmwater system that provides seasonal fish use (Cambium 2023a).

14.2.2.2.2.7 Area East of Sand Islands (along the preferred alignment)

The Sand Islands area in the vicinity of the preferred alignment (Assessment Sites A to D) is relatively shallow, with water depths generally under 1 m at the time of the surveys (**Appendix T2**, **Sections 4.3.1 to 4.3.4** and **Figure 2**). Substrates throughout most of the sites were sand and silt dominant with traces amounts of gravel. Sandy gravel was also present in the nearshore area around the island in Assessment Site D (Cambium 2023b).

Aquatic vegetation throughout the Assessment Sites A to D includes dense stands of Cattail (Cattail Mineral Shallow Marsh, MAS2-1) as well as Soft-stemmed Bulrush (associated with the Georgina Island Wetland Complex located along the shoreline area), and weedbed communities consisting of milfoil (SAS1-4), wild celery (SAS1-5), pondweeds (SAS1-1) and stonewort SAS1-3 (a macro algae) (Cambium 2023b).

Riparian vegetation along the shoreline beyond the wetland includes White Cedar – Hardwood Mixed Forest (SWM1-1) and parkland (Cambium 2023a).

Fish species captured within these areas include Banded Killifish, Central Mudminnow, Emerald Shiner, Largemouth Bass, Round Goby and Yellow Perch (Cambium 2023b).

Shallow water habitat is found throughout the Sand Islands, with the dense areas of aquatic vegetation that provides good quality fish habitat (e.g., cover, rearing and foraging habitat) for a variety of cool and warm-water fish species (Cambium 2023b).

Older (previous years) evidence of Centrachidae spp. spawning along the north shore of Georgina Island in Assessment Site A, and some new evidence (i.e., fresh excavations) of low-level use on the eastern shore of the island was found in Site D (no adult fish present) (Cambium 2023b).

14.2.2.2.2.8 West Property Nearshore Area (along the preferred alignment)

The nearshore zone of the West Property (Assessment Site H) in the vicinity of the preferred alignment is shallow and low gradient, with water depths under 1 m extending out approximately 75 m from shore at the time of the surveys (**Appendix T2**, **Section 4.3.6**). Beyond the shoreline interface, in-water habitat consisted mainly of a beach area with sand dominant substrate and a lack of cover opportunities for fish (e.g., aquatic vegetation, coarse substrate), except for a narrow band of Stonewort present in the outer littoral zone. The fish habitat was described generally as homogenous, low gradient habitat and likely not productive for fish. Within the shoreline interface, small protrusions of cobble and boulder groynes and other areas of cobble and boulders were observed. It was noted that these areas may provide multi use life cycle functions including cover, foraging, and potential spawning opportunities for Smallmouth Bass (Cambium 2023b).

Riparian vegetation along the shoreline is composed of mature deciduous and mixed forest communities including Moist-Fresh White Cedar - Sugar Maple Mixed Forest (FOM7-1) and Fresh Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5) found further back from the shoreline (Cambium 2023b).

Fish species captured within these areas include Banded Killifish, Emerald Shiner, Largemouth Bass, Round Goby, Yellow Bullhead and Yellow Perch and most were captured in areas of coarse substrate noted above (Cambium 2023b).

14.2.2.2.2.9 Open Water Areas (along the preferred alignment between the Sand Islands and the Mainland)

These sites (Assessment Sites E, F and G) are open water, mainly homogenous aquatic communities that provide limited aquatic vegetation and cover opportunities for fish (**Appendix T2**, **Section 4.3.5**).

Water depths range from 1 to 3.0 m and substrates are sand dominant with the exception of a gravel bar found in Assessment Sites E. The gravel bar was gently sloping and formed a morphological transition point between the Sand Islands and the open water. Substrates were gravel dominant with sand (subdominant), with no aquatic vegetation and this feature was not anticipated to provide notably higher-quality habitat for fish. A milfoil weedbed community (SAS1-4) is also found in Assessment Site G and is located at the western terminus of a shoal present further east of the alignment (Cambium 2023b).

14.2.2.2.2.10 Spawning Surveys Results

Spawning surveys were completed on six dates in the early spring of 2023 for Northern Pike and Muskellunge in areas of the Georgina Island Wetland Complex and Watercourse #1. Although Northern Pike were observed in other parts of the study area in 2023 during similar times (e.g., three adults were observed at another candidate site at the Bayvista Property – see Watercourse #2 below), no evidence of spawning activity was observed in the Georgina Island Wetland Complex. Additional surveys would be needed to confirm absence of spawning, since usage may vary from year to year depending on conditions. Incidental observations of spawning Yellow Perch were also documented during the surveys on April 19, 2023, at the Georgina Island marina (Cambium 2023b).

Spawning surveys on six dates were completed in the early spring of 2023 for Northern Pike and Muskellunge within and around Watercourse #2 on the Bayvista Property. In contrast to the 2022 site visit, flow conditions in the watercourse at the time of the 2023 surveys were low and provided limited connectivity from Lake Simcoe to the wetland. No spawning activity was observed in Watercourse #2. However, surveys on April 12 and April 14, 2023, did document three adult fish on both days exhibiting pre-spawning behavior at the outlet area of the watercourse to Lake Simcoe. This suggests an affinity for the area and potential for Watercourse #2 to provide spawning habitat during times of higher flow and connectivity to the lake (Cambium 2023b).

Spawning surveys were completed on fives dates in the early spring of 2023 for Walleye in the area of the cobble / angular substrate found along the shoreline of the Bayvista Property. No evidence of spawning activity by Walleye was observed in this area (Cambium 2023b).

Full documentation of these surveys and the results are found in the GIFL Aquatic Existing Conditions Report for the Preferred Alignment (see **Appendix T2** – **Appendix D**).

14.2.2.2.3 AQUATIC HABITAT SENSITIVITY

Cambium (2023b – Section 6) classified the areas of sensitivity within the study area using the terms Low Sensitivity, Moderate Sensitivity, High Sensitivity and Rare. The following definitions and criteria were derived from sensitivity descriptions outlined in the Guide to the Risk Management Framework for DFO Habitat Management Staff Version 1.0 (DFO, 2006) (e.g., Species Sensitivity, Species Dependence on Habitat, Rarity, and Habitat Resiliency) and the Environmental Guide for Fish and Fish Habitat (MTO, 2009) (MTO, 2020).

- "Low Sensitivity – Habitat occupied by low sensitivity fish communities (e.g., most cyprinids and Centrarchidae *spp.*). Generally, this habitat has the potential to support single use or non-reproductive life-cycle functions. It is habitat that is prevalent within a watercourse or waterbody that is stable and resilient to change and perturbation. In most cases, these habitat types have the opportunity to be enhanced or restored.
- Moderate Sensitivity – Generally warm and coolwater habitat that supports species such as Northern Pike, Walleye, and some Cyprinids spp., that are moderately resilient to change. This habitat has the potential to support multiple life cycle functions (e.g., spawning, feeding, rearing, migration, and over-wintering). This also includes spawning habitat for Northern Pike, Muskellunge and Walleye, which although require specific habitat characteristics, is typically not limited on the landscape, and can be effectively replicated through enhancement and restoration measures. This habitat is somewhat resilient to change and perturbation. Habitat that has been disrupted by past human activity may also fall into this category.
- High Sensitivity – Important or specialized habitat that is utilized by sensitive fish species (typically coldwater communities such as Salmonidae *spp*.) and/or is required to carry out their lifecycles. Spawning habitat requirements for coldwater species can be specific and limited on the sub-watershed level. Frequently, spawning habitat for coldwater species, such as groundwater upwelling, is a limited and an important habitat feature for the survival and maintenance of populations. High sensitivity habitat typically has a low resilience to change and is susceptible to impact from anthropogenic influences. The habitat is difficult to replicate or improve through enhancement or restoration efforts.

- Rare – Habitat that is critical to the survival of a species (typically SAR), is extremely rare / limited on the sub-watershed and watershed level and is difficult or impossible to replicate through enhancement or restoration efforts" (Cambium 2023b).

14.2.2.2.3.1 Aquatic Habitat Sensitivity - Along the two Original Alignments

Low Sensitivity areas identified along the two original alignment options (**Appendix T1** – **Figure 2**) are primarily associated with the deeper open water areas between the mainland nearshore connections and the Sand Islands (Assessment Sites 5 to 10 and portions of Sites 4 and 12) as well as the shallower shoreline area within Assessment Site 11 off the West Property (see **Appendix T1** - **Figure 19**). While these open water areas are important as movement corridors, "they are not anticipated to significantly contribute to the reproductive capacity of local fish communities" (2023a, p.49). With regard to the shallower nearshore area within Assessment Site 11 (mainland, West Property), the site is "composed of homogenous beach front with limited productive capacity or complex habitat elements" (Cambium 2023a).

Moderate Sensitivity areas identified along the original alignments include:

- Potential Northern Pike and Muskellunge spawning habitat – Georgina Island Wetland Complex (Cattail Mineral Shallow Marsh – MAS2-1) which includes Watercourse #1 (found in Assessment Site 1), and the wetland area (Silver Maple Mineral Deciduous Swamp - SWD3-2) associated with Watercourse #2 at the Bayvista Property (found in Assessment Site 12) (Cambium 2023a).
- Potential Walleye spawning habitat – a small area of coarse substates (angular rock) confirmed to be anthropogenic in nature (i.e., base of old dock), that is found in the nearshore area of Assessment Site 12 along Bayvista Property shoreline (Cambium 2023a).
- Multi-use fish habitat for spawning, rearing of young-of-the-year, refugia, and foraging including abundant and relatively diverse aquatic vegetation communities (e.g., milfoil (SAS1-4), wild celery (SAS1-5) and pondweeds (SAS1-1) found along the full length of the Sand Islands. Evidence of Centrarchidae spp. (e.g., Largemouth and Smallmouth Bass, Pumpkinseed) spawning was observed in the area. Found in Assessment Sites 1 – 3 and a portion of 4 (Cambium 2023a).

See **Appendix T1** – **Figures 17 - 19** and for more details see **Section 6**.

No High Sensitivity or Rare areas were identified along the original alignments.

14.2.2.2.3.2 Aquatic Habitat Sensitivity - Along the Preferred Alignment

Low Sensitivity areas identified along the preferred alignment are primarily associated with the deeper open water areas between the mainland nearshore connection and the Sand Islands (Assessment Sites E to G), as well as portions of the shallower areas within Assessment Sites C, D and H (see **Appendix T2** - **Figure 14**). While these open water areas are important as movement corridors, "they are not anticipated to significantly contribute to the reproductive capacity of local fish communities" (Cambium 2023b, p.48).

Moderate Sensitivity areas identified along the preferred alignment include:

- Potential Northern Pike and Muskellunge spawning habitat – Georgina Island Wetland Complex (Cattail Mineral Shallow Marsh – MAS2-1), found in Assessment Site A (Cambium 2023b).

- Multi-use fish habitat for spawning, rearing of young-of-the-year, refugia, and foraging including abundant and relatively diverse aquatic vegetation communities (e.g., milfoil (SAS1-4), wild celery (SAS1-5) and pondweeds (SAS1-1), in the area found east of Sand Islands (Assessment Sites A, B and C) and in small portions of Sites D and G. Evidence of Yellow Perch and Centrarchidae spp. (e.g., Largemouth and Smallmouth Bass, Pumpkinseed) spawning was observed in Sites A and D respectively, and an area of coarse substrates (potential Smallmouth Bass spawning habitat) was observed in Site H (Cambium 2023b).

See **Appendix T2** – **Figures 12 to 14** and for more details see **Section 6**.

No High Sensitivity or Rare areas were identified along the preferred alignment.

14.2.2.2.4 AQUATIC SPECIES AT RISK

With regard to aquatic SAR, Black Redhorse (*Moxostoma duquesnei*, considered THR under the SARA) has been documented in Lake Simcoe, as noted on DFO SAR mapping (DFO, 2024). However, the habitat for this species “moderate to fast-flowing areas in large warmwater streams” (COSEWIC, 2015), is not found within the study area. This species is not anticipated within the Georgina Island sub-basin, or within the watercourses found in the study area (Cambium 2023b).

Furthermore, DFO stated as part of its review of the draft IPD that “there are currently no aquatic species listed federally under the SARA mapped for the proposed Project locations” This will be confirmed again with DFO during future study phases.

14.2.3 Terrestrial Environment

14.2.3.1 Approach and Data Collection Methods

14.2.3.1.1 BACKGROUND DATA REVIEW

Cambium completed a comprehensive background desktop assessment to inform the understanding of the local conditions and guide the field program. This review included:

- LIO database via the online Natural Heritage Areas: Make-a-Map tool (MNRF, 2022b)
- Natural Heritage Information Center (NHIC) database: SAR occurrence records
- Online Atlas Data, including:
    - Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature, 2018)
- Ontario Breeding Birds Atlas (OBBA) (2001-2005) (Bird Studies Canada, 2005)
- Technical reports relevant to the study area, including:
    - Ecology Screening Memo (WSP, 2020)
    - Chippewas of Georgina Island First Nation Fixed Link: Initial Project Description of a Designated Project (IPD) (WSP, 2022)
- LSRCA interactive mapping (LSRCA, 2022)

Regulatory agencies were also contacted by Cambium via background information request letters. Agencies contacted include:

- Environment and Climate Change Canada: Canadian Wildlife Service (ECCC-CWS)
- Ministry of Natural Resources (MNR)
- Ministry of Environment, Conservation, and Parks (MECP)
- Natural Heritage Information Centre (NHIC)
- Lake Simcoe Region Conservation Authority (LSRCA)

A summary of the responses as well as copies of all correspondence is provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023), **Appendix T3**.

14.2.3.1.2 TERRESTRIAL FIELD INVESTIGATIONS

Terrestrial ecology investigations were conducted in 2022 and 2023 by appropriately trained Cambium staff. A total of 91 field days and 759.25 person hours were spent completing investigations within the study area, as documented within the Cambium Field Logs appended to the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023), **Appendix T3**. The list of terrestrial survey types completed is provided in **Table D-2**, with additional details provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). A total of 26 terrestrial survey types were conducted in 2022 and 2023.

For the purpose of the terrestrial field investigations and reporting, the study area was divided into three areas:

- Georgina Island (Island Properties) (~32 ha) and the Sand Islands
- Bayvista Property (~23 ha)
- West Property (~27 ha)

Table D-2 Terrestrial Field Investigations Completed by Cambium in 2022 and 2023

Survey Type	Property & Date(s) of Site Visits	Comments / Status
General Characterization of Habitats / Vegetation		
1) Vegetation Community Classification and Botanical Inventory	Island Properties – May 10, May 18, June 22, Sept. 14, 2022 Bayvista Property – May 11, May 17, June 21, July 6, Sept. 7, 2022 West Property – May 11, June 28, July 6, Sept. 8, 2022	Three-season botanical inventory and vegetation community characterization and delineation completed in 2022. Vegetation communities characterized using the Ecological Land Classification (ELC) System for Southern Ontario (Lee, et al., 1998).
2) Wetland Boundary Delineation	Island Properties – June 22, Bayvista Property – July 6, West Property – June 28, July 6,	Completed using Ontario Wetland Evaluation System (OWES) protocol.

Survey Type	Property & Date(s) of Site Visits	Comments / Status
3) Butternut Survey	Completed concurrently with other vegetation surveys	Butternut search completed. Butternut Health Assessment to be completed, as required, during future study phases.
Avian Surveys		
4) Breeding Bird Surveys	Island Properties – May 25, June 22, 2022 Bayvista Property – June 9, June 21, 2022 West Property – May 31, June 15, 2022	Completed in 2022, based on Ontario Breeding Bird Atlas (OBBA) survey protocols.
5) Least Bittern Surveys	May 24, 2022 June 21, 2022	Following observations of Least Bittern, a single targeted survey was completed based on the Marsh Monitoring Protocol for marsh birds (Bird Studies Canada, 2008).
6) Grassland Bird Surveys	Bayvista Property – May 24, June 3, June 9, June 15, 2022	Completed in 2022, following the MNR protocol for Eastern Meadowlark (OMNR, 2013).
7) Eastern Whip-poor-will Surveys	Bayvista and West Properties – May 17, June 13, June 15, 2022, and May 30, June 30 and July 7, 2023	Completed in 2022 and 2023, following the Draft Survey Protocol for Eastern Whip-poor-will in Ontario (MNRF, 2014), as well as aspects of the Canadian Nightjar Survey: Protocol 2022 (Birds Canada, 2022). Additional surveys may be warranted in future study phases.
8) Waterfowl Nesting Area Surveys	Island Properties – May 5, May 10, May 18, May 24, June 8, June 22, July 14, 2022, and May 5, May 25, May 30 June 1, June 7, June 14 and June 28, 2023 Bayvista Property – May 6, May 11, May 17, May 31, June 8, June 21, July 14, 2022	Completed in 2022 and 2023 (Community I7 only), according to the SWH Criteria Schedules for Ecoregion 6E (MNRF, 2015a) and the Bird and Bird Habitats: Guidelines for Wind Power Projects (MNRF, 2011).
9) Raptor Stick Nest Survey	April 27, April 28, May 5, May 6, December 13, December 21, 2022, and January 24, and March 8, 2023.	Completed in 2022 and 2023.
10) Woodland Raptor Nesting Survey	May 24, May 31, 2022, and April 6 and April 20, 2023	Completed in spring 2022 and 2023.

Survey Type	Property & Date(s) of Site Visits	Comments / Status
11) Bald Eagle and Osprey Nesting, Foraging ang Perching Habitat Surveys	Conducted concurrently with all surveys through 2022 and 2023.	Completed in 2022 and 2023.
12) Waterfowl Stopover and Staging Area Surveys	Eleven (11) survey dates: Sept. 27, Oct. 6, Oct. 17, Oct. 25, Nov. 1, Nov. 8, Nov. 15, Nov. 23, Nov. 29, Dec. 6, Dec. 13, 2022	Completed in 2022.
13) Shorebird Migratory Stopover Surveys	Ten (10) survey dates: July 26, Aug. 5, Aug. 16, Aug. 26, Sept. 9, Sept. 15, Sept. 27, Oct. 6, Oct. 17, Oct. 25, 2022	Completed in 2022.
14) Winter Raptor Survey	December 13 and 21, 2022, and January 24 and March 8, 2023.	Completed in 2022 and 2023.
15) Pileated Woodpecker Habitat Surveys	December 21, January 24, March 8, April 11, April 26, April 26, May 5, 2023	Completed in 2022 and 2023.
16) Gull Nesting Surveys	May 5, May 15, May 30, June 7 and June 14, 2023.	Completed in 2023.
Herpetofauna Surveys		
17) Amphibian Calling Surveys	Island Properties – May 5, May 24, June 21, 2022, and April 29, May 19, June 28, 2023 Bayvista Property – April 25, May 24, June 15, 2022 West Property – April 24, May 9, May 24, June 15, 2022, and April 11, 27, May 5, 2023 (then discontinued due to lack of water)	Surveys completed in 2022 and at additional locations in 2023 following to the Marsh Monitoring Program guidance (Bird Studies Canada, 2008).
18) Snake Surveys	Island Properties – May 5, May 24, June 3, June 8, June 9, June 16, June 21, June 29, July 8, July 14, 2022, and April 20, April 27, May 5, May 15, May 25, June 1, June 7, June 14, and June 28, 2023. Bayvista & West Properties – May 18, May 31, June 1, June 8, June 9, June 16, June 21, June 29, July 8, July 14, 2022, and April 11, April 20, April 27, May 5, May 15, May 25, June 1, June 7, June 14, and June 28, 2023.	Two (2) survey types completed in 2022: Visual Encounter Surveys (VES) and Artificial Cover Object (ACO) surveys, following the MNR protocol for SAR snakes (MNRF, 2016). Additional VES and ACO checks completed in 2023.

Survey Type	Property & Date(s) of Site Visits	Comments / Status
19) Turtle Surveys	Island Properties Turtle Basking Surveys (TBS) – May 5, May 10, May 18, May 24, June 1, 2022, and April 13, April 27, May 5, May 10, and May 16, 2023 Island Turtle Nesting Surveys (TNS) – June 3, June 8, June 9, June 13, June 15, June 21, 2022, and May 25, May 30, June 1, June 7, and June 14, 2023. Bayvista Property (TBS) – May 6, May 11, May 17, May 31, June 1, 2022 Bayvista Property (TNS) – June 1, June 8, June 9, June 13, June 15, June 21, 2022 West Property (TNS) – June 1, June 8, June 9, June 13, June 15, June 21, 2022	Three (3) survey types were completed in 2022: TBS, TNS and Road Surveys (RS), following the MNR protocol for Blanding's Turtle (MNRF, 2015b). Note: no TBS were completed on the West Property due to lack of suitable overwintering habitat identified. Additional TBS and TNS surveys completed in select communities in 2023.
Mammal Surveys		
20) Bat Maternity Roost Habitat Surveys	April 27, April 28, May 5, May 6, 2022	Completed in 2022 using both a plot-based assessment approach and transect surveys.
21) Bat Acoustic Monitoring	Acoustic Deployment #1: June 8, 2022 Acoustic Retrieval #1: June 20, 2022 Acoustic Deployment #2: July 5, 2022 Acoustic Retrieval #2: July 18, 2022 Acoustic Redeployment: July 21, 2022 Acoustic Redeployment: August 4, 2022	Surveys completed in 2022 followed the approach outlined by MECP in Maternity Roost Surveys (Forests / Woodlands) (MECP, 2021b). Further studies may be required at future study phases.
22) Deer Wintering Habitat Survey	December 13 and 21, 2022, and January 24 and March 8, 2023	Completed in 2022 and 2023.
23) Winter Mammal Survey	December 13 and 21, 2022, and January 24 and March 8, 2023	Completed in 2022 and 2023.
Other Surveys		
24) Insect Survey	July 8, Sept. 7, Sept. 8, Sept 14, 2022	Completed in 2022.
25) Terrestrial Crayfish Survey	Concurrent with other terrestrial surveys	Completed in 2022.
26) Seeps and Springs	Concurrent with other terrestrial surveys	Completed in 2022.

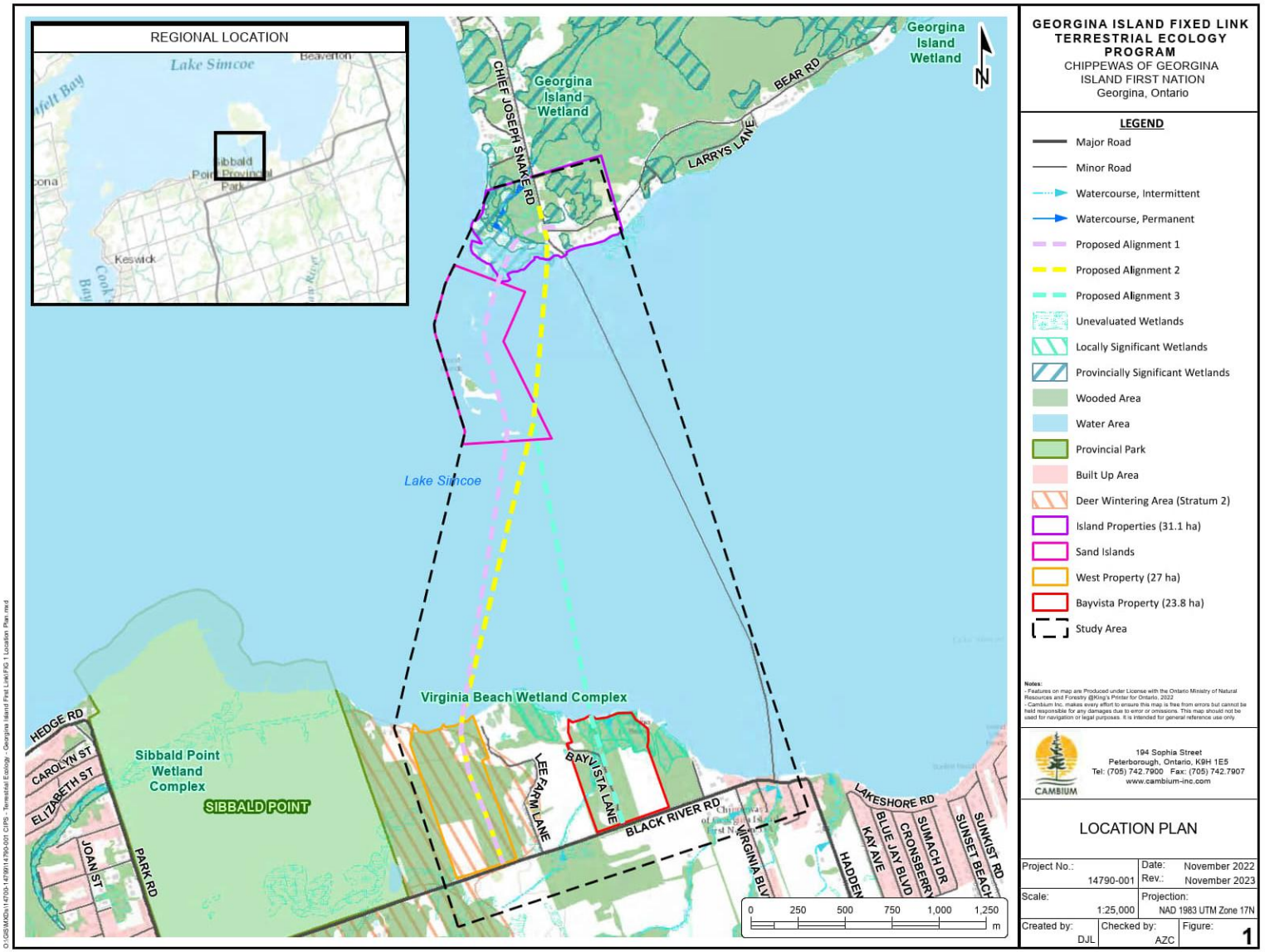


Figure D-9 Study Area Properties and Landscape Context (Cambium Inc., 2023)

14.2.3.2 Characterization of Terrestrial Natural Features and Functions

14.2.3.2.1 STUDY AREA OVERVIEW AND HISTORICAL CONTEXT

The study area is located within the Mixedwood Plains Ecozone: Lake Simcoe – Rideau Ecoregion 6E (GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). This Ecoregion extends from Lake Huron in the west to the Ottawa River in the east, including Ottawa, Kingston, Peterborough, Barrie, Tobermory, Kitchener, and Toronto. It is characterized by both shallow soil areas such as alvar and bedrock plains, as well as deep soil areas including on the Oak Ridges Moraine. Ecoregion 6E falls within the Great-Lakes St. Lawrence Forest Region (Lee, et al., 1998). The study area has also been influenced by the construction TSW, which includes Lake Simcoe. The TSW was constructed over a period of approximately 100 years and opened to full navigation in 1920 (Parks Canada, 2022). Some low-lying lands in the region were flooded to provide a navigable water elevation throughout.

As noted previously, the study area was divided into three areas for field surveys and reporting 1) Georgina Island and the Sand Islands, 2) Bayvista Property, and 3) West Property. Each property within the study area is described briefly below, with additional details in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

The Georgina Island portion of the study area is the southwest corner of Georgina Island and the Sand Islands. Based on a review of historical imagery, Cambium notes that the large marsh that is currently present off the southwest corner of the island has generally developed in the past 60 years (Cambium Inc., 2023). In 1960 there was an open water channel through the marsh, and the marsh itself was much smaller and did not extend to the sand islands as it does now (Cambium Inc., 2023). The forest / swamp at the south end of the island was also present in 1960.

The Bayvista Property is characterized by natural forests / swamps, plantation, and open, historically cleared areas. There is a laneway that traverses the property from Black River Road to the shoreline of Lake Simcoe, providing access to the adjacent property to the west. Except for the wetlands, most of the Bayvista Property was cleared in 1959, and a small homestead was present along Black River Road as well as a dwelling along the Lake Simcoe shoreline (Cambium Inc., 2023).

The West Property is primarily forested, with a mix of deciduous, coniferous, and mixed forest / mixed swamp communities. There are also small open areas that are associated with historical building footprints as well as a young plantation near Black River Road. Small areas near Black River Road are also used for material storage and deposition of dredged material from the ferry terminal harbour. Historical imagery indicates that parts of the deciduous and mixed forest / mixed swamp communities were present in 1959, but the majority of the lands within 200 m of the shoreline were cleared at that time (Cambium Inc., 2023).

14.2.3.2.2 DESIGNATED NATURAL AREAS

As previously documented in the IPD, there are several provincially designated or provincially mapped natural features within the study area including:

- Georgina Island PSW

- Virginia Beach Wetland Complex (non-PSW)
- Stratum 2 Deer Wintering Area (i.e., SWH)
- Sibbald Point Provincial Park (Recreation Class)
- Greenbelt Policy Area (2017) (protected countryside – mainland only)
- Growth Plan for the Greater Golden Horseshoe (2019) (mainland only)

Except for the Greenbelt Policy Area and Growth Plan, these features are mapped on **Figure D-9** and additional information about each of these designated areas is provided below.

There are no other designated natural features within the study area. Specifically, there are no Areas of Natural and Scientific Interest (ANSIs), no Environmentally Significant Areas (ESAs), and the study area is not located within the Oak Ridges Moraine Conservation Plan (ORMCP) Area.

All of the study area, as well as Lake Simcoe, is within the LSPP Area.

14.2.3.2.2.1 Provincially Significant Wetlands

Provincially mapped wetlands, including PSWs, evaluated non-PSW wetlands and unevaluated wetlands are present within the study area. These wetlands are mapped on **Figure D-9**. The Georgina Island Wetland is a PSW that includes swamp and marsh communities across Georgina Island, including the large marsh at the southwest tip of Georgina Island, within the study area. There are also unevaluated wetlands surrounding this PSW.

Virginia Beach Wetland Complex was evaluated by LSRCA in 1994 and is mapped as a non-PSW within and beyond the Bayvista Property. This wetland was re-evaluated by MNR in 2005 and 2012, with the latest recommendation being that it be complexed with the Sibbald Point Wetland Complex PSW to the west (MNRF, 2015c). Therefore, this feature should be considered a candidate PSW.

No wetlands are mapped in the provincial database on the West Property.

14.2.3.2.2.2 Stratum 2 Deer Wintering Area

Deer Wintering (yard) Areas are mapped by the MNR and include both Stratum 1 and Stratum 2 areas. Stratum 2 areas are typically a mix of deciduous and coniferous tree species with plenty of available browse, in association with agricultural areas. Deer generally use these areas in early winter and may remain in these areas in mild winters (MNRF, 2015a). A Stratum 2 Deer Wintering Area is mapped in the study area on the West Property (**Figure D-9**). Stratum 1 Deer Wintering Areas are the core parts of a deer yard and are typically included within Stratum 2 areas. These areas typically comprise coniferous trees (pine, hemlock, cedar and spruce) and are critical for survival in severe winters (MNRF, 2015a). There are no Stratum 1 Deer Wintering Areas mapped within the study area.

14.2.3.2.2.3 Provincial Parks

Sibbald Point Provincial Park is located to the west outside the study area (**Figure D-9**). This park is managed as a Recreation Class Park. The recreational classification has been assigned “in recognition of the variety and quality of recreation opportunities it provides and its vicinity to population centre in central and southern Ontario” (MNRF, Sibbald Point Provincial Park

Management Plan, 2015d). There are three zones within the park: Historical, Natural Environment and Development. The Historical Zone includes the 8 ha Sibbald Estate. The Natural Environment Zones include Sibbald Creek and its riparian buffer (18 ha), the Southern Forested Area (41 ha), Lake Simcoe Lakebed (19 ha) and the Shore Bluff (5 ha). The Development Zones contain areas of the park that support intensive day-use and camping activities and includes roads, structures, beaches, picnic areas, car campgrounds, service and maintenance facilities, offices and other buildings (MNRF, Sibbald Point Provincial Park Management Plan, 2015d).

14.2.3.2.3 VEGETATION CLASSIFICATION, WETLAND DELINEATION AND BOTANICAL INVENTORY

Cambium completed ELC characterization and delineation as well as a three-season botanical inventory within the study area. Ten (10) terrestrial vegetation community types and six wetland vegetation community types were delineated on the Island properties. On the Bayvista Property, there were seven terrestrial vegetation community types and four wetland vegetation community types delineated. On the West Property, there were nine terrestrial vegetation community types and three wetland vegetation community types identified. The identified vegetation community types are all common in Ontario (i.e., ranked S4, S4S5 or S5). Where additional information was required to assign vegetation community classification, soil characterization using a hand auger was completed (Cambium Inc., 2023). Vegetation Communities are illustrated Figure D-10 through Figure D-13.

Wetland boundaries within the GIFL study area were delineated by Cambium staff, in accordance with the OWES protocols. Wetland boundaries were recorded in the field using a hand-held Global Positioning System (GPS) and are illustrated on Figure D-10 through Figure D-13. Some of the field-verified mapping was consistent with provincial mapping, however refinements were made to all wetlands, and previously unmapped wetlands were documented on the West Property (Cambium Inc., 2023).

A total of 319 vascular plant species were identified during the 2022 field surveys completed by Cambium (Cambium Inc., 2023). Of the 319 species identified, 246 (77%) were native species. The majority of the native species identified are considered to be provincially common or secure (i.e., ranked S4 or S5). Two (2) vascular plant SAR were identified, as follows:

a) Black Ash (Fraxinus nigra; Fed: THR; Prov: END, S3) – observed on all properties
b) Butternut (Juglans cinerea; Fed: END; Prov: END, S2?2) – observed on the Island and West Property

Summary information for the three properties is provided in **Table D-3**, with additional details and a completed vascular plant list provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

[2] '?' denotes inexact or uncertain numeric rank

Table D-3: Vascular Plant Species Documented within the Study Area

Property	Total Species	Native Species
Island Properties	211	178 (84%)
Bayvista Property	198	151 (76%)
West Property	216	163 (75%)

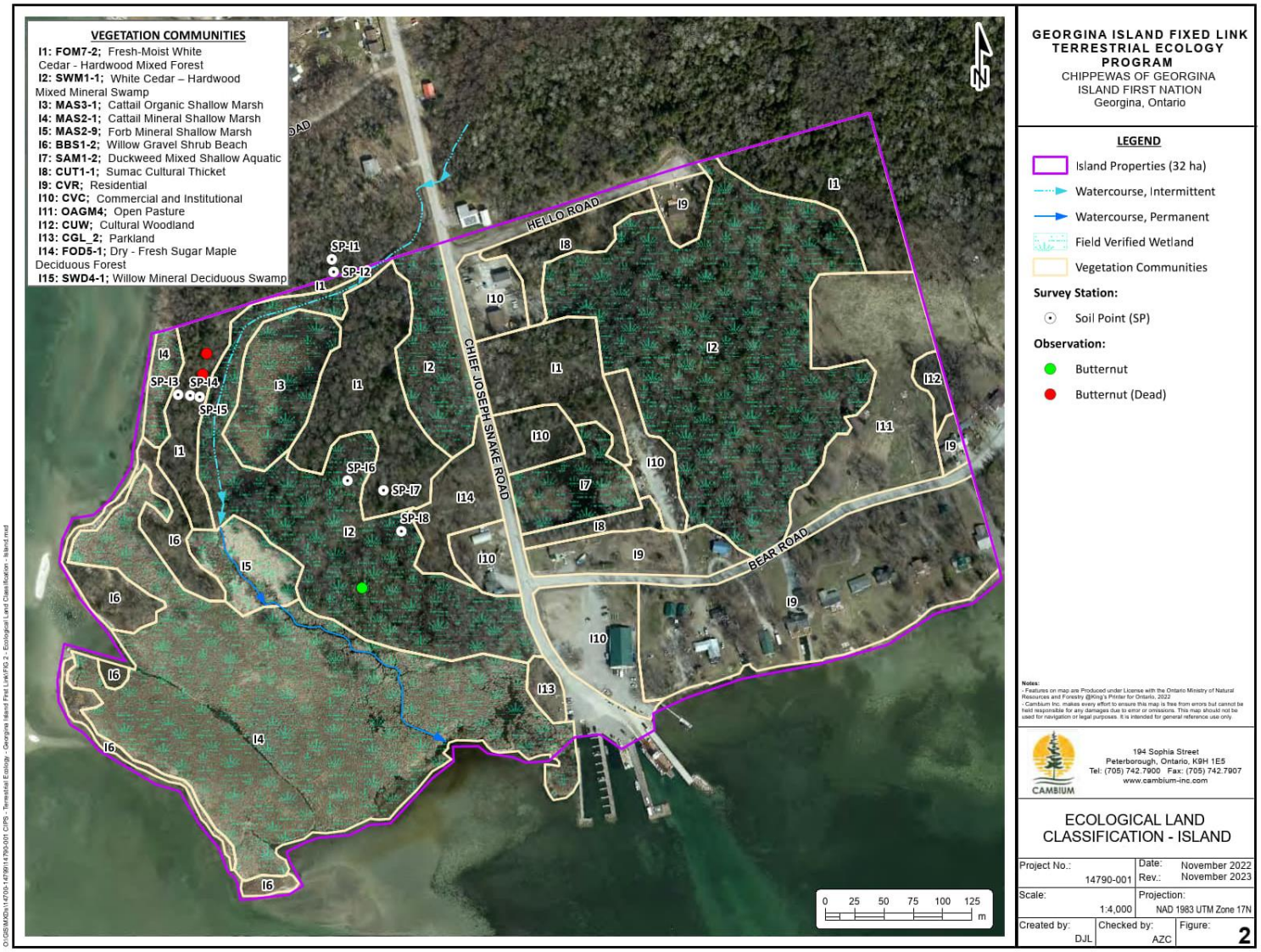


Figure D-10 Ecological Land Classification – Georgina Island (Cambium Inc., 2023)

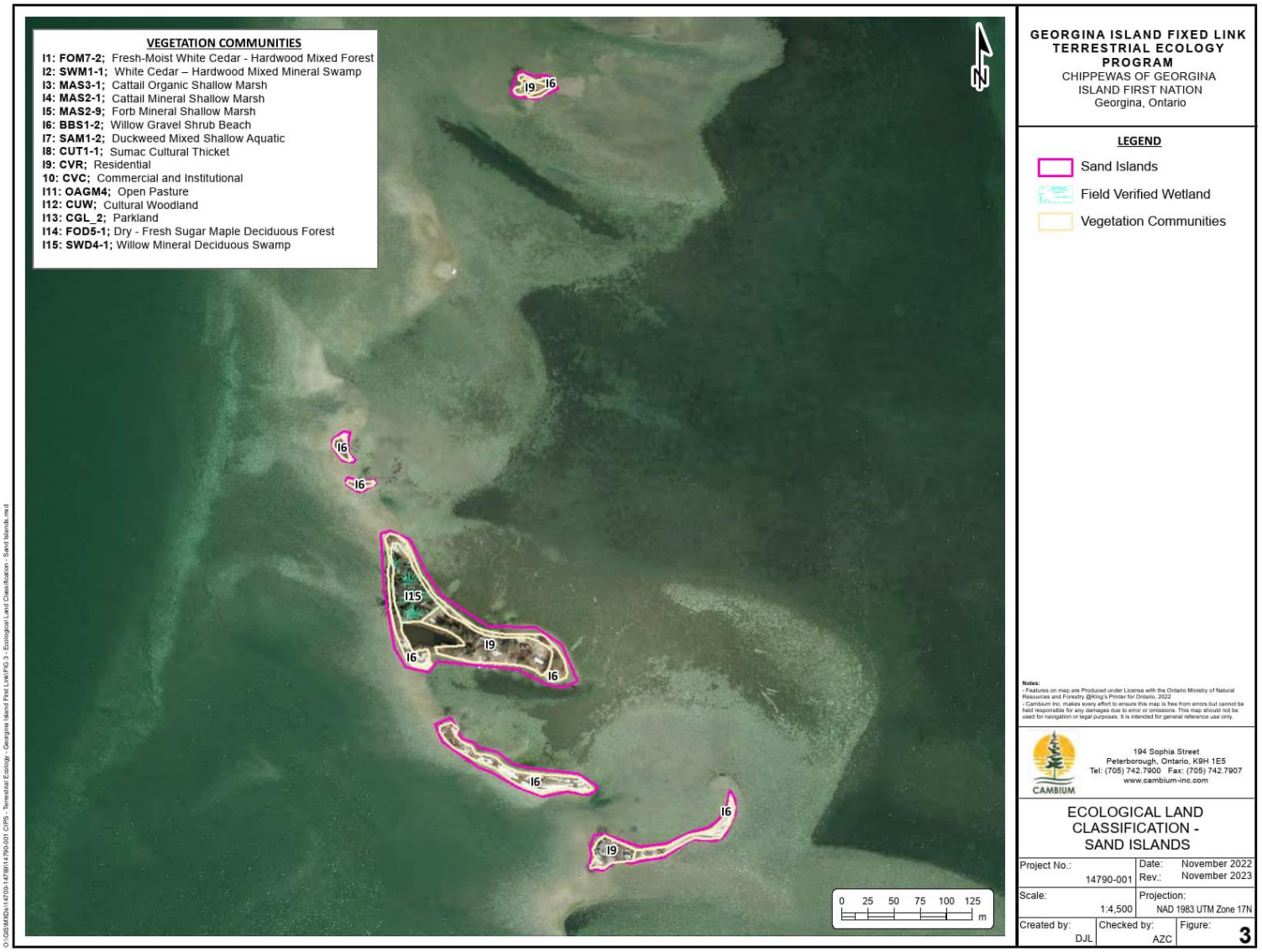


Figure D-11 Ecological Land Classification - Sand Islands (Cambium Inc., 2023)

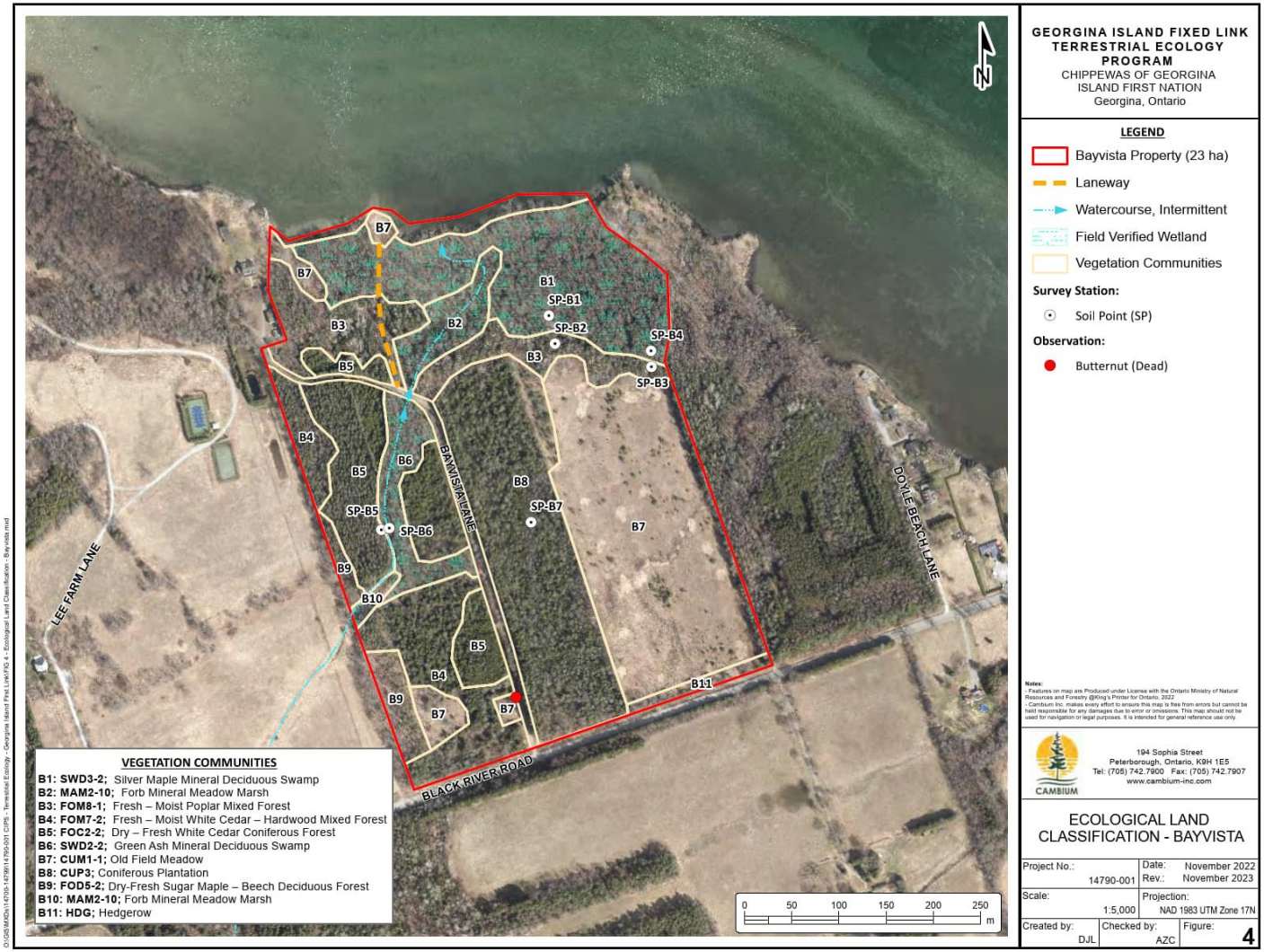


Figure D-12 Ecological Land Classification - Bayvista Property (Cambium Inc., 2023)

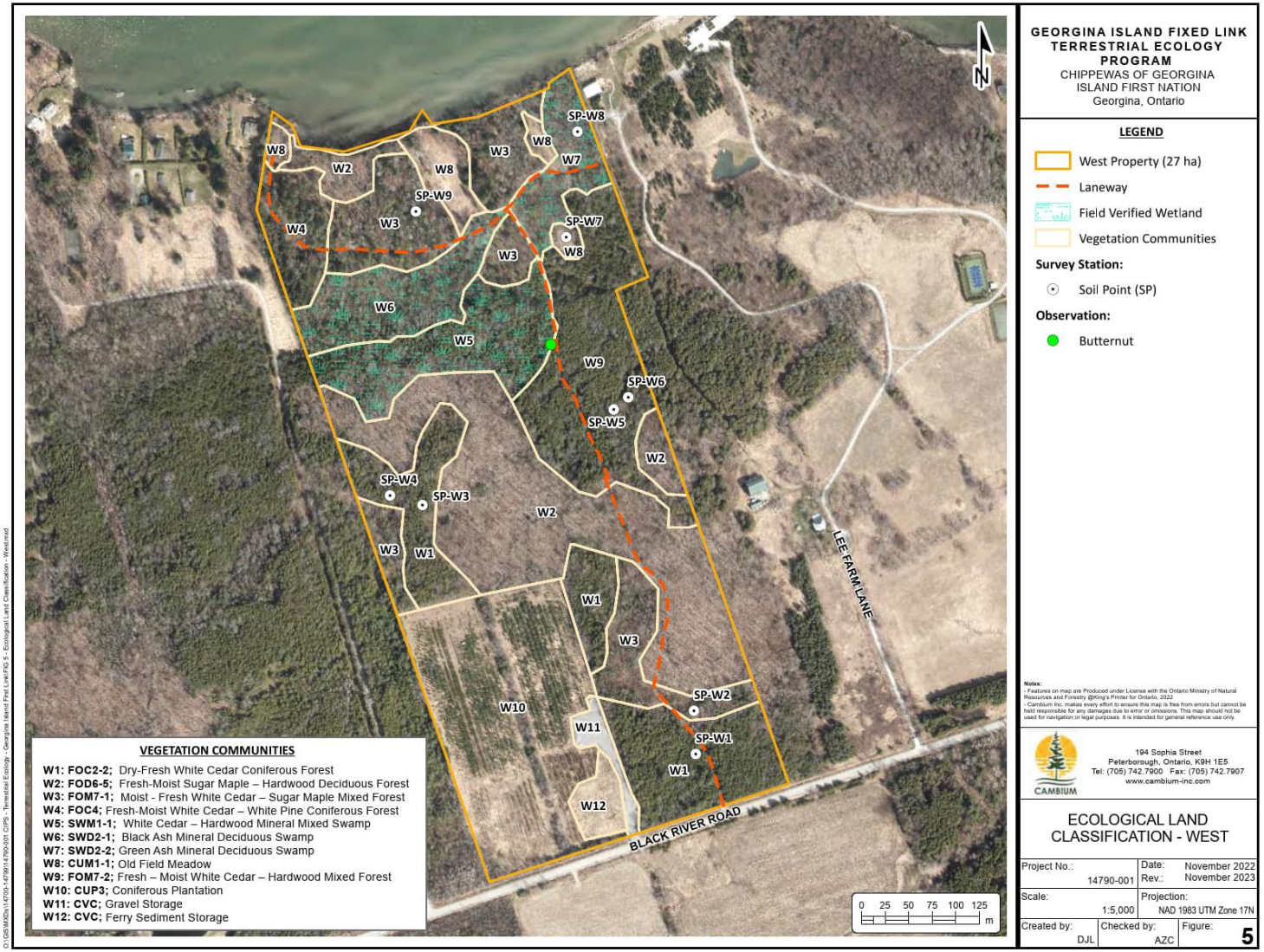


Figure D-13 Ecological Land Classification - West Property (Cambium Inc., 2023)

14.2.3.2.4 AVIFAUNA

14.2.3.2.4.1 Breeding Bird Surveys

Cambium documented some level of breeding evidence (i.e., possible, probable, or confirmed) for a total of 75 avian species within the study area (Cambium Inc., 2023). Of these 75 species, 31 exhibited probable or confirmed breeding evidence. Area sensitive birds were also documented on all three properties. Additional summary information is provided in Table D-4, with further detail provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). Additional discussion about SWH and SAR are provided in subsequent sections.

Table D-4: Avifauna Results Summary

Property	Total No. with breeding evidence	Area Sensitive Bird Species Species Concern and Rare Wildlife Species	Avian SAR (THR and END)
Island Properties	56 species	<u>Area-Sensitive Species: Seven species:</u> • Blackburnian Warbler (*Setophaga fusca*) • Black-throated Green Warbler (*Setophaga virens)* • Blue-headed Vireo (*Vireo solitarius*) • Northern Parula (*Setophaga americana*) • Ovenbird (*Seiurus aurocapilla)* • Veery (*Catharus fuscescens*) • Winter Wren (*Troglodytes hiemalis)* <u>SC and Rare Wildlife Species:</u> • Great Egret (S2B) • Eastern Wood-pewee (Fed: SC; Prov SC)	**Least Bittern** (Fed: THR; Prov: THR; *Ixobrychus exilis*) **Bank Swallow** (Fed: THR; Prov: THR; *Riparia riparia*) **Barn Swallow** (THR; *Hirundo rustica*)
Bayvista Property	42 species	<u>Area-Sensitive Species: Five species:</u> • Black-throated Green Warbler • Ovenbird • Veery • Winter Wren • Yellow-bellied Sapsucker (*Sphyrapicus varius*) <u>SC and Rare Wildlife Species:</u> • Eastern Wood-pewee (Fed: SC; Prov SC)	**Eastern Whip-poor-will** (Fed: THR; Prov: SC) **Wood Thrush** (Fed: THR; Prov: SC)

Property	Total No. with breeding evidence	Area Sensitive Bird Species Species Concern and Rare Wildlife Species	Avian SAR (THR and END)
West Property	44 species	Area-Sensitive Species: Six species: • Blackburnian Warbler • Black-throated Blue Warbler (*Setophaga caerulescens*) • Black-throated Green Warbler • Ovenbird • Scarlet Tanager (*Piranga olivacea*) • Winter Wren SC and Rare Wildlife Species: • Eastern Wood-pewee (Fed: SC; Prov SC)	None Observed

14.2.3.2.4.2 Least Bittern Surveys

Although targeted Least Bittern (Fed: THR; Prov: THR) surveys were not originally scoped as part of this Project (based on guidance from the MECP), Cambium staff encountered two Least Bittern nests (each containing five eggs) during TBS within the large cattail marsh at the south tip of Georgina Island on May 24, 2022. Several additional incidental observations of Least Bittern were made during the survey season in the same vicinity (Cambium Inc., 2023). Additional discussion about Least Bittern is included in the subsequent SAR section (**Section 14.2.3.2.8**).

14.2.3.2.4.3 Grassland Breeding Bird Surveys

Cambium completed Grassland Bird Surveys within suitable habitat in the study area, which was limited to a single ~5.4 ha Dry-Moist Old Field Meadow (CUM1-1) community on the Bayvista Property. Although this community meets the minimum size threshold, the vegetation composition and characteristics were sub-optimal. None of the target grassland bird species (i.e., Bobolink, Eastern Meadowlark, Grasshopper Sparrow) were observed, however a single Eastern Meadowlark was observed on the adjacent lands to the west of the Bayvista Property (Cambium Inc., 2023). Additional discussion about grassland birds, and Eastern Meadowlark, specifically, is included in the subsequent SAR section (**Section 14.2.3.2.8**).

14.2.3.2.4.4 Eastern Whip-poor-will Surveys

Both the Bayvista and West Properties had potentially suitable habitat for Eastern Whip-poor-will (Federal Status: THR; Provincial Status: THR (Fed: THR; Prov: THR)), therefore targeted surveys were completed by Cambium on both mainland properties in 2022. Three survey stations were located on the Bayvista Property and two surveys stations were located on the West Property. Evening surveys were completed three times at each station per the survey protocols (Cambium Inc., 2023).

One Eastern Whip-poor-will was heard calling during the third round of surveys in June on the Bayvista Property. In addition, an individual was flushed during daytime terrestrial surveys in early May on the Bayvista Property. Additional surveys were completed in 2023 on the Bayvista Property to attempt to better define the habitat and address future regulatory requirements for this species. No Eastern Whip-poor-will were documented during the 2023 surveys (Cambium Inc., 2023). Additional discussion of Eastern Whip-poor-will is included in the subsequent SAR section (**Section 14.2.3.2.8**).

14.2.3.2.4.5 Waterfowl Nesting Surveys

Waterfowl nesting surveys were completed by Cambium in suitable habitats, which included portions of the Island and Bayvista Properties. Waterfowl nesting observations included Canada Goose, Mallard and Wood Duck, as well as potential for Common Merganser nesting. Groups of Common Mergansers with young were observed regularly by mid-June, in the nearshore area of the Bayvista Property as well as adjacent to the large marsh on Georgina Island. Additional waterfowl nesting surveys were completed in 2023 in one area on the island where access was limited in 2022 (i.e., within and surrounding community I7) (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.6 Woodland Raptor Nesting Survey

Cambium conducted a raptor stick nest survey in early May 2022. A total of three nests were observed and all were on the Bayvista Property. All were inactive and remained inactive through the survey period. The nests were checked again in early spring 2023 and no evidence of active nesting was observed. Additional raptor stick nest surveys were completed in winter 2022/2023. No additional stick nests were observed (Cambium Inc., 2023).

Raptor Nesting Surveys were conducted at survey stations on all properties. There were two surveys stations on the Island Properties, and three stations on each of the mainland properties. Call broadcast surveys were completed at each station on two occasions in May 2022 and again in April 2023. One Broad-winged Hawk (*Buteo platypterus*) responded to a broadcasted call from the Bayvista Property on April 20, 2023. The individual flew northwest towards Lake Simcoe; an active nest for this species was not located in the study area. The broadcast raptor calls also resulted in agitated behavior by a pair of Osprey on the Bayvista Property on May 31, 2022. The pair was observed perching and flying near the shoreline, but no nest was located (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.7 Bald Eagle and Osprey Nesting, Foraging and Perching Habitat Surveys

Given the highly visible nature of Bald Eagle and Osprey, specific survey stations were not established for these species, rather incidental observations were documented during all field visits completed by Cambium in 2022. Particular attention was also paid towards shoreline and nearshore areas, as well as forest communities with mature and/or super canopy trees (Cambium Inc., 2023).

Observations of Bald Eagle were made on several occasions, including flyovers and perching on adjacent lands. Probable breeding evidence for Osprey was observed on both the West and Bayvista Properties, based on the presence of a pair observed in suitable habitat during the breeding season. It is unknown whether the pairs observed were the same individuals. No nests

were observed within the study area (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.8 Waterfowl Stopover and Staging Area Surveys

Eleven (11) waterfowl stopover and staging area surveys were completed between September 27 and December 13, 2022. Most waterfowl were documented in the open water around the south tip of Georgina Island and the Sand Islands. Variation in species assemblage and abundance was noted throughout the survey period. In the early stages of the survey period, the most common species observed were American Black Duck (*Anas rubripes*), Canada Goose (*Branta canadensis*), Common Goldeneye (*Bucephala clangula*) and Gadwall (*Mareca strepera*). An increase in waterfowl abundance was documented from November 1 onwards, with the most common waterfowl species observed at this time being Bufflehead (*Bucephala albeola*), Canada Goose, and Common Goldeneye. Another spike in observations occurred during the November 23 survey, when a total of approximately 1163 individuals were documented. The most abundant species during this survey were Canada Goose, Common Merganser (*Mergus merganser*), Bufflehead, Common Goldeneye and Hooded Merganser (*Lophodytes cucullatus*) (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.9 Shorebird Migratory Stopover Surveys

Ten shorebird surveys were completed between July 26 and October 25, 2022. There were occasional observations of Least Sandpiper (*Calidris minutilla*) and Semipalmated Plover (*Charadrius semipalmatus*), however shorebird abundance was low throughout the survey period and no shorebird observations were made after the survey conducted on September 15. Habitat conditions are not ideal for shorebirds as there are limited shallow areas for wading and foraging (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.10 Winter Raptor Survey

Winter surveys were conducted on four occasions from December 13, 2022 through March 8, 2023 and no raptors were documented utilizing the study area during these visits, although eight Bald Eagle were observed at the edge of the ice along the ferry route on January 24, 2023 (Cambium Inc., 2023). Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.4.11 Pileated Woodpecker Habitat Surveys

Pileated Woodpecker nesting habitat surveys were conducted in winter 2022/2023, focusing on the area within 30 m of the alignment alternatives. A single active Pileated Woodpecker nest was documented on the West Property, outside of the 30 m survey area. No other Pileated Woodpecker nests were documented (Cambium Inc., 2023).

14.2.3.2.4.12 Gull Nesting Surveys

Five gull nesting surveys between May 5 and June 14, 2023, were completed at two sites on the Sand Islands. Evidence of gull nesting was documented during all five survey dates. A total of 55 gull nests were observed including three herring Gull nests on the southernmost Sand Island and 52 Ring-billed Gull nests on the second most southern island.

Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.5 HERPETOFAUNA

14.2.3.2.5.1 Amphibians

A total of 10 amphibian species were recorded by Cambium within the study area, both during targeting amphibian calling surveys and incidentally during other field investigations (Cambium Inc., 2023). A summary of the findings for each property is presented in Table D-5 with further detail provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). Additional discussion about amphibian SWH and SAR are provided in subsequent sections.

Table D-5: Amphibian Observations Summary

Property	Total No of species	Species Observed and highest level of breeding evidence documented	SAR (THR and END)
Island Properties	10 species	• American Bullfrog[3] (*Lithobates catesbeianus*) – L2 breeding • American Toad (*Anaxyrus americanus*) – L3 breeding • Blue Spotted Salamander (*Ambystoma laterale*) • Gray Treefrog (*Hyla versicolor*) – L3 breeding • Green Frog (*Lithobates clamitans*) – L3 breeding • Northern Leopard Frog (*Lithobates pipiens*) – L3 breeding • Pickerel Frog (*Lithobates palustris*) – L1 breeding • Spring Peeper (Pseudacris crucifer) – L3 breeding • Western Chorus Frog (*Pseudacris triseriata*) – L2 breeding • Wood Frog (*Lithobates sylvaticus*) – L1 breeding	**Western Chorus Frog** (Fed: THR; Prov: Not at Risk [NAR])
Bayvista Property	5 species	• American Toad – L2 breeding • Blue Spotted Salamander • Gray Treefrog – L2 breeding • Spring Peeper – L3 breeding • Western Chorus Frog – L3 breeding	**Western Chorus Frog** (Fed: THR; Prov: NAR)

[3] understood to have cultural significance to GIFN

Property	Total No of species	Species Observed and highest level of breeding evidence documented	SAR (THR and END)
West Property	5 species	• American Toad – L1 breeding • Gray Treefrog – L1 breeding • Spring Peeper – L1 breeding • Western Chorus Frog – L2 breeding • Wood Frog – L1 breeding	**Western Chorus Frog** (Fed: THR; Prov: NAR)

14.2.3.2.5.2 Snakes

Cambium completed combined ACO / Visual Encounter Surveys (VES) surveys during the active season, according to the survey protocols. The total VES survey areas within the study area include ~0.34 ha on the Island Properties; ~6.9 ha on the Bayvista Property; and ~5.8 ha on the West Property (i.e., a total of ~13 ha). Therefore, the combined survey effort was ~180 hours in 2022 over 10 surveys; and the protocol requirement of one hour/ha was met. An additional 10 ACO surveys were completed in 2023 to document use one year after deployment. An additional ~135 hours of survey effort was contributed in 2023 (Cambium Inc., 2023).

Two snake species were observed on multiple occasions within the study area, on each of the three properties: Eastern Gartersnake (*Thamnophis sirtalis*) and Northern Watersnake (*Nerodia sipedon*). Neither of the observed species is federally or provincially at risk. Further information regarding the survey areas, level of effort and survey findings is provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

Additional discussion about SWH is provided in the subsequent SWH section (**Section 14.2.3.2.7**).

14.2.3.2.5.3 Turtles

Cambium completed TBS in 2022 with additional TBS completed at two new survey stations in 2023. There is ~7.0 ha of suitable basing / overwintering habitat on Georgina Island and ~3.5 ha of suitable basking / overwintering habitat on the Bayvista Property. Search effort was >2 hours of person time per hectare, in accordance with the protocol requirements. Surveys were completed between May 5 and June 1, 2022, and in one location (TBS Area 3) on the Island, an additional six surveys were completed between April 13 and May 16, 2023 (Cambium Inc., 2023).

Cambium completed a total of five TNS in 2022, with additional TNS completed at TNS Area 2 and TNS Area 8 in 2023. Surveys were completed according to survey protocols. Nesting surveys were completed in suitable habitat on Georgina Island, the Sand Islands, Bayvista Property and West Property within the study area. Five surveys were completed between June 1 and June 21, 2022. In 2023, an additional five TNS were completed in TNS Area 2 between May 25 and June 14, and on one date (June 14) in TNS Area 8 (Cambium Inc., 2023).

A total of two turtle species were observed: Midland Painted Turtle (*Chrysemys picta;* Fed: SC; Prov: NAR) and Snapping Turtle (*Chelydra serpentina;* Fed: SC; Prov: SC). Multiple individuals of both species were observed basking on several occasions in the marsh on Georgina Island,

community I7, and in the swamp community on the Bayvista Property. Several potential / confirmed turtle nests were discovered on Georgina Island within the study area, indicating that nesting is occurring in the local area (Cambium Inc., 2023).

MECP confirmed in 2022 that Blanding's Turtle (*Emydoidea blandingii*; Fed: END; Prov: THR) has been documented on the mainland, within 250 m of the study area. According to the Wetland Evaluation on Georgina Island (Toronto Zoo, 2015), there are also reports of Blanding's Turtle from the marsh on Georgina Island. No Blanding's Turtles were observed during any of the targeted turtle surveys or at any other time during Cambium's 2022 and 2023 field program; however, according to the MNR survey protocol (MNRF, 2015b), additional targeted surveys would be required to confirm absence.

No Spotted Turtles (*Clemmys guttata*; Fed: END; Prov: END) were observed during any of the targeted turtle surveys or at any other time during Cambium's 2022 and 2023 field program. However, the species is known to occur in Southern Ontario and suitable habitat exists in the study area (Cambium Inc., 2023).

Additional discussion about SWH and SAR are provided in subsequent sections (**Section 14.2.3.2.7 and Section 14.2.3.2.8**).

14.2.3.2.6 MAMMALS

14.2.3.2.6.1 Bat Surveys

Cambium completed Bat Maternity Roost Habitat Assessment Surveys as well as Bat Acoustic Monitoring in 2022. Maternity roost surveys were completed to determine the potential for Bat Maternity Colonies (SWH) and to guide the placement of acoustic monitoring devices. Acoustic surveys were completed to detect the presence of SAR Bats. Details of the assessment methodologies are found within the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

According to Cambium (2023b), using the plot-based assessment approach, the survey areas met the density threshold of greater than or equal to 10 snag trees / ha for consideration as SWH for Bat Maternity Colonies. The calculated total snag density for forested communities on each property were: 25.5 snag trees / ha (Island), 27 snag trees / ha (Bayvista) and 28.8 snag trees / ha (West Property) (Cambium Inc., 2023).

The acoustic monitoring surveys included devices deployed on all three properties (i.e., Island, Bayvista, West). Four passive acoustic monitoring devices were deployed for a minimum of 10 nights in June 2022, with suitable weather conditions, with supplemental data collected at alternate locations in July and August 2022. Results were analyzed using the automatic species identification feature of the Wildlife Acoustics Kaleidoscope Pro Version 5.4.8 software package to analyze all ultrasonic recordings (Cambium Inc., 2023).

The acoustic monitoring results identified the presence of eight bat species in the study area, including all four SAR bat species: Eastern Small-footed Myotis (Fed: Not listed; Prov: END), Little Brown Myotis (Fed: END; Prov: END), Northern Myotis (Fed: END, Prov: END) and Tri-coloured Bat (Fed: END; Prov: END). Two of the common bat species documented are the two bat species that inform SWH determination for Bat Maternity Colonies: Silver-haired Bat and Big Brown Bat. A summary of the bat acoustic monitoring results is presented in Table D-6, with

additional details provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). Additional discussion about SWH and SAR are provided in subsequent sections (**Section 14.2.3.2.7 and Section 14.2.3.2.8**).

Table D-6: Summary of Bat Acoustic Monitoring Results

Survey Station	Date Range Deployed	Observations[4] p<0.05 (high probability)	p<0.1 (medium probability)	p>0.1(low probability)
Island Property				
BA-I1	June 08-22, 2022	Silver-haired Bat **Little Brown Myotis** **Tri-coloured Bat**	None	Big Brown Bat Eastern Red Bat Hoary Bat **Eastern Small-footed Myotis** **Northern Myotis**
BA-I2	June 08-20, 2022	Silver-haired Bat **Eastern Small Footed Myotis** **Little Brown Myotis** **Northern Myotis** **Tri-colored Bat**	None	Big Brown Bat Eastern Red Bat Hoary Bat
Bayvista Property				
BA-B1	June 08-20, 2022	Hoary Bat	None	Silver-haired Bat **Little Brown Myotis**
BA-B2	July 05-18, 2022	None	None	None
BA-B2	July 21-Aug 04, 2022	Big Brown Bat Hoary Bat Silver-haired Bat **Little Brown Myotis** **Tri-colored Bat**	None	Eastern Red Bat **Eastern Small-footed Myotis** **Northern Myotis**
BA-B3	July 05-18, 2022	Big Brown Bat Hoary Bat Silver-haired Bat **Eastern Small Footed Myotis** **Little Brown Myotis** **Northern Myotis**	None	Eastern Red Bat **Tri-colored Bat**
West Property				
BA-W1	June 8-20, 2022	Big Brown Bat Silver-haired Bat **Little Brown Myotis** **Tri-colored Bat**	None	Eastern Red Bat Hoary Bat **Eastern Small-footed Myotis**
BA-W2	July 05-18, 2022	Hoary Bat Silver-haired Bat **Little Brown Myotis**	**Tri-colored Bat**	Big Brown Bat **Northern Myotis**
BA-W3	July 05-18, 2022	Big Brown Bat Eastern Red Bat Hoary Bat Silver-haired Bat **Little Brown Myotis**	**Tri-colored Bat**	**Northern Myotis**

[4] Bolded species are SAR

14.2.3.2.6.2 Winter Wildlife Surveys

Winter wildlife surveys were completed by Cambium staff on four dates: December 13 and 21, 2022, January 24 and March 8, 2023. Many tracks, trails, scat and signs of browse were observed on each of the three properties. A summary of the key findings for each property are outlined below, with additional details provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

On the Island property, evidence of seven wildlife species was documented: White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), River Otter (*Lontra canadensis*), Red Squirrel (*Tamiasciurus hudsonicus*), Raccoon (*Procyon lotor*), Eastern Cottontail (*Sylvilagus floridanus*) and a mouse species. There were also seven wildlife species observed on the Bayvista Property during the winter site visits: White-tailed Deer, Coyote, Red Squirrel, Eastern Cottontail, Raccoon, Wild Turkey (*Meleagris gallopavo*) and a mouse species. Coyote tracks were the most prevalent tracks observed on the Bayvista Property. A total of six wildlife species were documented on the West Property: White-tailed Deer, Coyote, Eastern Cottontail, Red Squirrel, Ruffed Grouse (*Bonasa umbellus*) and a mouse species (Cambium Inc., 2023).

14.2.3.2.6.3 Insect Surveys

Insect surveys were completed on six dates between May 24 and September 14, 2022. The inspect species documented included 10 bee genera, four fly genera, three beetle genera, three wasp genera, two true bug general, one grasshopper genus, five spider genera, 16 lepidoptera genera and six odonata genera. An additional 21 insects could not be identified to genus level but were identified to the lowest taxonomic level possible (e.g., order or family). Of the insect species observed, two species are considered SC species, both federally and provincially: Monarch (*Danaus plexippus*) and Yellow-banded Bumblebee (*Bombus terricola*). Monarch was observed on all three properties while Yellow-banded Bumblebee was observed only on the West Property (Cambium Inc., 2023). Additional discussion about SWH is provided **Section 14.2.3.2.7.**

14.2.3.2.6.4 Terrestrial Crayfish

Habitat-based surveys for terrestrial crayfish evidence (i.e., chimneys and/or burrows) were completed concurrently with other terrestrial surveys, through the duration of the field program. Crayfish burrows were documented in several locations, on the Island and Bayvista Properties (Cambium Inc., 2023). Additional discussion about SWH is provided **Section 14.2.3.2.7.**

14.2.3.2.6.5 General Wildlife and Wildlife Habitat Observations

Incidental observations of wildlife were documented during all surveys, with locations of notable observations documented by GPS. Where wildlife observations were made by others (e.g., CIPS staff), these were also integrated into the wildlife species lists presented in the appendices of the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023).

14.2.3.2.7 SIGNIFICANT WILDLIFE HABITAT

SWHs are natural heritage features that are afforded protection from development and site alteration under the *Provincial Policy Statement* (PPS) (Ministry of Municipal Affairs and Housing, 2020), which is issued under the *Planning Act*. The MNR produced guidance

documents in 2015, to assist in the identification of SWH in Ecoregions of Ontario. The SWH Criteria Schedules for Ecoregion 6E is the relevant guidance document for the study area. Cambium completed a SWH screening using this guidance document and the results of the 2022 / 2023 field investigations to identify candidate and/or confirm SWH features within the study area.

A summary table of relevant SWH for the study area is provided in **Table D-7**, with further details of the SWH assessment provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). All candidate and confirmed SWH types identified within the study area (Cambium Inc., 2023) are on Figure D-14 and Figure D-21.

Table D-7: Significant Wildlife Habitat Summary

SWH Type	SWH Criteria and Results	Confirmed / Candidate
Island Properties (Figure D-14, Figure D-15, Figure D-16, and Figure D-17)		
Amphibian Breeding Habitat (Woodland)	SWH Criteria: Confirmed based on the presence of a breeding population of one or more of the listed newt / salamander species, or two or more of the listed frog species with at least 20 individuals (adults or egg masses) or two or more of the listed frog species with Call Level Codes of 3 (L3). Results: • ACS2 (Community I1, I2, and I4): Spring Peeper (L3), Gray Treefrog (L3) • ACS3 (Community I2): Spring Peeper (L3), Gray Treefrog (L3) • ACS9 (Community I7): Spring Peeper (L3), Gray Treefrog (L3) Blue-spotted Salamander were also observed along the shoreline of Community I2, which further supports the designation of SWH for Amphibian Breeding Habitat (Woodlands).	**Confirmed**
Amphibian Breeding Habitat (Wetland)	SWH Criteria: Confirmed by the presence of a breeding population of one or more of the listed newt / salamander species or two or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog/toad species with Call Level Codes of 3 (L3); or wetland with confirmed breeding Bullfrogs. Results: • ACS1 (Community I4 and I5): American Toad (L3), Green Frog (L3), Bullfrog (L2) • ACS9 (Community I7): Green Frog (L3), Gray Treefrog (L3)	**Confirmed**
Colonially-Nesting Bird Breeding Habitat (Ground)	SWH Criteria: Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. Results: A total of 52 Ring-billed Gull nests and three Herring Gull nests across the two southernmost Sand Islands were documented in spring 2023. Both islands have been mapped as SWH.	**Confirmed**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
Colonially-Nesting Bird Breeding Habitat (Tree/Shrub)	SWH Criteria: Presence of five or more active nests of Great Blue Heron or other listed species (i.e., Black-crowned Night-heron, Great Egret, Green Heron). Results: • A pair of Great Egret was observed in the breeding season in the large cattail marsh (Community I4). No nests were observed in the surrounding trees. Five active nests would be required to confirm this SWH.	**Candidate**
Marsh Bird Breeding Habitat	SWH Criteria: Presence of five or more nesting pairs of Sedge Wren or Marsh Wren or one pair of Sandhill Cranes; or breeding by any combination of five or more of the listed species (i.e., American Bittern, American Coot, Common Loon, Common Moorhen, Green Heron, Marsh Wren, Pied-billed Grebe, Sandhill Crane, Sedge Wren, Sora, Trumpeter Swan, Virginia Rail, Black Tern or Yellow Rail). In addition, any wetland with breeding of at least one Black Tern, Green Heron, Trumpeter Swam, or Yellow Rail is SWH. Results: • Targeted surveys of Community I4 were hindered by the decision avoid interference with the confirmed Least Bittern nesting habitat in this community. • Observations from the periphery of Community I4 indicate possible / probable breeding evidence of three listed species: Trumpeter Swan, Black Tern, and Common Loon.	**Candidate**
Special Concern and Rare Wildlife Species	SWH Criteria: Confirmed through presence of an SC or rare wildlife species in habitat that supports an important life stage component for the species (e.g., nesting habitat or foraging habitat). Results: • A pair of Great Egret (S2B) was observed in the breeding season (indicating probable breeding) in Community I4. • Eastern Wood-pewee (SC) was documented in several locations, including at BBS stations: BBS-I1, BBS-I2, BBS-I4 and BBS-I7. • A total of 29 Black Terns (SC, *Chlidonias niger*) were observed on the Sand Islands in Community I6.	**Confirmed** (Great Egret, Eastern Wood-pewee, Black Tern, Snapping Turtle and Monarch)

SWH Type	SWH Criteria and Results	Confirmed / Candidate
	• Multiple Snapping Turtle (SC) individuals were documented in suitable habitat (i.e., Communities I3, I4, I5 and I7). • Monarch (SC) was observed in suitable habitat in Community I11.	
Terrestrial Crayfish	SWH Criteria: Confirmed by the presence of one or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or terrestrial sites. Results: • Crayfish chimneys were observed along the fringes of the watercourse within Community I2.	**Confirmed**
Turtle Nesting Area	SWH Criteria: Confirmed by the presence of five or more nesting Midland Painted Turtles, or one or more nesting Northern Map Turtle or Snapping Turtle. Results: • Turtle nesting evidence was observed in several locations on the island. Eight Midland Painted Turtles were observed actively nesting in Community I10 and one on the shoulder of Chief Joseph Snake Road. Community I10 was classified as 'Commercial and Institutional' in ELC since it was a cleared area of exposed and deposited gravel. These disturbed habitats do not qualify as SWH. However, Cambium recommends that all locations with evidence of turtle nesting within natural areas be considered Candidate SWH.	**Candidate**
Turtle Wintering Area	SWH Criteria: Confirmed by the presence of five or more overwintering Midland Painted Turtles, or one or more overwintering Northern Map Turtle or Snapping Turtle. Results: • Communities I3, I4, I5 and I7 had congregations of Midland Painted Turtle and/or Snapping Turtle observed in early spring and met the basic habitat criteria for overwintering habitat.	**Confirmed** (Communities I3, I4, I5 and I7)
Bat Maternity Colonies	SWH Criteria:	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
	Confirmed by the presence of Maternity Colonies with confirmed use by >10 Big Brown Bats or > 5 Adult Femail Silver-haired Bats. The area of habitat includes the entire woodland or a forest stand ELC ecosite or an Ecoelement containing the maternity colonies. Candidate SWH includes mature or mixed forest stands with >10 large diameter (>25 cm diameter at breast height (DBH)) wildlife trees per ha. Results: • The woodlands on the island west of Chief Joseph Snake Road met the density threshold of 10 snag trees / ha and a high number of Silver-haired Bats (1926 passes) were documented at one of the Island Acoustic Monitoring Stations (BA-I1). While maternity colonies are likely present, these were not confirmed. The entire woodland west of Chief Joseph Snake Road is therefore considered Candidate SWH. • The woodlands on the east side of Chief Joseph Snake Road are considered to be *potential* Candidate SWH as maternity roost and acoustic surveys were not completed in these communities.	
Waterfowl Stopover and Staging Areas (Aquatic)	SWH Criteria: Confirmed by aggregations of 100 or more individuals of the listed species for seven days, resulting in >700 waterfowl use days. Results: Surveys completed in fall 2022 confirmed >700 habitat use days by SWH listed waterfowl species. Observations were made in the nearshore aquatic areas both south of Georgina Island and along the mainland properties. The entire Shorebird and Waterfowl Survey Area and an adjacent 100 m has been mapped as SWH for this category.	**Confirmed**
Snake Hibernaculum	SWH Criteria: Confirmed by the presence of a snake hibernaculum used by a minimum of five individuals of a listed snake species or individuals of two or more snake species. May also be confirmed by congregations of five individuals of a snake or individuals of two or more species near a potential hibernaculum, on sunny warm days. Results: Surveys in 2022 and 2023 did not confirm the presence of a hibernaculum or potential hibernaculum, however it is difficult to rule out this SWH given that two of the listed snake species (i.e., Eastern Gartersnake and Northern Watersnake) were observed on several	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
	occasions and all natural habitats except for aquatic habitats have the potential to support this SWH.	
Raptor Wintering Area	SWH Criteria: Confirmed by the presence of one or more Short-eared Owl, one or more Bald Eagle or at least 10 individuals and two of the listed hawk / owl species. The site must be a combination of fields and woodlands that provide roosting, foraging and resting habitats, and >20 ha. To be significant, the site must be used regularly (i.e., 3 in 5 years for a minimum of 20 days). Results: Although potentially suitable habitat is present in the forest / pasture east of Chief Joseph Snake Road, minimal use by raptors was documented in the winter / early spring surveys in 2022 and 2023. However, without further study, this SWH cannot be ruled out. Due to the winter observations of Bald Eagles in the study area, all potentially suitable habitat (>20 ha with combination of forest and upland cultural communities) are mapped as candidate SWH. For the island, this includes Communities I1, I2, I11 and I12, east of Chief Joseph Snake Road.	**Candidate**
Bayvista Property (Figure D-18 and Figure D-19)		
Amphibian Breeding Habitat (Woodland)	SWH Criteria: Confirmed based on the presence of a breeding population of one or more of the listed newt/salamander species, or two or more of the listed frog species with at least 20 individuals (adults or egg masses) or two or more of the listed frog species with Call Level Codes of 3 (L3). Results: • ACS5 (Community B1): Spring Peeper (L3), Western Chorus Frog (L3), Gray Treefrog (L3) Blue-spotted Salamander were also observed within Community B1, which further supports the designation of SWH for Amphibian Breeding Habitat (Woodlands).	**Confirmed**
Special Concern and Rare Wildlife	SWH Criteria: Confirmed through presence of an SC or rare wildlife species in habitat that supports an important life stage component for the species (e.g., nesting habitat or foraging habitat).	**Confirmed** (Eastern Wood-pewee,

SWH Type	SWH Criteria and Results	Confirmed / Candidate
	Results: • Eastern Wood-pewee (SC) documented in several locations, including at BBS stations: BBS-B2, BBS-B3, and BBS-B7 • Wood Thrush (SC) was documented at one station: WPW-B3 • Multiple Snapping Turtle (SC) individuals were documented in suitable habitat (i.e., Communities B1, and B2).	Wood Thrush, Snapping Turtle and Monarch)
Terrestrial Crayfish	SWH Criteria: Confirmed by the presence of one or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or terrestrial sites. Results: • Crayfish chimneys were observed along the fringes of the watercourse and at the fringes of the wetland / terrestrial interface between communities B1 and B3.	**Confirmed**
Turtle Wintering Area	SWH Criteria: Confirmed by the presence of five or more overwintering Midland Painted Turtles, or one or more overwintering Northern Map Turtle or Snapping Turtle. Results: • Community B1 had congregations of both Midland Painted Turtle and Snapping Turtle observed in early spring and meets the basic habitat criteria for overwintering habitat.	**Confirmed**
Bat Maternity Colonies	SWH Criteria: Confirmed by the presence of Maternity Colonies with confirmed use by >10 Big Brown Bats or > 5 Adult Femail Silver-haired Bats. The area of habitat includes the entire woodland or a forest stand ELC ecosite or an Ecoelement containing the maternity colonies. Candidate SWH includes mature or mixed forest stands with >10 large diameter (>25 cm DBH) wildlife trees per ha. Results: The woodland communities B1 and B3 met the density threshold of 10 snag trees / ha and a large number of passes of the target species were documented at one of the Bayvista Acoustic Monitoring Stations (BA-B2), however the number was less than 500 passes. While maternity colonies are likely present, these were not confirmed. ELC communities B1 and B3 are recommended as candidate SWH.	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
Waterfowl Stopover and Staging Areas (Aquatic)	SWH Criteria: Confirmed by aggregations of 100 or more individuals of the listed species for seven days, resulting in >700 waterfowl use days. Results: Surveys completed in fall 2022 confirmed >700 habitat use days by SWH listed waterfowl species. Observations were made in the nearshore aquatic areas both south of Georgina Island and along the mainland properties. The entire Shorebird and Waterfowl Survey Area and an adjacent 100 m has been mapped as SWH for this category.	**Confirmed**
Snake Hibernaculum	SWH Criteria: Confirmed by the presence of a snake hibernaculum used by a minimum of five individuals of a listed snake species or individuals of two or more snake species. May also be confirmed by congregations of five individuals of a snake or individuals of two or more species near a potential hibernaculum, on sunny warm days. Results: Surveys in 2022 and 2023 did not confirm the presence of a hibernaculum or potential hibernaculum, however it is difficult to rule out this SWH given that two of the listed snake species (i.e., Eastern Gartersnake and Northern Watersnake) were observed on several occasions and all natural habitats except for aquatic habitats have the potential to support this SWH.	**Candidate**
Raptor Wintering Area	SWH Criteria: Confirmed by the presence of one or more Short-eared Owl, one or more Bald Eagle or at least 10 individuals and two of the listed hawk / owl species. The site must be a combination of fields and woodlands that provide roosting, foraging and resting habitats, and >20 ha. To be significant, the site must be used regularly (i.e., 3 in 5 years for a minimum of 20 days). Results: Although potentially suitable habitat is present in the forest / meadow on the Bayvista Property, minimal use by raptors was documented in the winter / early spring surveys in 2022 and 2023. However, without further study, this SWH cannot be ruled out. Due to the winter observations of Bald Eagles in the study area, all potentially suitable habitat (>20 ha with combination of forest and upland cultural communities) are mapped as	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
	candidate SWH. For the Bayvista Property this includes Communities B4 – B11 in the southern 2/3 of the property.	
West Property (Figure D-20 and Figure D-21)		
Deer Wintering Habitat (Stratum II)	SWH Criteria: Deer yards are mapped by MNR district offices and are available via LIO mapping. Field investigations that record deer tracks in winter are done to confirm use (often via an aircraft) over a series of winters to establish the boundary. MNR completes these investigations. Results: • Stratum II Deer Wintering Habitat is mapped in LIO for the West Property, and surrounding area, extended primarily to the west.	**Provincial (LIO) Confirmed**
Special Concern and Rare Wildlife Species	SWH Criteria: Confirmed through presence of an SC or rare wildlife species in habitat that supports an important life stage component for the species (e.g., nesting habitat or foraging habitat). Results: • Eastern Wood-pewee (SC) documented in several locations, including at BBS stations: BBS-W1, BBS-W2, BBS-W3, BBS-W4, BBS-W6, and BBS-W8	**Confirmed** (Eastern Wood-pewee, Monarch, Yellow-banded Bumble Bee)
Woodland Area Sensitive Bird Breeding Habitat	SWH Criteria: Confirmed by presence of nesting or breeding pairs of three or more of the listed wildlife species. Generally, SWH requires interior habitat measured as 200 m or greater from a forest edge (MNRF 2015), however, the Natural Heritage Reference Manual (2010) considers 100m or greater from a forest edge to be interior habitat. Results: BBS-W2 and BBS-W7 met the threshold of the presence of three criteria listed species during the breeding season, as follows: • BBS-W2: Blackburnian Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Ovenbird, Scarlet Tanager • BBS-W7: Black-throated Green Warbler, Ovenbird and Winter Wren	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
Waterfowl Stopover and Staging Areas (Aquatic)	SWH Criteria: Confirmed by aggregations of 100 or more individuals of the listed species for seven days, resulting in >700 waterfowl use days. Results: Surveys completed in fall 2022 confirmed >700 habitat use days by SWH listed waterfowl species. Observations were made in the nearshore aquatic areas both south of Georgina Island and along the mainland properties. The entire Shorebird and Waterfowl Survey Area and an adjacent 100 m has been mapped as SWH for this category.	**Confirmed**
Bat Maternity Colonies	SWH Criteria: Confirmed by the presence of Maternity Colonies with confirmed use by >10 Big Brown Bats or > 5 Adult Femail Silver-haired Bats. The area of habitat includes the entire woodland or a forest stand ELC ecosite or an Ecoelement containing the maternity colonies. Results: • Greater than 500 passes of the target species (combined) were documented at two of the West Property Acoustic Monitoring Stations (BA-W1 and W3). ELC communities W3, W5 and W6 are recommended as Candidate SWH.	**Candidate**
Snake Hibernaculum	SWH Criteria: Confirmed by the presence of a snake hibernaculum used by a minimum of five individuals of a listed snake species or individuals of two or more snake species. May also be confirmed by congregations of five individuals of a snake or individuals of two or more species near a potential hibernaculum, on sunny warm days. Results: Surveys in 2022 and 2023 did not confirm the presence of a hibernaculum or potential hibernaculum, however it is difficult to rule out this SWH given that two of the listed snake species (i.e., Eastern Gartersnake and Northern Watersnake) were observed on several occasions and all natural habitats except for aquatic habitats have the potential to support this SWH.	**Candidate**

SWH Type	SWH Criteria and Results	Confirmed / Candidate
Raptor Wintering Area	SWH Criteria: Confirmed by the presence of one or more Short-eared Owl, one or more Bald Eagle or at least 10 individuals and two of the listed hawk / owl species. The site must be a combination of fields and woodlands that provide roosting, foraging and resting habitats, and >20 ha. To be significant, the site must be used regularly (i.e., 3 in 5 years for a minimum of 20 days). Results: Although potentially suitable habitat is present in the forest / meadow on the West Property, minimal use by raptors was documented in the winter / early spring surveys in 2022 and 2023. However, without further study, this SWH cannot be ruled out. Due to the winter observations of Bald Eagles in the study area, all potentially suitable habitat (>20 ha with combination of forest and upland cultural communities) are mapped as candidate SWH. For the West Property this includes Communities W1 – W9.	**Candidate**

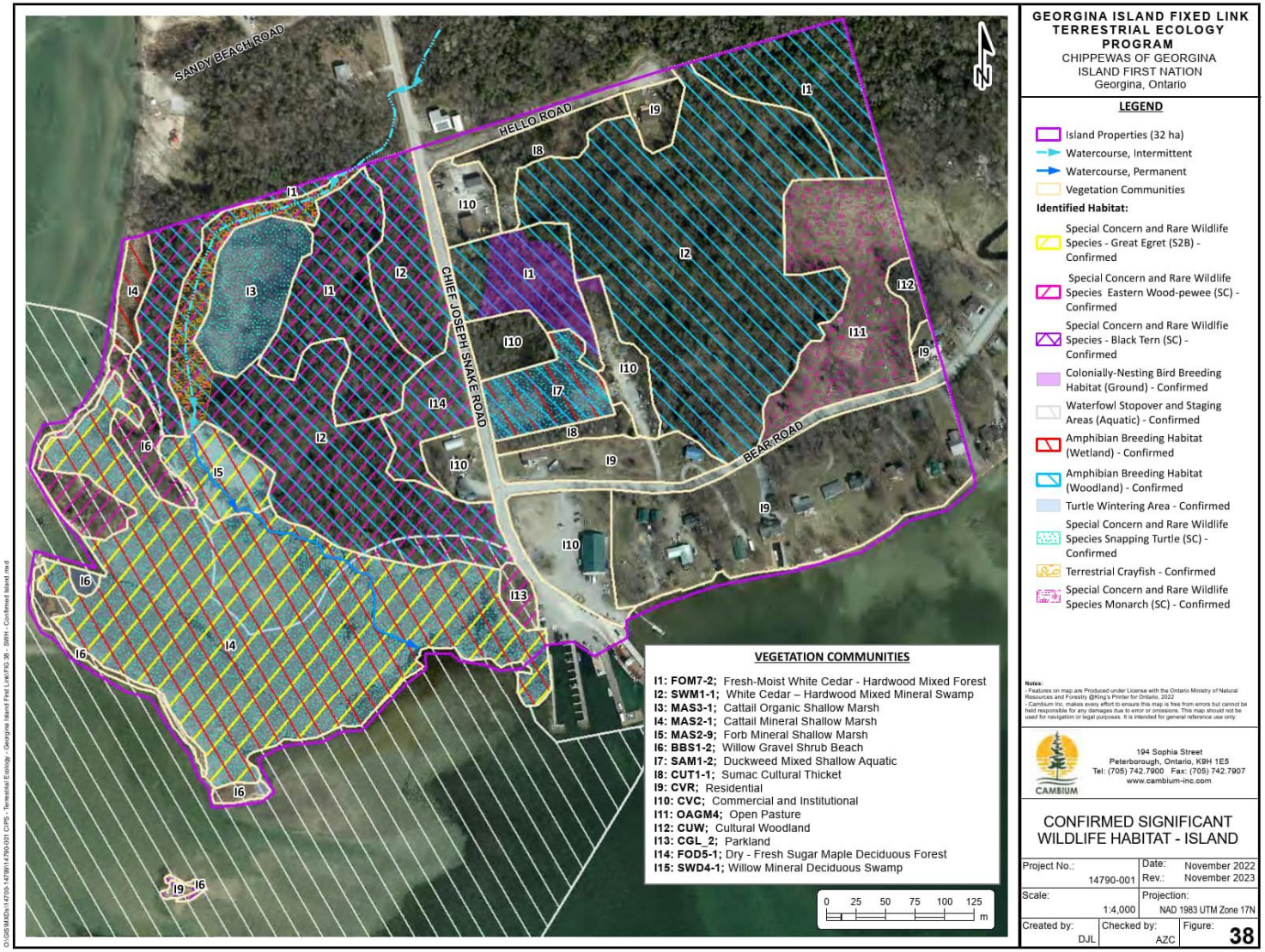


Figure D-14 Significant Wildlife Habitat – Georgina Island (Cambium Inc., 2023)

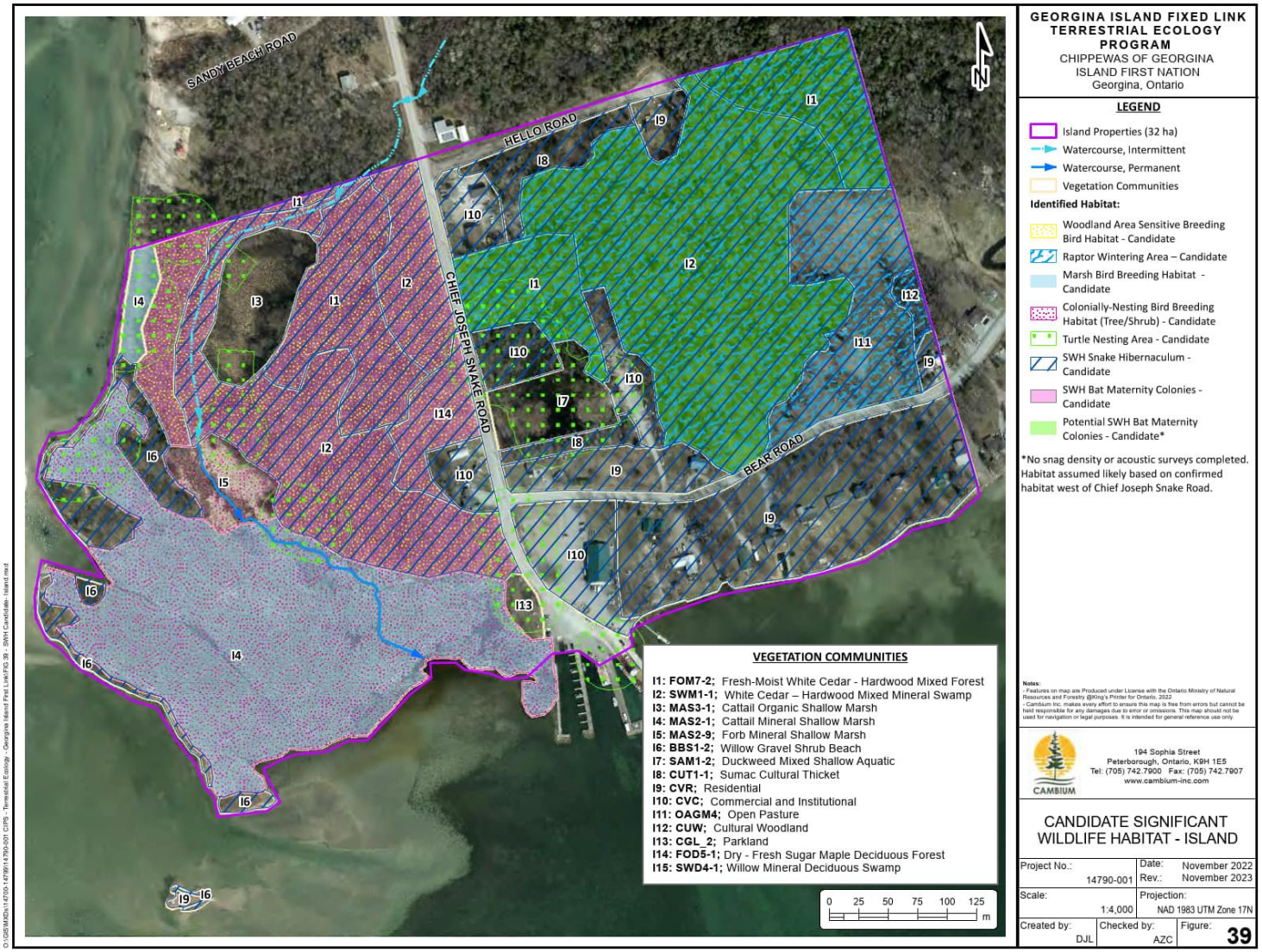


Figure D-15 Candidate Significant Wildlife Habitat -Georgina Island (Cambium Inc., 2023)

Figure D-16 Confirmed Significant Wildlife Habitat - Sands Island (Cambium Inc., 2023)

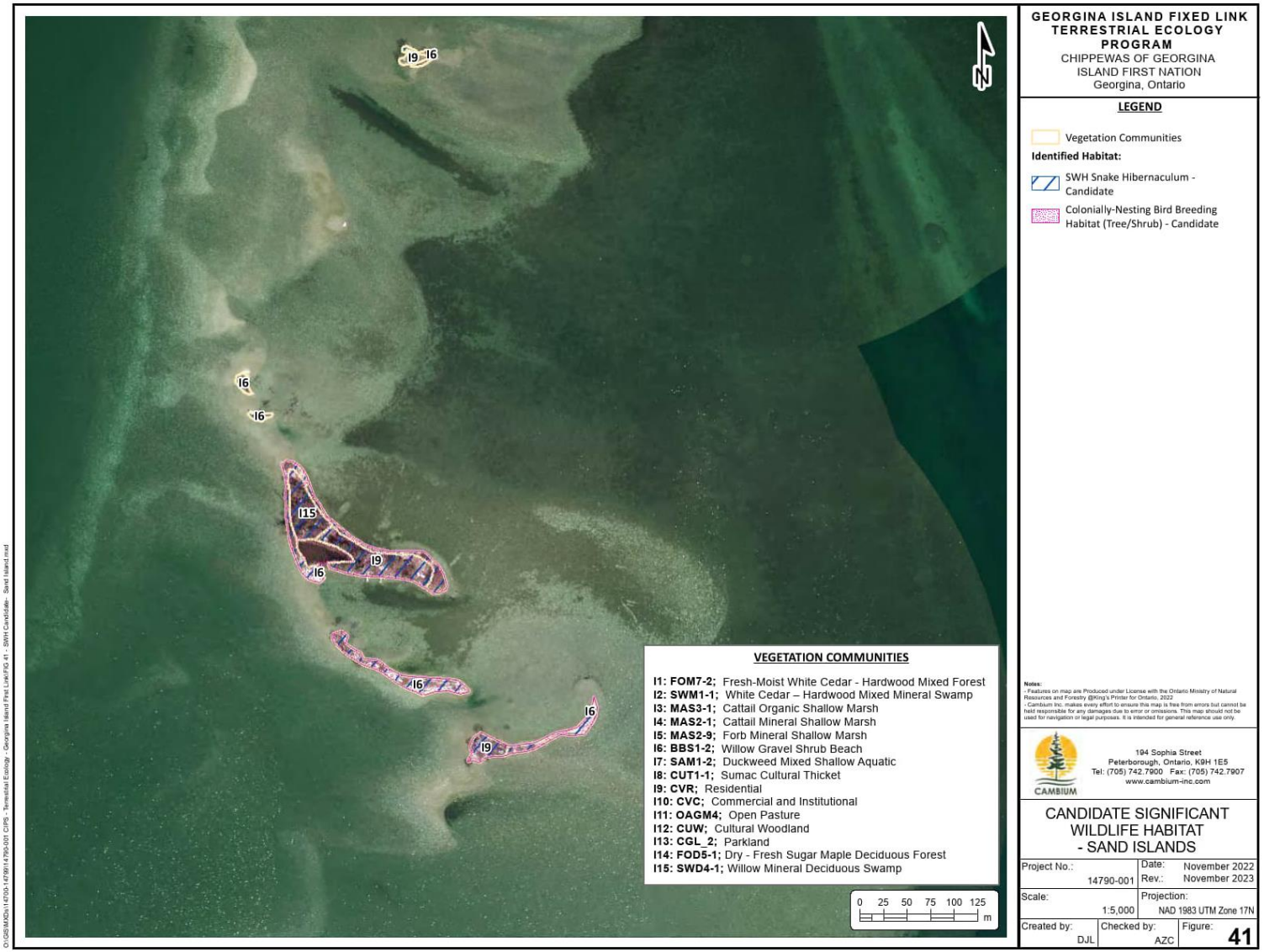


Figure D-17 Candidate Significant Wildlife Habitat - Sands Island (Cambium Inc., 2023)

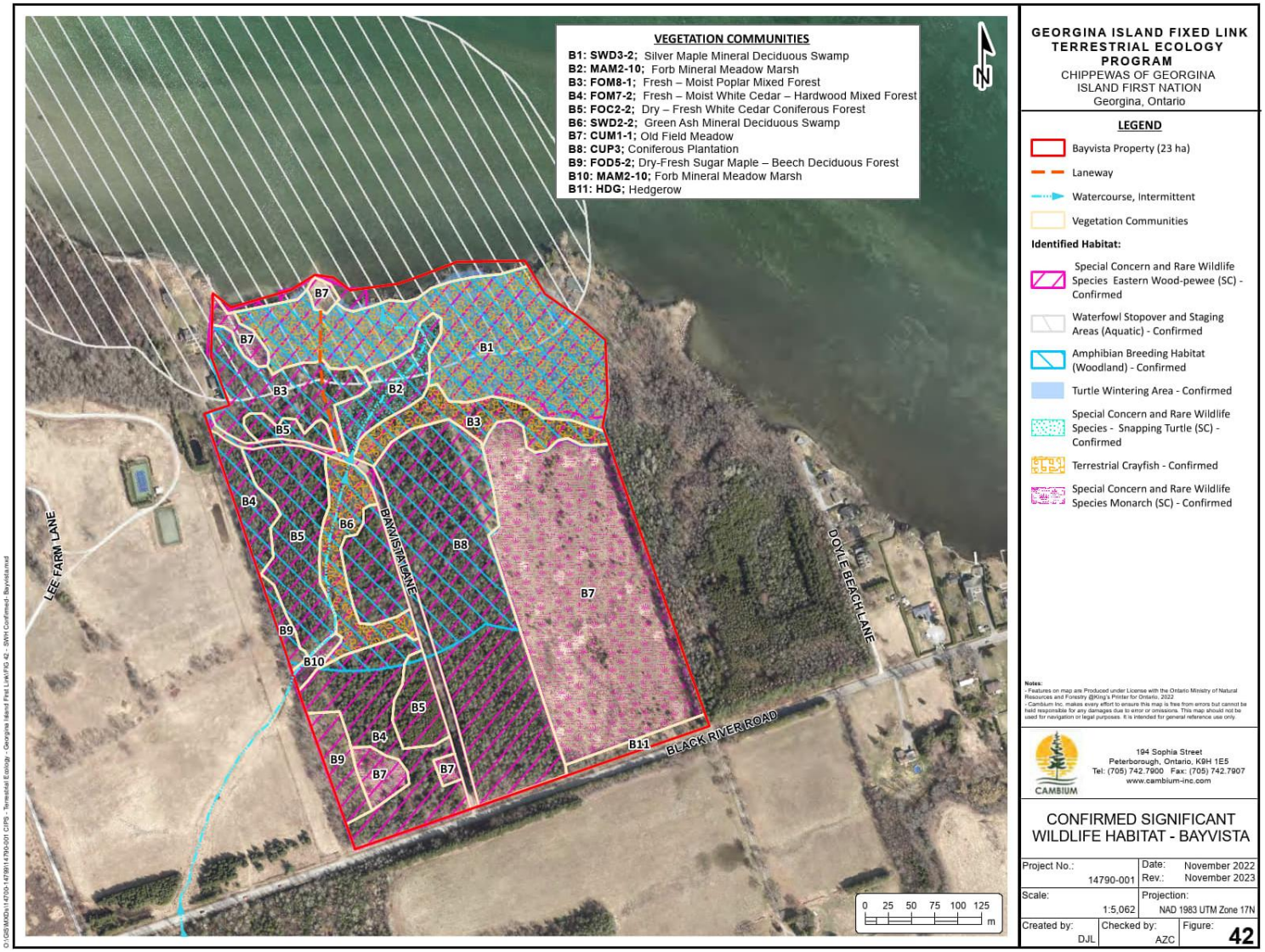


Figure D-18 Confirmed Significant Wildlife Habitat - Bayvista (Cambium Inc., 2023)

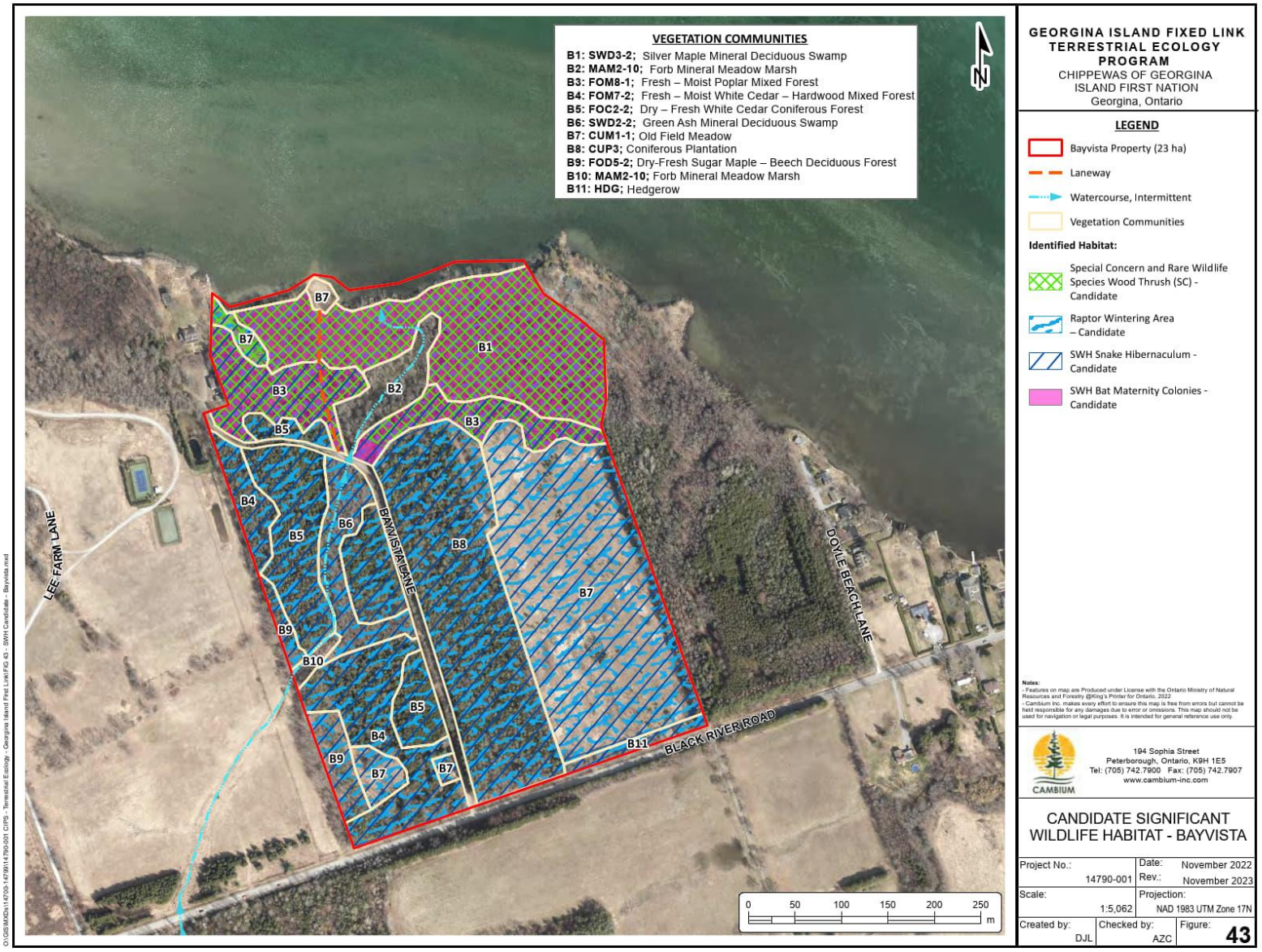


Figure D-19 Candidate Significant Wildlife Habitat - Bayvista (Cambium Inc., 2023)

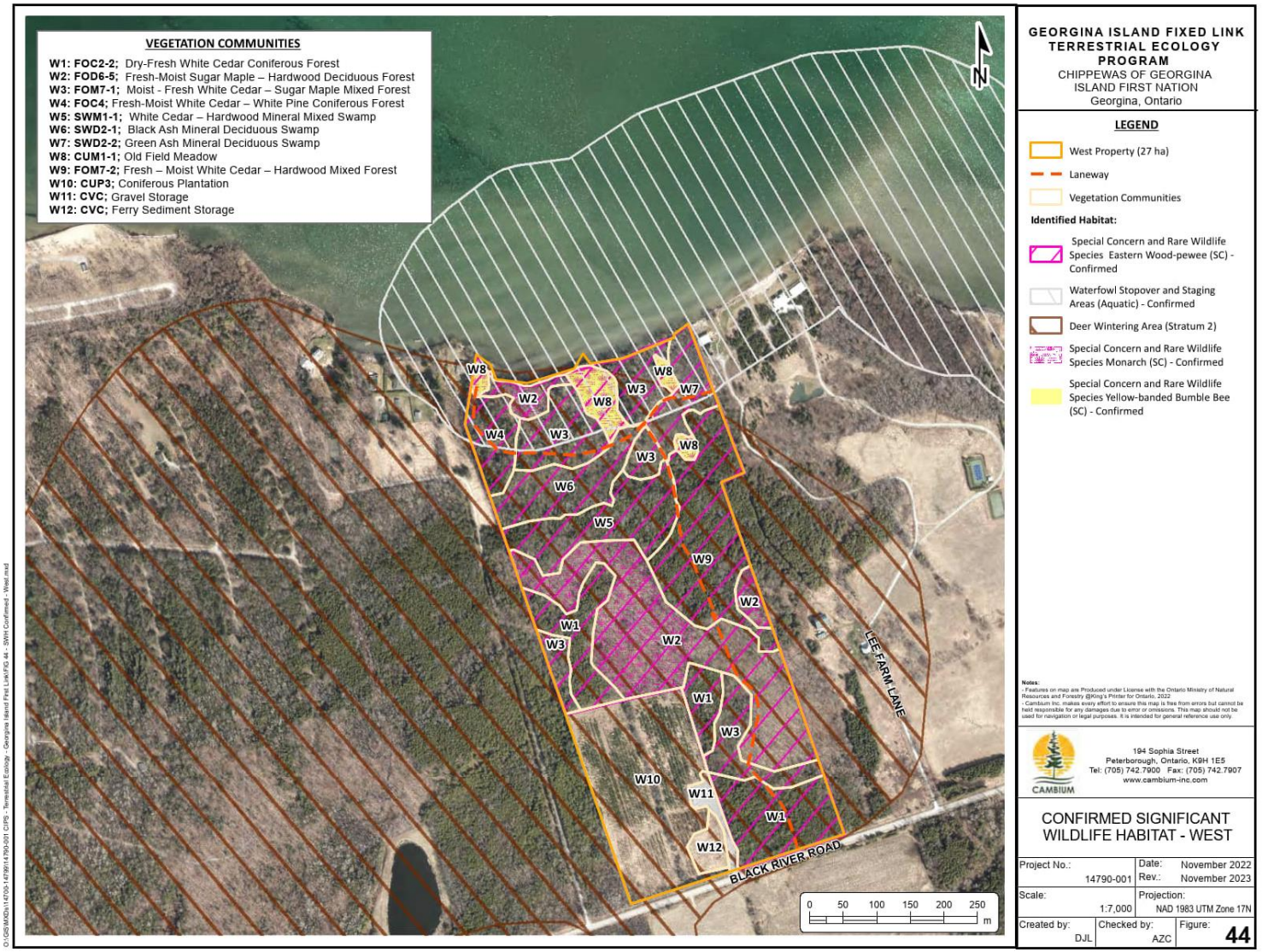
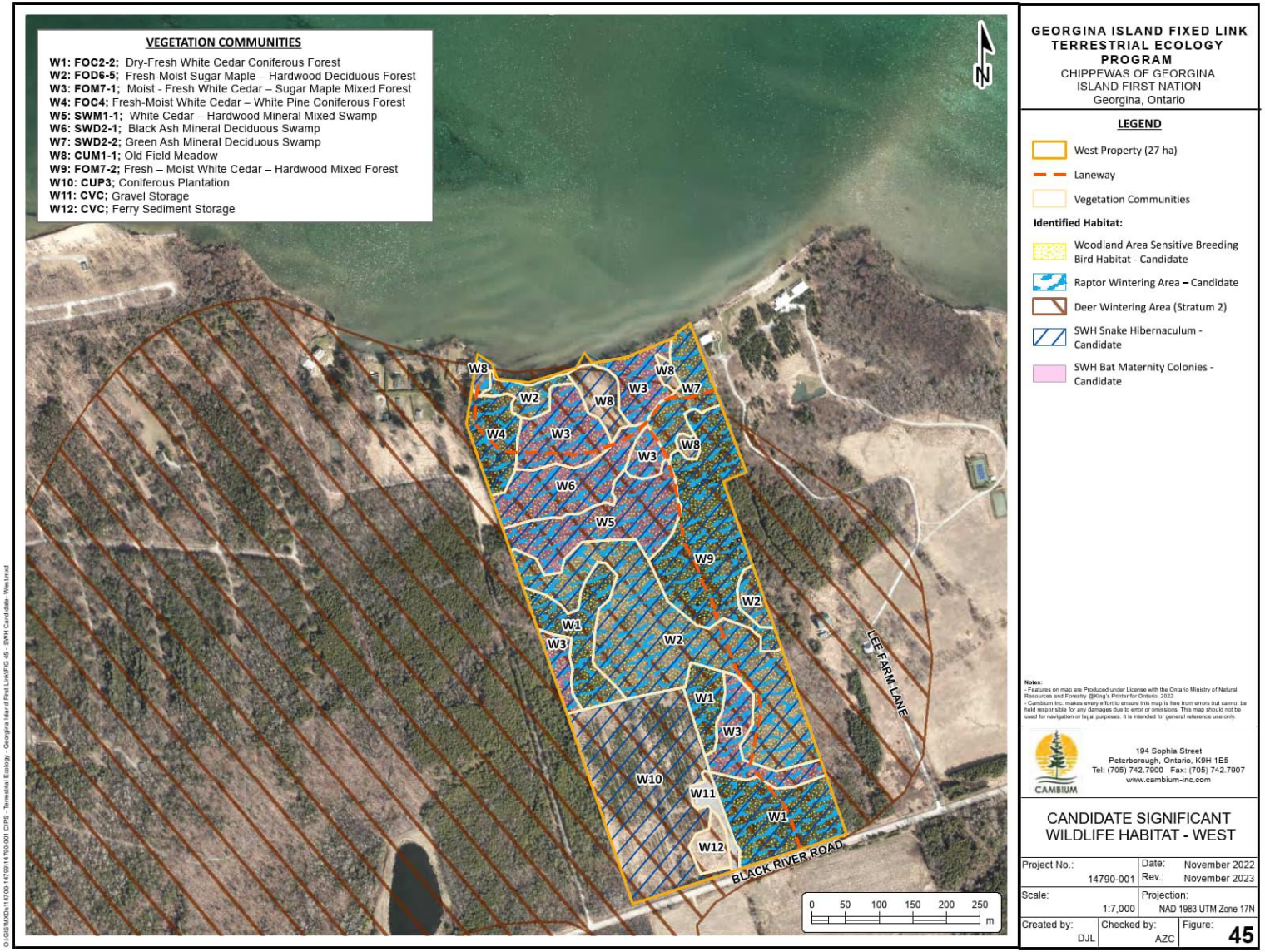


Figure D-20 Confirmed Significant Wildlife Habitat – West Property (Cambium Inc., 2023)



GEORGINA ISLAND FIXED LINK
TERRESTRIAL ECOLOGY
PROGRAM
CHIPPEWAS OF GEORGINA
ISLAND FIRST NATION
Georgina, Ontario

LEGEND

- West Property (27 ha)
- Laneway
- Vegetation Communities

Identified Habitat:

- Woodland Area Sensitive Breeding Bird Habitat - Candidate
- Raptor Wintering Area – Candidate
- Deer Wintering Area (Stratum 2)
- SWH Snake Hibernaculum - Candidate
- SWH Bat Maternity Colonies - Candidate

Notes:
- Features on map are Produced under License with the Ontario Ministry of Natural Resources and Forestry @King's Printer for Ontario, 2022
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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CANDIDATE SIGNIFICANT WILDLIFE HABITAT - WEST

Project No.: 14790-001		Date: November 2022 Rev.: November 2023	
Scale: 1:7,000		Projection: NAD 1983 UTM Zone 17N	
Created by: DJL	Checked by: AZC	Figure:	45

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Figure D-21 Candidate Significant Wildlife Habitat - West Property (Cambium Inc., 2023)

14.2.3.2.8 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

14.2.3.2.8.1 Endangered and Threatened Species

There were 11 federally and/or provincially protected (i.e., END and THR) SAR observed in the study area during Cambium's 2022 and 2023 field surveys and/or confirmed through the background data review and agency consultation (Cambium Inc., 2023). These observations are summarized in **Table D-8**, with habitat illustrated on **Figure D-22**, **Figure D-23**, and **Figure D-24**. A discussion of implications for the Project is provided in **Section 20.2**. Following the completion of the Terrestrial Existing Conditions Report (Cambium Inc., 2023), additional species have been listed under the ESA and other species have been downlisted. Notably, on January 27, 2025, three additional bat species were listed as endangered on the Species at Risk List in Ontario: Eastern Red Bat (*Lasiurus borealis*), Hoary Bat (*Lasiurus cinereus*) and Silver-haired Bat (*Lasionycteris noctivagans*). In addition, Eastern Whip-poor-will has been downlisted from Threatened to Special Concern. Future project phases will address any uplisted species including any associated permitting or approval requirements.

Table D-8: Summary of SAR and SAR Habitat Confirmed in the Study Area

Species	Federal Status	Provincial Status	Observations	Protected Habitat
Island Properties (Figure D-22)				
Black Ash	THR	END	Observed in Communities I2 and I3	As of January 2024, healthy Black Ash trees greater than 8 cm DBH, located in areas of the province where the species has experienced significant mortality due to the invasive Emerald Ash Borer (EAB) insect, are protected under the ESA. Protection includes the tree and its habitat (including a 30 m buffer / root zone). Although designated THR by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Black Ash is not currently listed on Schedule 1 of SARA.
Butternut	END	END	One live tree observed by Cambium in Community I2	Protected under Sections 9 and 10 of the ESA. 25 m radius around the tree is protected. 50 m radius around the tree is considered recovery habitat.
Least Bittern	THR	THR	Two active nests observed by Cambium in Community I4 Adults heard on several occasions by Cambium in Community I4	Protected under Sections 9 and 10 of the ESA. MECP advised that the wetland where the species was documented plus an additional 100 m buffer is considered protected habitat for Least Bittern. The Federal Recovery Strategy (Environment Canada, 2014) defines critical habitat as suitable habitat within 500 m of the documented breeding activity.
Western Chorus Frog	THR	NAR	L2 breeding documented in Community I2 by Cambium	A critical habitat description has not been published for Western Chorus Frog; however, SARA protects the species and its habitat, including its egg-laying and hibernation sites. The ELC community in which this species was documented with breeding evidence (i.e., Community I2) is mapped as habitat for Western Chorus Frog.
Blanding's Turtle	END	THR	Not observed during Cambium 2022 or 2023 field surveys Record of Blanding's Turtle within Community I4	Record within Community I4 results in application of the habitat provisions in SARA and the ESA. ESA General Habitat Description (MNRF, 2021): Category 2: the wetland complex (i.e., all suitable wetlands or waterbodies within 500 m of each other) that extends up to 2 km from an occurrence,

Species	Federal Status	Provincial Status	Observations	Protected Habitat
				and the area within 30 m around those suitable wetlands or waterbodies. Category 3: the area between 30 m and 250 m around suitable wetlands / waterbodies identified in Category 2, within 2 m of an occurrence. SARA: The Federal Recovery Strategy for Blanding's Turtle (Environment Canada, 2016) identifies critical habitat based on two criteria: habitat occupancy and habitat suitability. Habitat occupancy requires a minimum of two individuals to have been observed in a single year in the past 40 years, or when a single individual has been observed in two or more years in the past 40 years. Nesting records automatically meet the criterion. Habitat suitability includes both nesting and overwintering habitat. The Critical Habitat definition is generally consistent with the provincial approach except that the habitat extends 240 m from wetlands.
Eastern Small-footed Myotis	NAR	END	21 passes at acoustic monitoring stations	All forested communities west of Chief Joseph Snake Road are currently mapped by Cambium as high-quality SAR bat habitat. Forested communities east of Chief Joseph Snake Road are mapped as *potential* SAR bat habitat as roost surveys and acoustic monitoring were not completed in these communities. May require further assessment at future study phases should impacts to this habitat be proposed.
Little Brown Myotis	END	END	1,203 passes at acoustic monitoring stations	
Northern Myotis	END	END	83 passes at acoustic monitoring stations	
Tri-colored Bat	END	END	284 passes at acoustic monitoring stations	
Bayvista Property (Figure D-23)				
Black Ash	THR	END	Observed in Communities B1 and B2	As of January 2024, healthy Black Ash trees greater than 8 cm DBH, located in areas of the province where the species has experienced significant mortality due to the invasive Emerald Ash

Species	Federal Status	Provincial Status	Observations	Protected Habitat
				Borer (EAB) insect, are protected under the ESA. Protection includes the tree and its habitat (including a 30 m buffer / root zone). Although designated THR by COSEWIC, Black Ash is not currently listed on Schedule 1 of SARA.
Blanding's Turtle	END	THR	Not observed during Cambium 2022 or 2023 field surveys MECP record of Blanding's Turtle within 250 m of the study area	See above habitat description, under Island Properties.
Eastern Whip-poor-will	THR	SC	Cambium documented one visual and one aural observation on two separate dates during the breeding season	The Provincial General Habitat Description (MNR, 2013) includes the following Categories: • Category 1: nests and the area immediately around the nest (i.e., 20 m) • Category 2: area between 20 m and 170 m of the nest or centre of approximated defended territory • Category 3: area of suitable habitat between 170 m and 500 m of the nest site or the centre of the approximated defended territory.
Western Chorus Frog	THR	NAR	L3 breeding documented by Cambium in Communities B1 and B2	A critical habitat description has not been published for Western Chorus Frog; however,, SARA protects the species and its habitat, including its egg-laying and hibernation sites. The ELC communities in which this species was documented with breeding evidence (i.e., Community B1 and B2) are mapped as habitat for Western Chorus Frog.
Eastern Small-footed Myotis	NAR	END	11 passes at acoustic monitoring stations	Communities B1 and B3 on the Bayvista Property are currently mapped by Cambium as high-quality SAR bat habitat. May require further assessment at future study phases should impacts to this habitat be proposed.

Species	Federal Status	Provincial Status	Observations	Protected Habitat
Little Brown Myotis	END	END	7,908 passes at acoustic monitoring stations	
Northern Myotis	END	END	161 passes at acoustic monitoring stations	
Tri-colored Bat	END	END	83 passes at acoustic monitoring stations	
West Property (Figure D-24)				
Black Ash	THR	END	Observed in Communities W5, W6, and W9	As of January 2024, healthy Black Ash trees greater than 8 cm DBH, located in areas of the province where the species has experienced significant mortality due to the invasive Emerald Ash Borer (EAB) insect, are protected under the ESA. Protection includes the tree and its habitat (including a 30 m buffer / root zone). Although designated THR by COSEWIC, Black Ash is not currently listed on Schedule 1 of SARA.
Butternut	END	END	One live tree observed by Cambium in Community W9	Protected under Sections 9 and 10 of the ESA. 25 m radius around the tree is protected. 50 m radius around the tree is considered recovery habitat.
Blanding's Turtle	END	THR	Not observed during Cambium 2022 or 2023 field surveys. MECP record of Blanding's Turtle within 250 m of the study area	See above habitat description, under Island Properties.
Eastern Small-footed Myotis	NAR	END	1 pass at acoustic monitoring stations	Communities W3, W5, and W6 on the West Property are currently mapped by Cambium as high-quality SAR bat habitat. May require further assessment at future study phases should impacts to this habitat be proposed.

Species	Federal Status	Provincial Status	Observations	Protected Habitat
Little Brown Myotis	END	END	411 passes at acoustic monitoring stations	
Northern Myotis	END	END	3 passes at acoustic monitoring stations	
Tri-colored Bat	END	END	49 passes at acoustic monitoring stations	

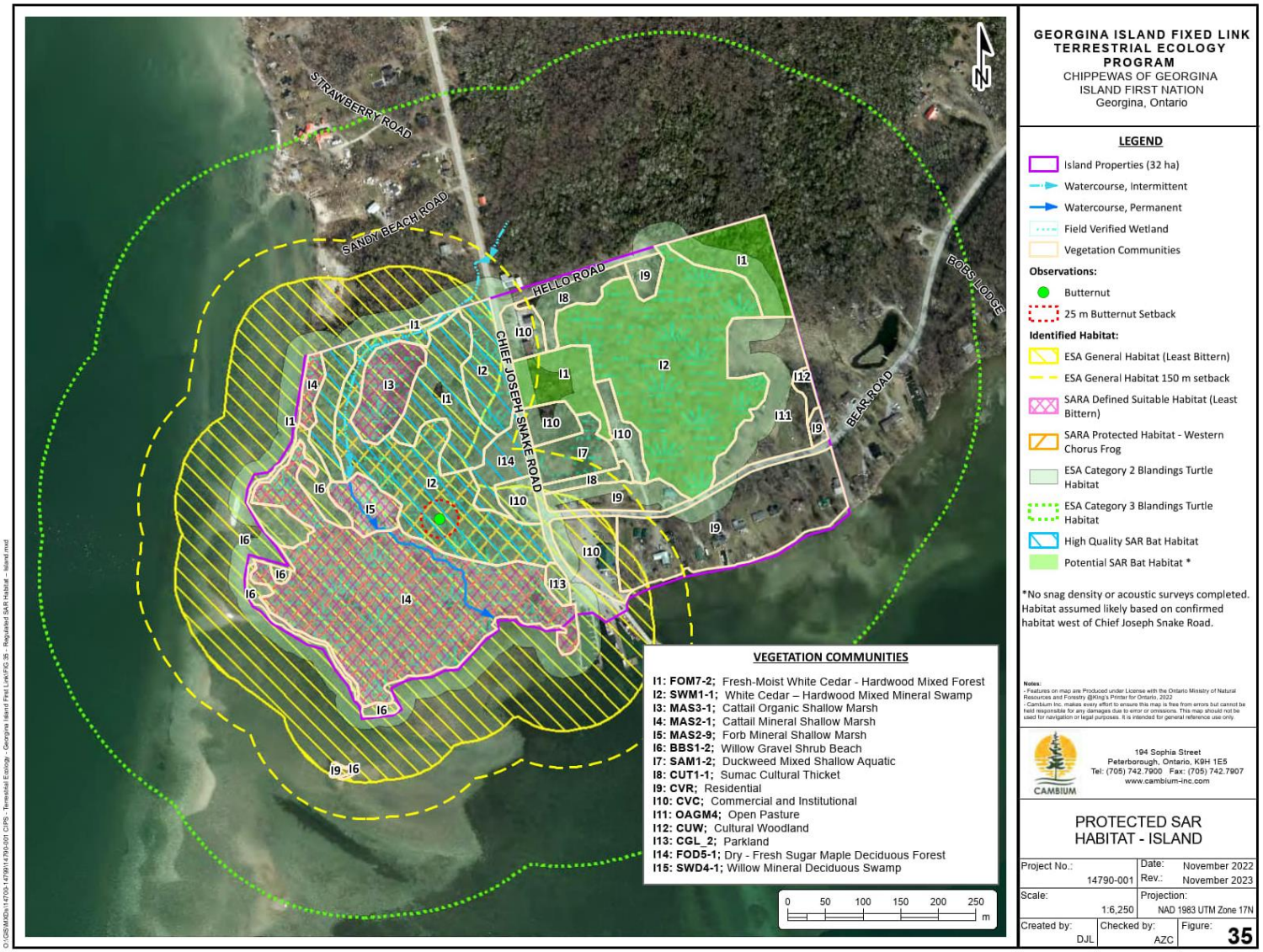


Figure D-22 SAR Habitat – Island Properties (Cambium Inc., 2023)

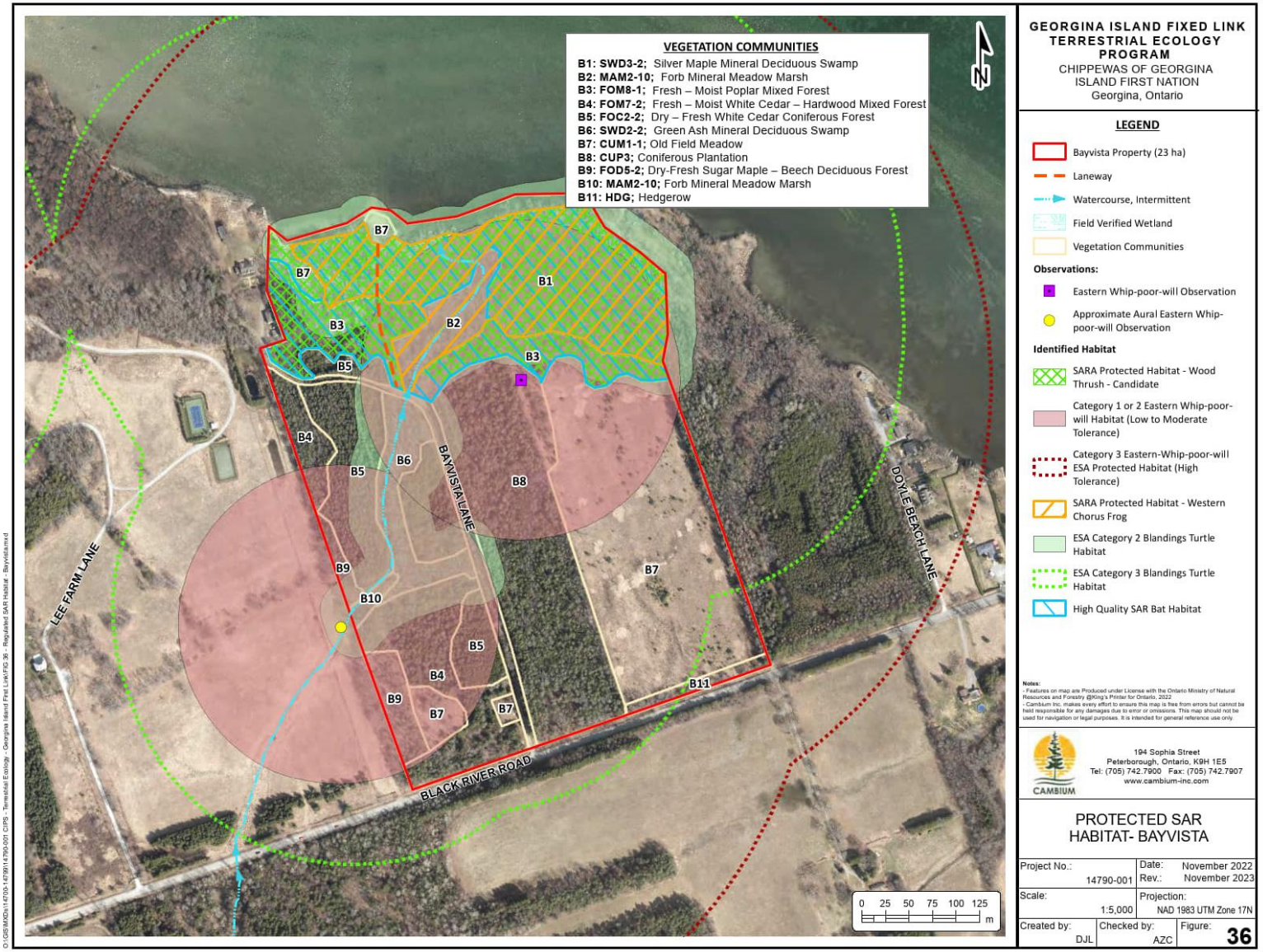


Figure D-23 SAR Habitat - Bayvista Property (Cambium Inc., 2023)

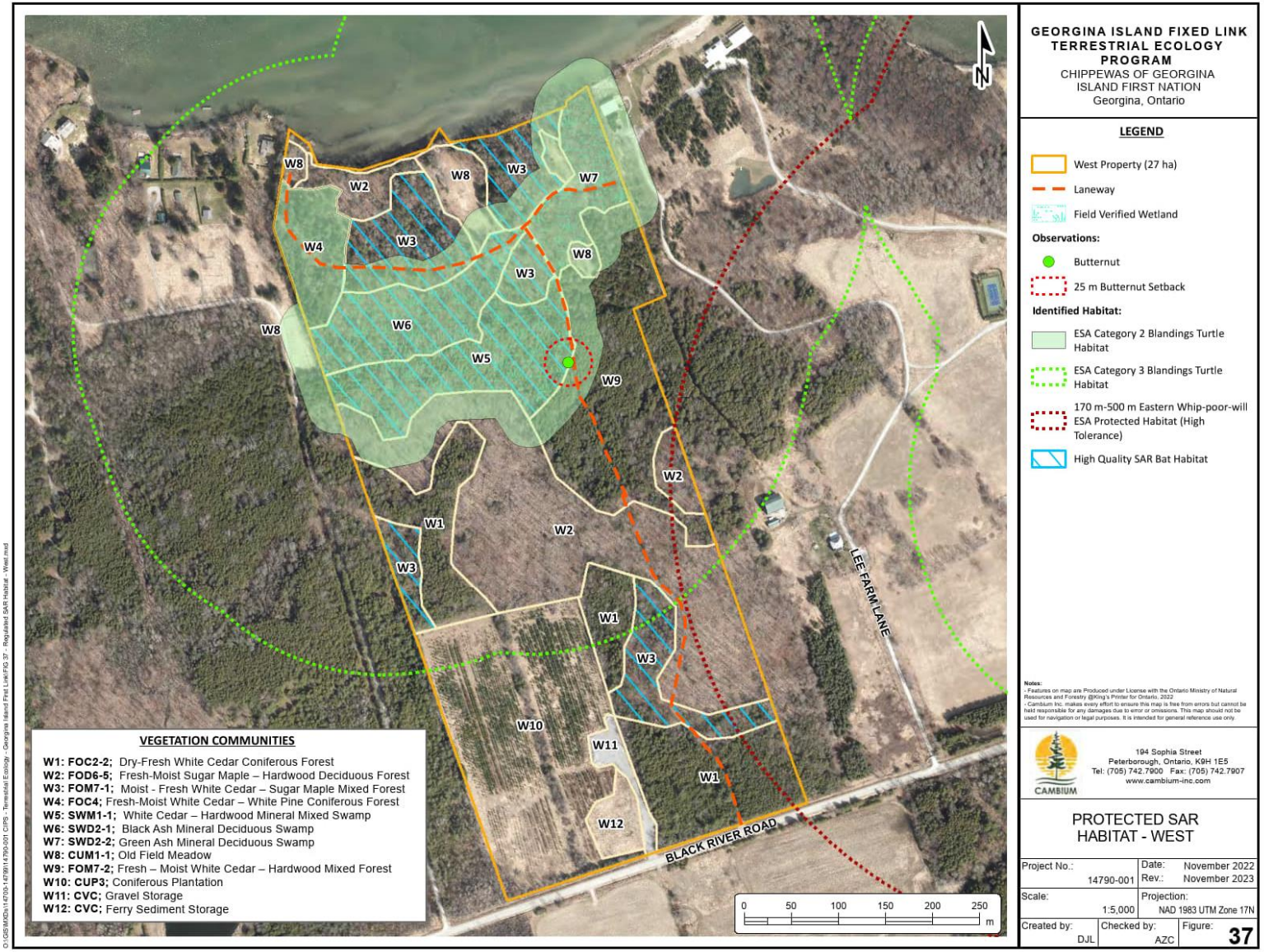


Figure D-24 SAR Habitat - West Property (Cambium Inc., 2023)

14.2.3.3 Areas of Concern

To visually represent the various terrestrial sensitivities and protected habitats within the study area, areas of concern with categories of High, Moderate and Low were developed by Cambium, as outlined below (Cambium Inc., 2023). These areas have been overlayed on each property and are presented on Figure D-25, Figure D-26, and Figure D-27. An overview of the areas of concern for the full study area is presented on Figure D-28. The proposed alignments are also overlayed on these figures. Figure D-28 illustrates that the Island properties have the greatest number of overlapping areas of concern, followed closely by the Bayvista Property. The West Property has relatively fewer areas of concern, however the alignments all pass through at least one area mapped as High Concern.

High Concern Areas:

- SAR Protected Habitat – habitats with low or no tolerance to disturbance, as noted in the guidance documents. Specifically, this includes:
    - Category 2 Blanding's Turtle Habitat
    - Least Bittern SARA-protected Habitat
    - Butternut – live trees + 25m setback
    - Eastern Whip-poor Will observations + 170 m buffer

Moderate Concern Areas:

- SAR Protected Habitat – habitats with a high or moderate tolerance to disturbance, as noted in guidance documents. Specifically, this includes:
    - Category 3 Blanding's Turtle Habitat
    - Least Bittern – ESA general habitat and buffer
    - Western Chorus Frog SARA-protected Habitat
    - Black Ash Swamp (Community W6)
    - High Quality SAR Bat Habitat
- SWH (Confirmed or Candidate)
- PSWs

Low Concern Areas:

- Woodlands
- Other wetlands

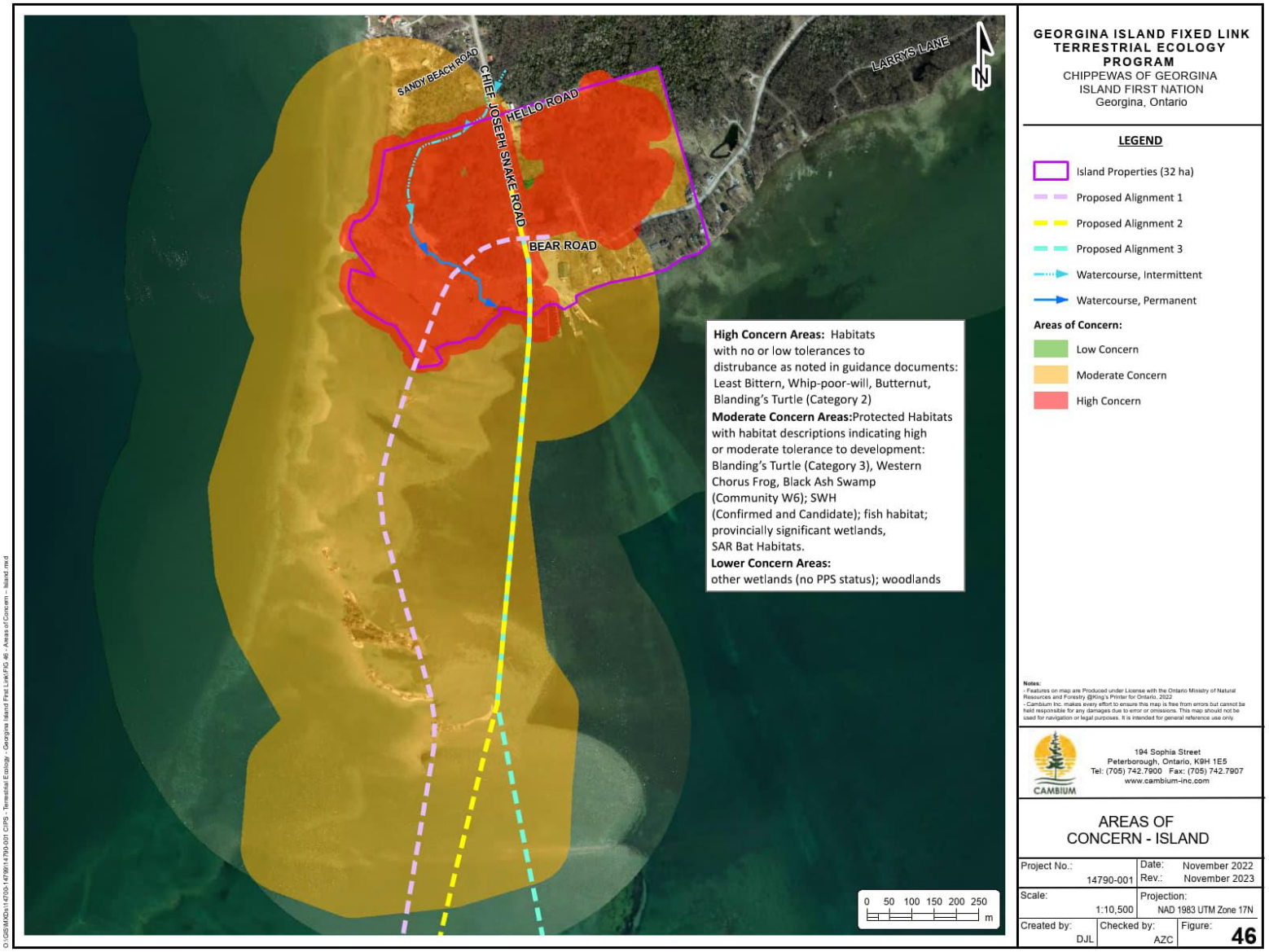


Figure D-25 Areas of Concern – Island Properties (Cambium Inc., 2023)

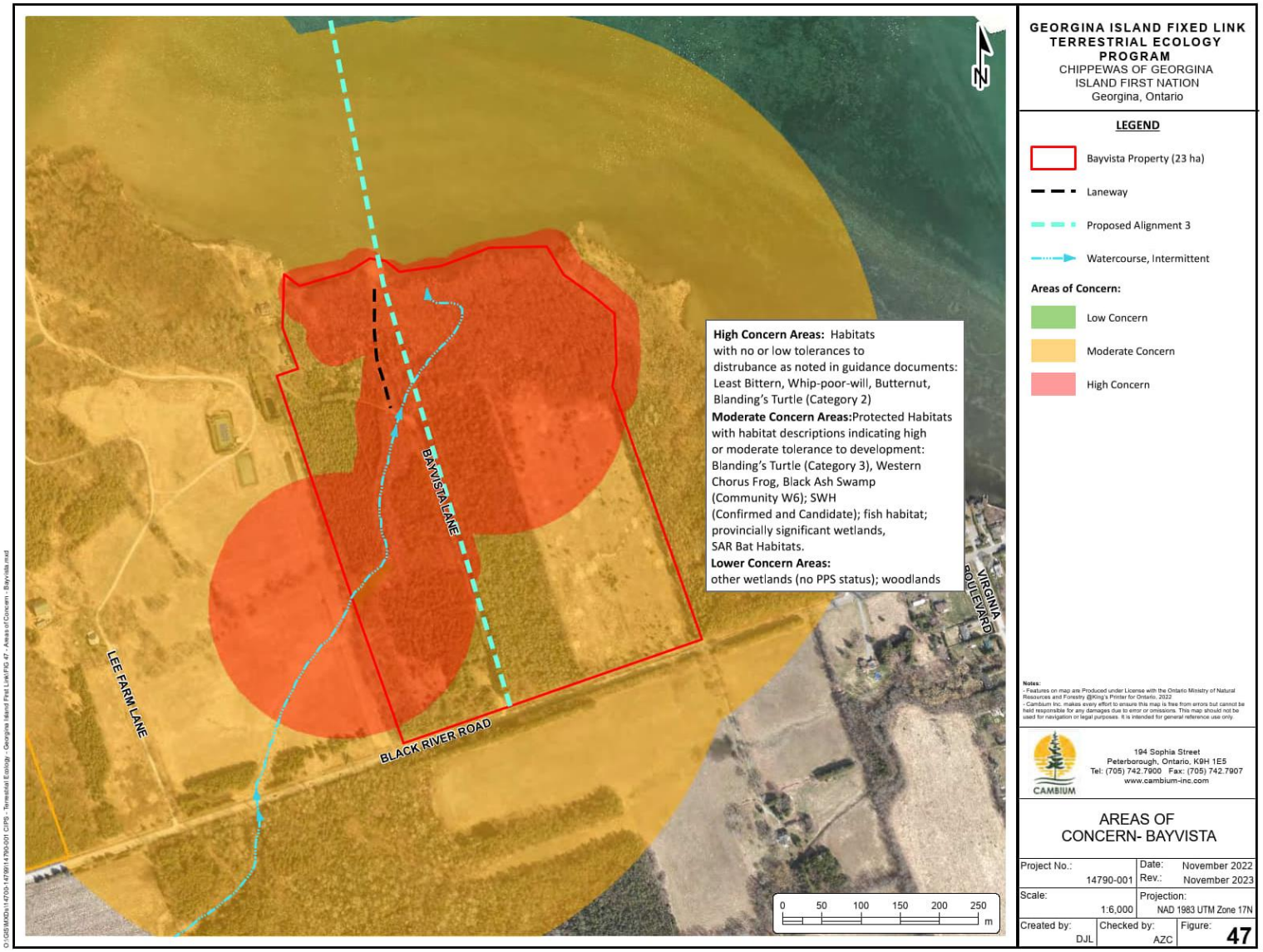


Figure D-26 Areas of Concern – Bayvista Property (Cambium Inc., 2023)

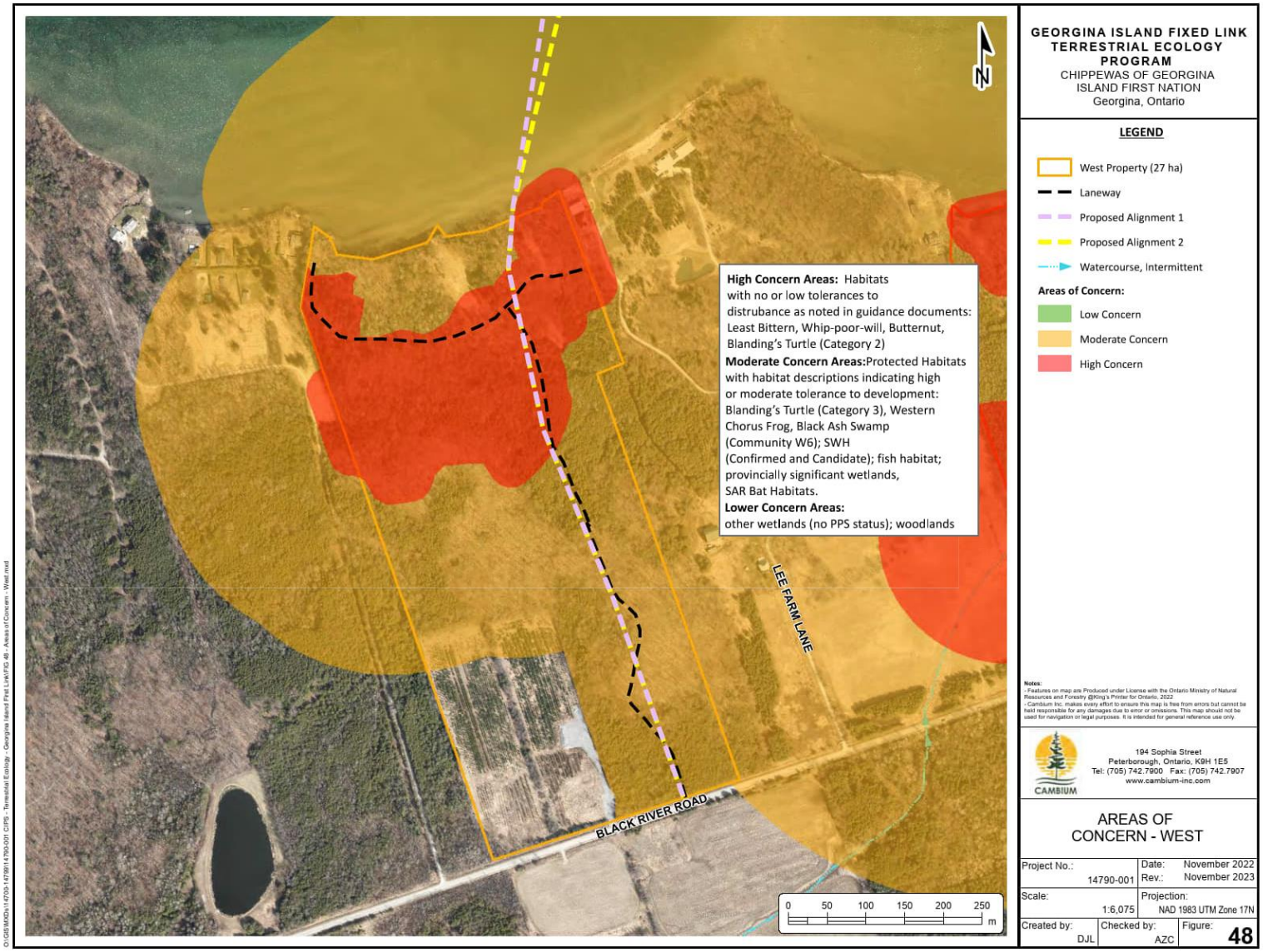


Figure D-27 Areas of Concern – West Property (Cambium Inc., 2023)

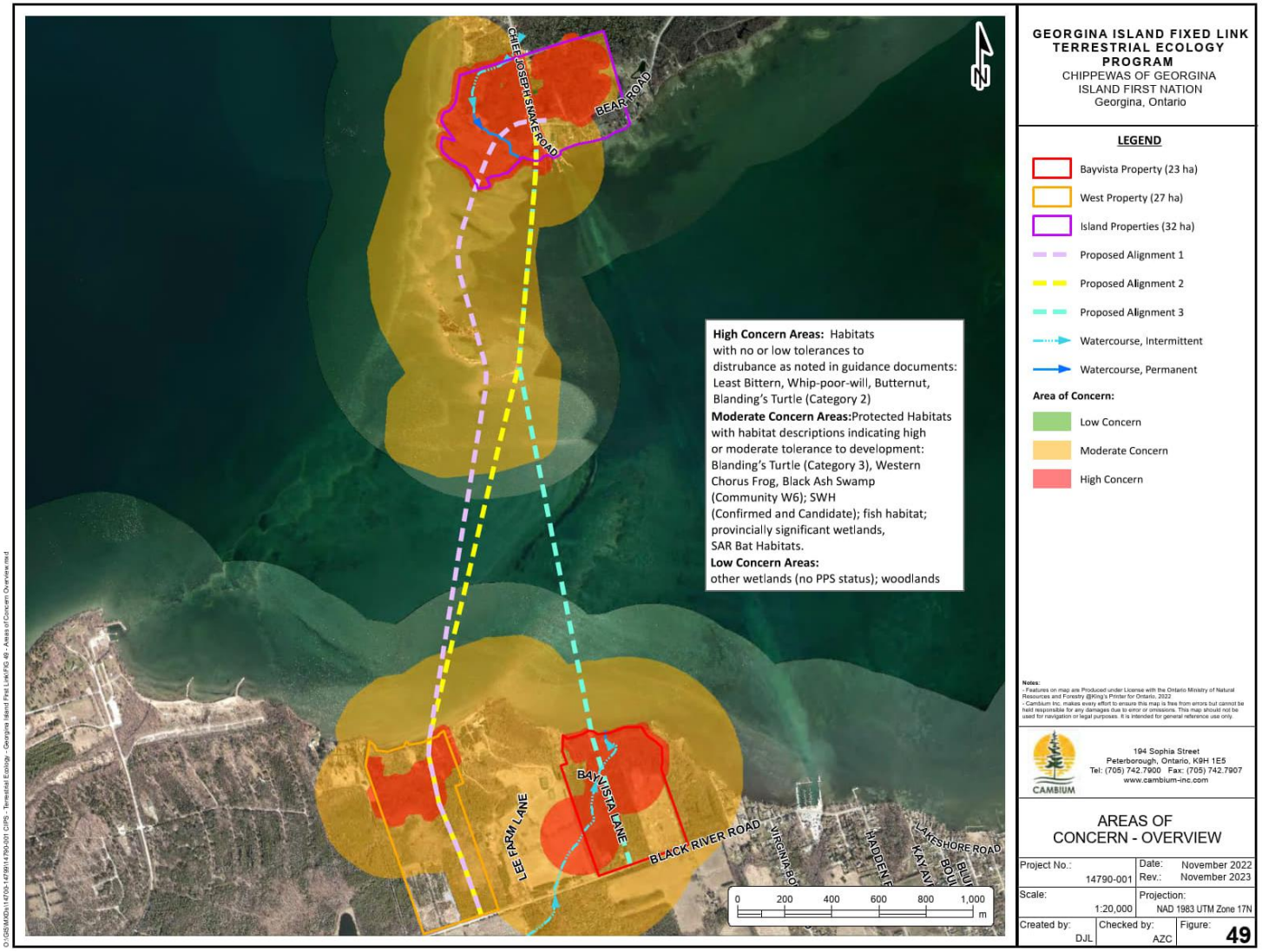


Figure D-28 Areas of Concern – Overview (Cambium Inc., 2023)

14.2.4 Culturally Significant Species

A list of culturally significant species was developed for the project by CIPS, through direct engagement with the GIFN Community, including verbal and written conversations with Community members, staff, leadership, and summer students. It was also informed by existing First Nation studies and documentation. The list includes species that have been confirmed as significant to Anishinaabeg. These species provide food, medicine, building materials and/or are held in a high spiritual regard. Many of the species on the list have been confirmed to be present within the study area during the 2022 and 2023 surveys completed by Cambium. The list of culturally significant species is provided in the Terrestrial Existing Conditions Report (**Appendix T3**) and a summary of the observations within the study area is provided below (Cambium Inc., 2023).

The following is a summary of the culturally significant species observations within the study area. This summary was prepared by CIPS but is not a comprehensive account of culturally significant species present in the study area. It is not in the best interest of the Community to disclose the locations and abundance of certain species.

- Large stands of **Ginebigobag** (Ostrich Ferns) on mainland properties
- **Mkinaakwag** (Turtles) present in Bayvista Property and GIFN study area
- **Waabizii** (Swans), **Shaagiig** (Egrets/Blue Herons/Bitterns), **Maakiig** (frogs) present within the GIFN Marsh
- **Waawaaskeshiig** (White-tailed Deer) Island, Bayvista and West Properties; known deer yard on West Property
- **Migiziig** (Bald Eagles) observed in study area, known to nest in east and north parts of Georgina Island
- **Wiigwaasaatig** (Birch Trees) Bayvista and West Properties
- **Giizhik** (Cedar Trees) Island, Bayvista and West Properties
- Funguses - Morels, Puffballs, Chicken-of-the-woods; not observed, but habitat exists on all properties
- **Azaawe** (Yellow Perch), **Ashigan** (Bass) present within the study area of Lake Simcoe

14.3 Hydrogeology

A preliminary hydrogeological study for the Project was completed by WSP last February 2024 (**Appendix W**). This desktop hydrogeological investigation aims to understand baseline groundwater conditions, identify potential impacts at the Project's earliest stages, and suggest preliminary mitigation measures. It supports the Project's conceptual design and the DPD by assessing preliminary baseline hydrogeological conditions, evaluating impacts of constructing a causeway/bridge, conducting well water surveys, water quality impact studies, assessing sensitive natural resources, and providing hydrogeological recommendations. The following subsections provide the baseline hydrogeological conditions of the study area.

The Project occurs within the Lakes Simcoe and Couchiching/Black River Source Protection Area. As such, the South Georgian Bay Lake Simcoe Source Protection Plan applies to activities related to the construction, operation, and maintenance of the project. The Plan

outlines threats and actions taken to protect untreated water supply that is used for drinking water systems from overuse and pollution. Relevant examples include policies for the handling, storage and application of road salt, storage of snow, handling and storage of fuel and dense non-aqueous phase liquid (DNAPL), and water taking.

The project site also overlaps with a Highly Vulnerable Aquifer (HVA), a Source Water Protection Area (SWPA), and an Intake Protection Zone (IPZ), as such, both the surface water and groundwater are vulnerable to contamination from human activities or natural processes. According to South Georgian Bay Lake Simcoe Source Protection Plan (LSRCA, 2025), portions of the study area lie within IPZ-3. IPZ-3 typically designates areas on the water and land surrounding a municipal surface water intake. IPZ-3 is assigned to areas where activities further away from the intake could still have an impact on water quality.

The study area includes two surface water features, specifically tributaries of the Black River. Additionally, the Black River and Lake Simcoe border the study area, with the regulation limits of the LSRCA overlapping this region.

The site is also within a large area of Significant Groundwater Recharge zone. Based on Black River watershed Plan (LSRCA, 2010) , significant groundwater recharge within the Black River subwatershed occurs on the Oak Ridges Moraine at the southern end of the subwatershed, specifically the northern flank, provides the highest recharge rates. The main component of groundwater recharge within the study area is expected through conservation reserve or wooded area which migrate laterally and discharge as baseflow through streamflow northeastward to Lake Simcoe. A small component of the recharge will migrate to recharge deeper regional overburden and bedrock units. Given the predominance of coarse textured soils in the area, the quantity of local recharge and subsequent base flow contributions to Black River are inferred to be significant

The site also contains provincial and other wetlands, significant woodland and species, and water courses which may be groundwater dependent features.

14.3.1 Groundwater Conditions

Based on the existing conditions described in **Appendix W**, the Project site is in areas with shallow groundwater levels controlled by unconfined overburden sandy unit. Deeper groundwater is expected within the weathered limestone aquifer.

Based on a review and plot of the MECP well records, water well records were identified within the study area (including a 500 m buffer around the study area). A tabular summary of the well records in the vicinity of the study area is presented in **Appendix W**. The mainland area predominantly depends on groundwater is for potable water supply, whereas drinking water within the study area in Georgina Island is provided through private wells and surface water takings from Lake Simcoe.

The study's review of the Ministry of the Environment, Conservation and Parks water well records shows that 145 water wells were advanced within 500-m radius of the proposed design alternatives on the mainland (see **Figure D-29** and **Table D-9** below) between 1950 and 2022. These include 103 records of domestic, one (1) commercial, and 10 public water supply wells, 7 test holes and 11 record of abandoned wells.

The records show that groundwater is present at depths ranging between -0.3 and 4.6 meters below the ground surface (mbgs) in the overburden and bedrock, which indicates that management of groundwater will be needed during construction of the Fixed Link, depending on the chosen construction methodology.

Based on recent water supply well records, it is interpreted that the mainland may be predominantly serviced by groundwater in addition to watermains supply. *The Georgina, Fox and Snake Islands Subwatershed Plan* (2017) confirms that drinking water within the area is provided through private wells and surface water from Lake Simcoe. A water well survey was completed by CIPS in December 2023 to confirm the reliance on and details of water wells available in the area (**Appendix W**).

Table D-9: Well Water Record Summary (500 m radius)

Well Record Information	Number of Wells
Total Recorded Wells[1]	145
Drilling Method	
Bored/Dug/Driven	12
Cable Tool, Rotary Drilling	109
Other, not specified	24
Use	
Public Supply	114
Municipal/Public Supply	10
Domestic Supply	103
Commercial	1
Industrial	0
Agricultural (Irrigation, Stock)	0
Monitoring Wells	0
Not used/ abandoned	11
Dewatering	0
Test hole	7
Not specified	13
Data	
Total Recorded Wells[1]	145
Depth <10 m	37
Depth >10 m and <30 m	79
Depth > 30 m	3
Depth Not Specified	26
Static Water Level <= 4 mbgs[2]	108
Flowing Wells	1

[1]It is common for shallow dug wells and well points to be not recorded.
[2]mbgs = meters below ground surface

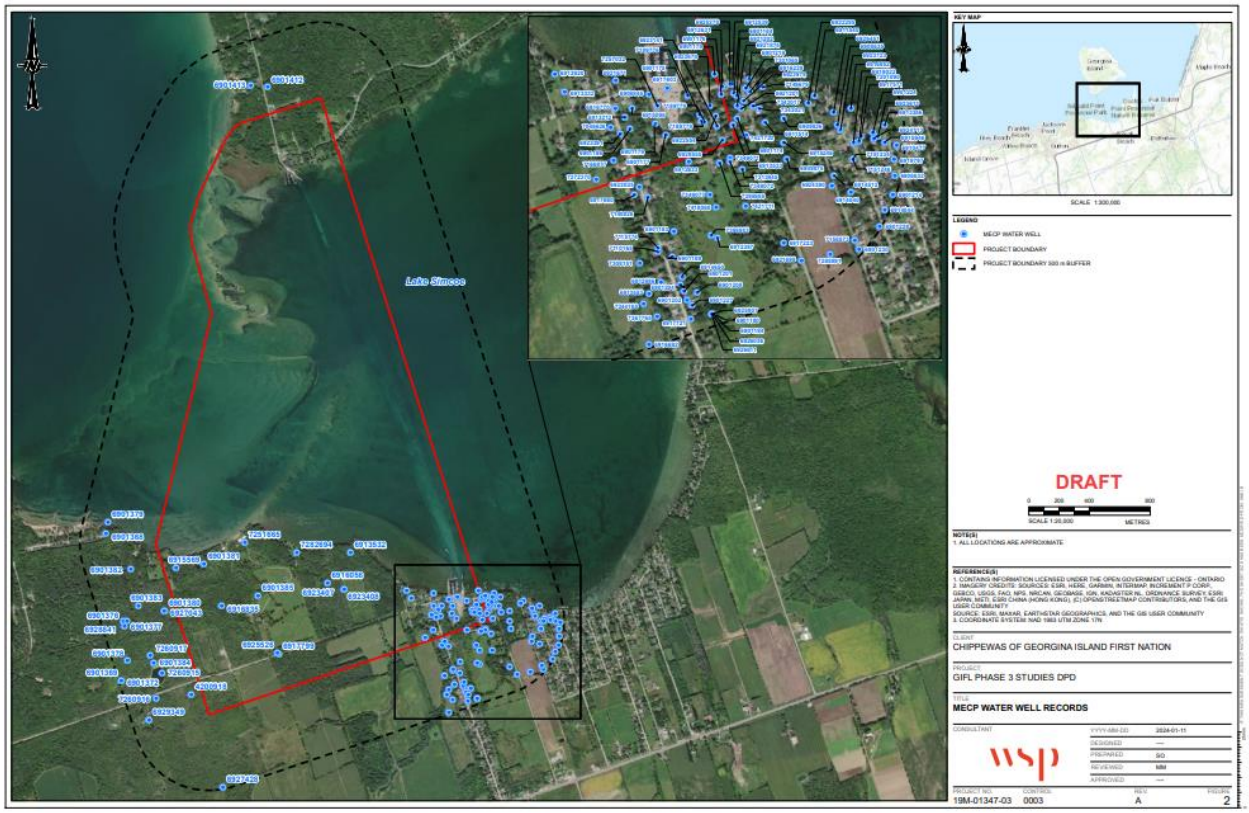


Figure D-29 MECP Water Well Records

Based on the well record information in the preliminary hydrogeological study, two primary aquifers are inferred to be present in the area of the Site: i) shallow unconfined aquifer, or aquifers and; ii) the deep bedrock aquifer. Most of the wells found in the well records are water supply wells (79%) constructed between 1950 to 2022. As such, the area is serviced with private domestic water wells. The review of MECP permits to take water records within the study area indicated no active permit was issued for construction dewatering activities and groundwater remediation.

In addition, a review of the MECP water well records, water supply records, documents provided by GIFN, and previously completed studies was completed and indicate the following:

- Georgina Island is serviced by a watermain that is present along Bear Road.
- A water treatment plant is present on the west side of Georgina Island (S. Burnett & Associates Limited , 2018) (**Figure D-30**).
- Water intake occurs from Lake Simcoe west of Georgina Island (S. Burnett & Associates Limited , 2018).
- Gravity sanitary sewer and pumping stations are present on Beaver Road (Neegan Burnside Ltd., 2008).

A detailed geotechnical investigation will also be completed to confirm the existing conditions of the shallow groundwater areas on Georgina Island.

Additional investigations, meetings with the LSRCA to coordinate potential effects on existing wetlands, and an investigation of source water quality during and post construction will be completed at subsequent phases of the Project.

14.3.2 Private Well Water Survey

The private Water Well Survey program was completed by CIPS in December 2023 (**Appendix W**). The survey involved the review of the following information: MECP water well records and water servicing in the study area; Georgina Island Water Treatment Plant details; existing drinking and recreational water sources (surface water and groundwater) used by the First Nation; and groundwater analyses for key parameters of Ontario Drinking Water Standards (see **Section 4.4** of **Appendix W**).

The program also included circulating water well survey questionnaires to identified well owners by regular mail. It was noted that no responses have been received before the deadline (October 31, 2023). In addition to these questionnaires that were distributed, the GIFN own two mainland properties (“West Property and “Bayvista Property”) that preliminarily included wells (6 onsite well records) for surveying. Permission to undertake surveys related to project deliverables for the Georgina Island Fixed Link has been previously obtained. However, CIPS staff were not able to locate the well on Site.

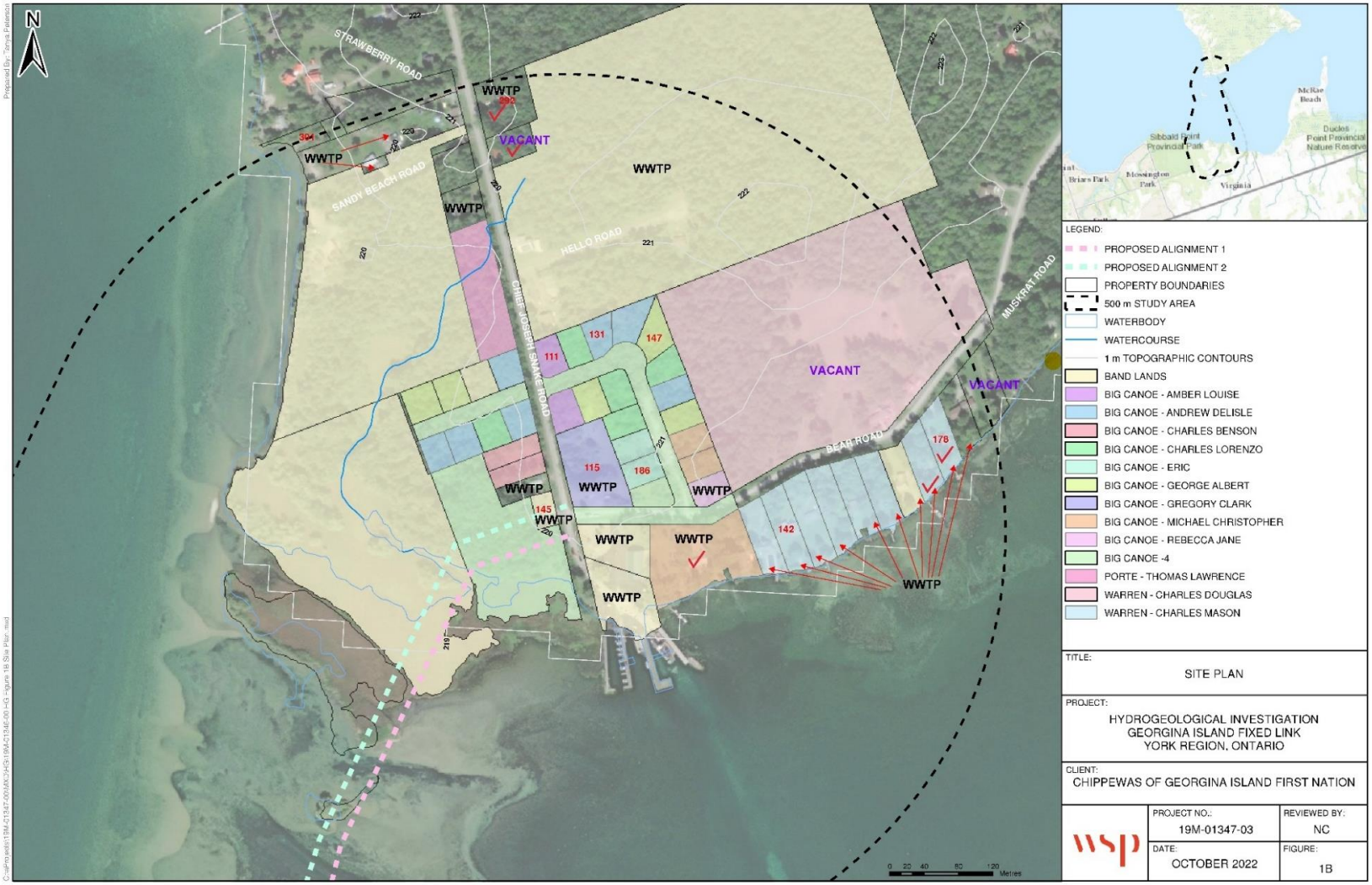


Figure D-30 Water Well Site Plan – Georgina Island

14.4 Drainage

The existing drainage system within the study area and surrounding areas drains overland by sheet flow into nearby streams, discharging into Lake Simcoe. The study area is mainly composed of forested areas and soil type is primarily sandy loam with imperfect drainage (Class B soil). As part of the early design phase of the Project, high level analysis of each catchment area was developed, as well as estimates of the existing runoff coefficient. The figure below presents the overall drainage patterns within the study area.

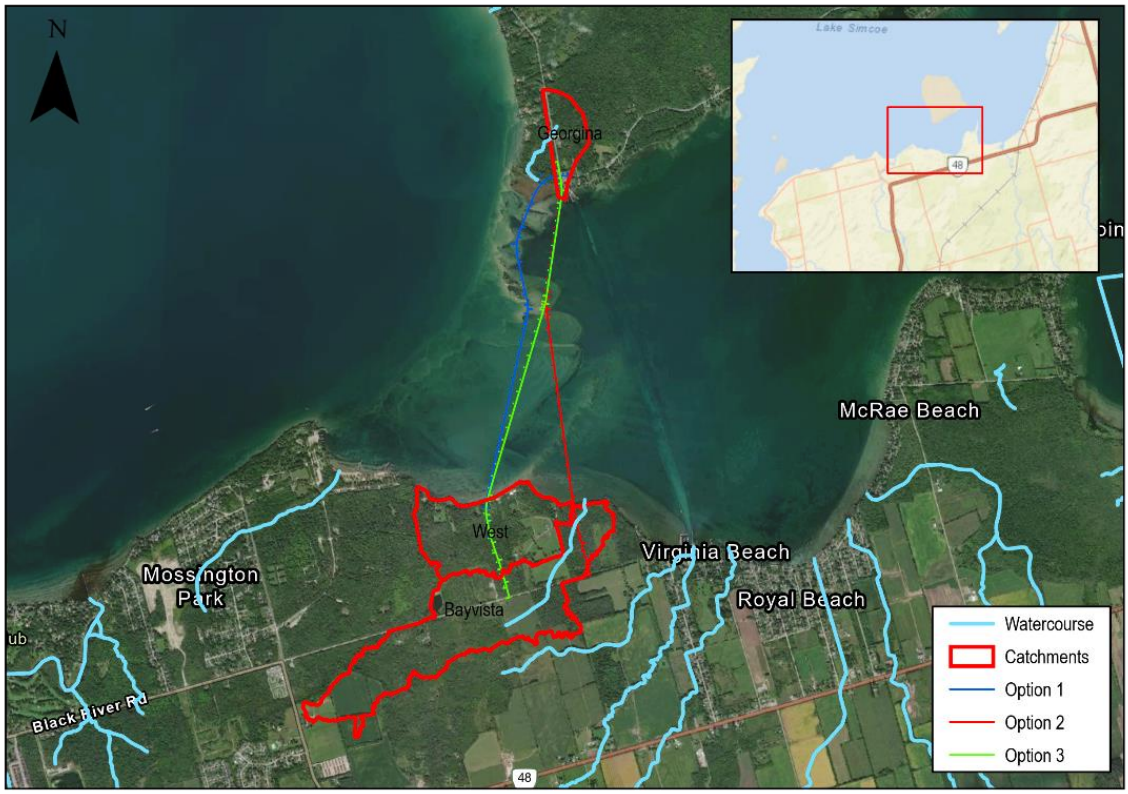


Figure D-31 Existing Drainage Areas

14.4.1.1 Georgina Island

The Georgina Island portion of the Project drains by overland flow along Chief Joseph Snake Road. The area is comprised of forested and developed areas (buildings, roadways, parking). Given the flat topography, soil type, and contribution from impervious areas, the estimated runoff coefficient for this area is 0.32 (MTO Design Chart 1.07).

From a drainage perspective, additional studies will be required as part of the Project, including to assess and identify:

- Water quantity and quality control measures;
- Impact of ice forces on bridge piers and abutment; and
- Climate change impact on lake water levels and wave action.

14.4.1.2 Bayvista Property

The Bayvista Property is located within an area that drains to Virginia Creek A. The creek has an overall watershed area of 124 ha and is composed of densely forested area and farmland. Given the soil type and flat topography, the creek watershed has an estimated runoff coefficient of 0.3 (MTO Design Chart 1.07).

14.4.1.3 West Property

The West Property is located within an area that drains by overland flow. It is mainly composed of densely vegetated area, which given the soil type and flat topography, is associated with a runoff coefficient of 0.2 (MTO Design Chart 1.07).

14.5 Atmospheric Environment

The assessment of existing air quality conditions in the study area focused on criteria air contaminants (CACs) that are expected to be released from existing sources including ferry operations and vehicle emissions. Selected indicator contaminants to assess include particulates matter, nitrogen oxides, and select volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). Existing air quality conditions were compared to the applicable Canadian Ambient Air Quality Standards (CAAQS) created by the Canadian Council of Ministers of the Environment (CCME) and the Ontario MECP Ambient Air Quality Criteria (AAQC); and based on the preliminary assessment, the existing air quality in the study area is characterized as good as the air quality criteria are met for the indicator contaminants. Refer to **Appendix U** for Air Quality Impact Assessment Report.

14.6 Acoustic Environment

A Noise Impact Assessment Report was drafted in 2023 and updated in 2025 based on new monitoring data, as well as 33% design drawings (**Appendix V**). An ambient or background noise monitoring program was conducted on September 7, 2022, to September 15, 2022, which included two monitoring locations (**Figure D-32**). One noise monitor was located on Georgina Island at the intersection of Chief Joseph Snake Road and Bear Road, north of the island ferry terminal, and the second one on the mainland at the Bayvista Property, west of the ferry terminal. These two locations were selected to represent the existing noise sensitive land uses (i.e., daycare, entertainment, hospitals, places of worship, schools, residential developments, parks) that are located within the study area. The noise measurements captured from traffic, the ferry operation, and other sources typical of the region in September. The objective of the monitoring program is to quantify the existing acoustical environment that these noise sensitive land uses currently experience daily, as well as to establish the baseline noise conditions.

Additionally, baseline noise measurements and POR verifications were undertaken on August 20, 2025, and August 27, 2025. These additional measurements confirmed that the baseline sound levels in 2022 assessment are conservative. The field verification determined that certain previously defined PORs are not noise sensitive and were subsequently excluded in the 2025 assessment.

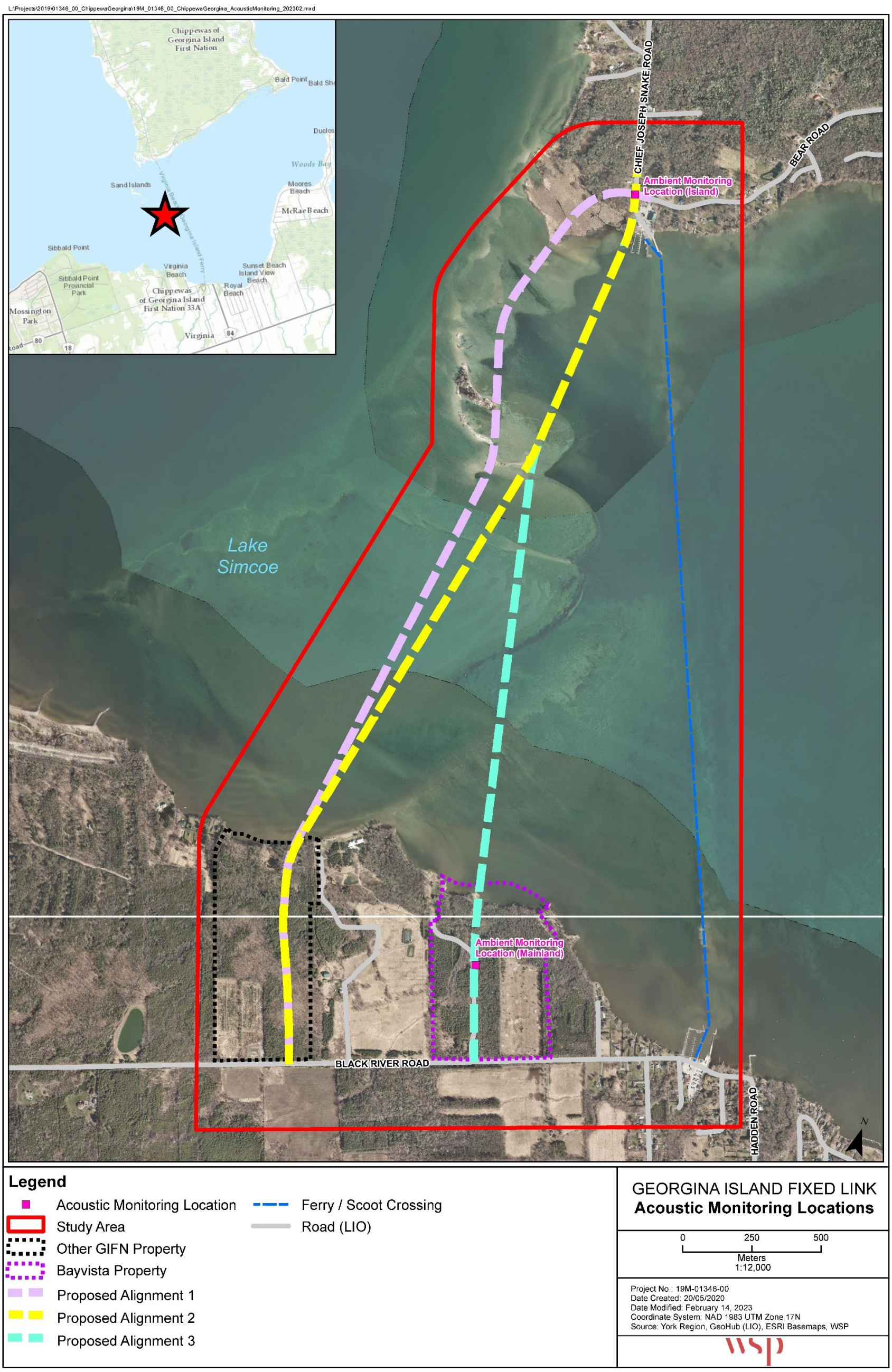


Figure D-32 Acoustic Monitoring Stations September 2022

Table D-10: Sound Level Ranges (Averaged over 1 Hour)

Location	Daytime 7am to 10pm Leq 1-Hr (dBA)	Nighttime 10pm to 7am Leq 1-Hr (dBA)
Mainland	35 to 49	34 to 47
Island	44 to 56	31 to 56

Table D-11: Sound Level Ranges (Averaged over 15 Hours for Daytime and 9 Hours for Nighttime)

Location	Daytime 7am to 10pm Leq 15-Hr (dBA)	Nighttime 10pm to 7am Leq 9-Hr (dBA)
Mainland	41 to 47	41 to 45
Island	48 to 52	45 to 51

Table D-10 summarizes the sound level ranges at each of the monitoring locations and averaged over a one-hour period. **Table D-11**: summarizes the sound level ranges at each of the monitoring locations and averaged over 15 hours for the daytime period, and 9 hours for the nighttime period.

Based on the results of the monitoring program, the study area can be described as from a “Very Quiet” area to a “Quiet” area as the measured sound levels ranged from 30 dBA to below 60 dBA. For reference, a typical sound level of people having a normal conversation would be about 60 dBA, a whisper is about 30 dBA, and 50 dBA represents a quiet office.

14.7 Coastal Environment

A coastal engineering study was completed by WSP in September 2024. The study consisted of field investigations, hydrodynamic, wave, and sediment modelling, shoreline evolution assessment, ice analysis, and navigation impact assessment to characterize baseline coastal environment conditions and assesses potential impacts of the preferred alignment. The following subsections describe the baseline coastal environment conditions of the study area.

14.7.1 Lake Simcoe Water Levels

Lake Simcoe is part of a much larger system known as the TSW (**Figure D-33**). Water levels in Lake Simcoe are managed by Parks Canada, the Federal Government, via the TSW.

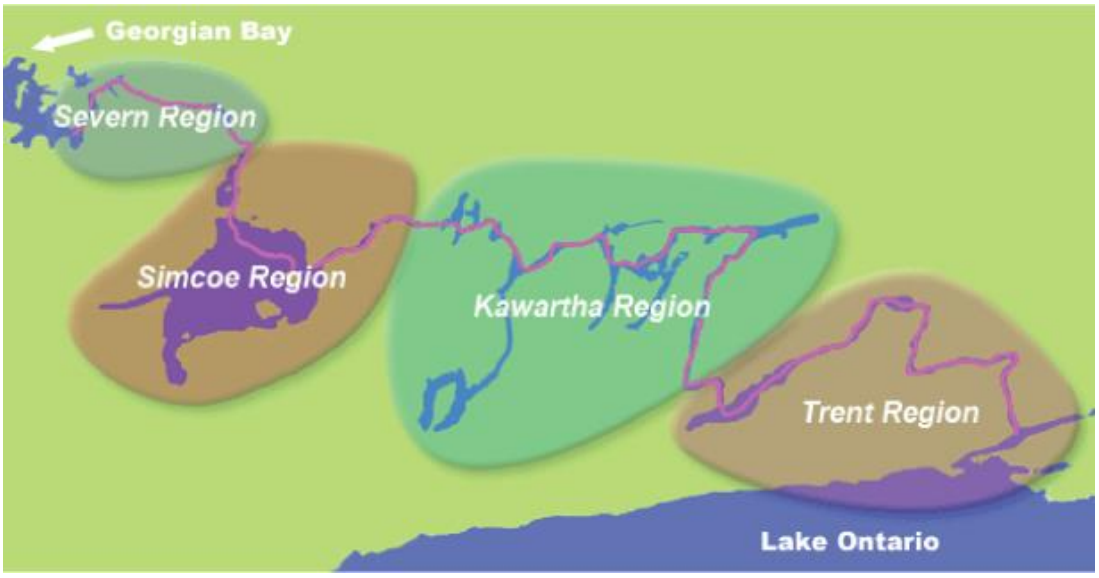


Figure D-33 Trent–Severn Waterway (LSRCA)

Long-term Lake Simcoe daily water levels at Jackson Point (**Figure D-34**) were provided by Parks Canada for the period of 1960 to 2022. The maximum water level recorded during this period is 219. 486 m CGVD28 (0.796 m CD) and occurred on May 14th, 1960. The minimum water level is 218.440 m CVGD28 (-0.25 m CD) and was recorded on December 15th, 1964.

Annual daily minimum, maximum and average water levels along with Parks Canada rule curve is shown in **Figure D-35.** Lake Simcoe water levels typically vary by about 0.4 to 0.5 m during any given year. As the summer progresses, the levels begin to drop because of increased evaporation and reduced inflows. The lowest levels are reached in late fall and winter.

Drawdown begins in the summer because it takes time to gradually reduce the levels in the lake. This needs to take place to make room for the precipitation that happens in the fall, winter, and spring. To protect against flooding and optimize public safety throughout the interconnected system, the lake is lowered to make room for high inflows that are typical over the non-navigation seasons (October - May).

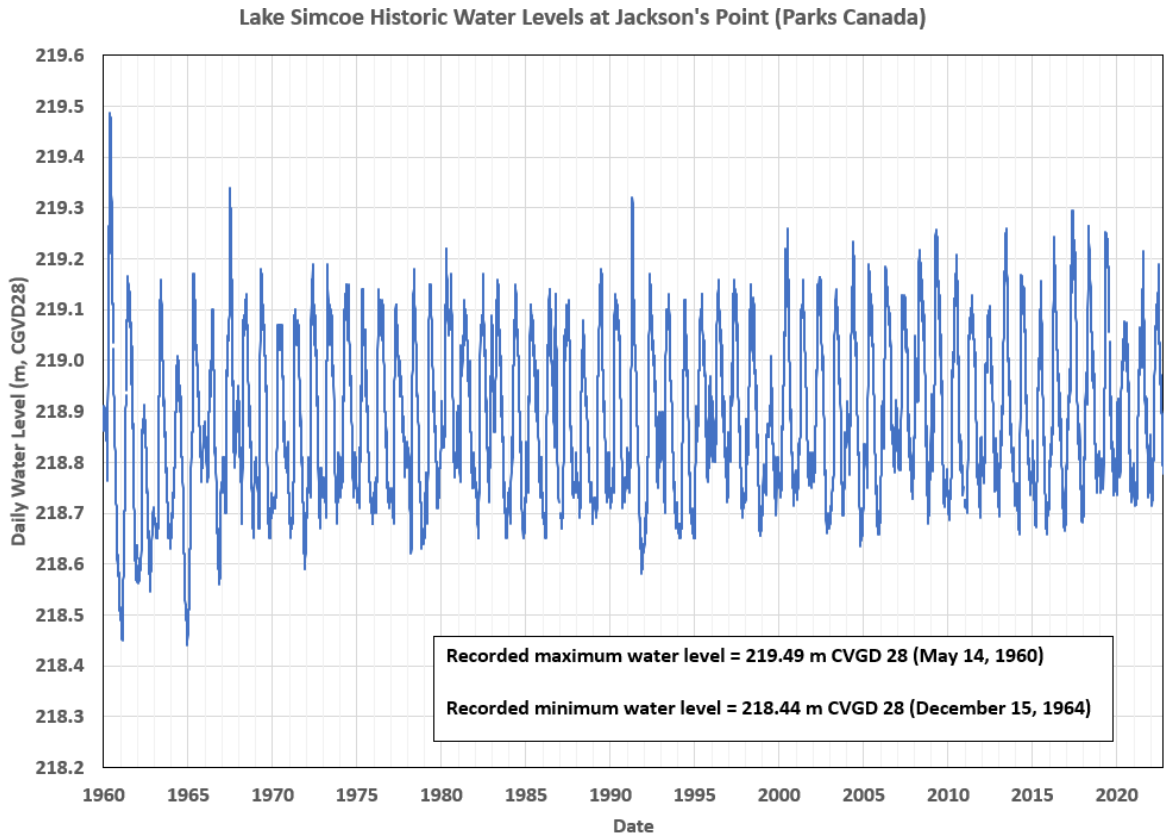


Figure D-34 Lake Simcoe Daily Water Level at Jackson Point

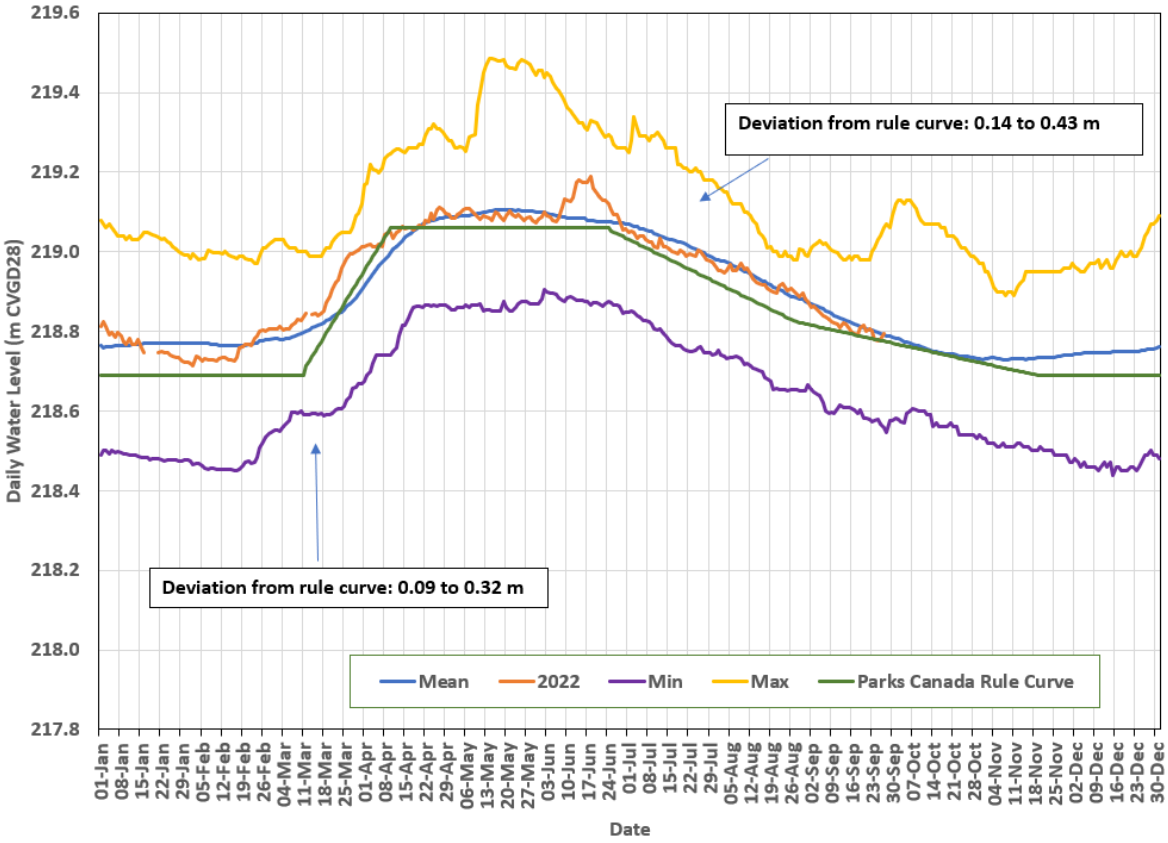


Figure D-35 Lake Simcoe Daily Water Level Statistics at Jackson Point

14.7.2 Lake Bathymetry

The Digital Elevation Model (DEM) of the portion of Lake Simcoe within the study area was developed using different bathymetric and topographic datasets. On September 16, 2022, WSP conducted a survey using the bathymetric data collected for the DEM. Outside the study area, bathymetric data was complemented using the Canadian Hydrographic Service (CHS) Non-Navigational (NONNA) bathymetric data and navigational charts. Topographic data was collected through from the Canadian DEM of Natural Resources Canada (NRCAN). All datasets were converted to the same vertical datum, using Chart Datum (CD), which elevation is at 218.69 m in CGVD28 for Lake Simcoe. **Figure D-36** shows the DEM of the large area of Lake Simcoe while **Figure D-37** shows the DEM of the study area.

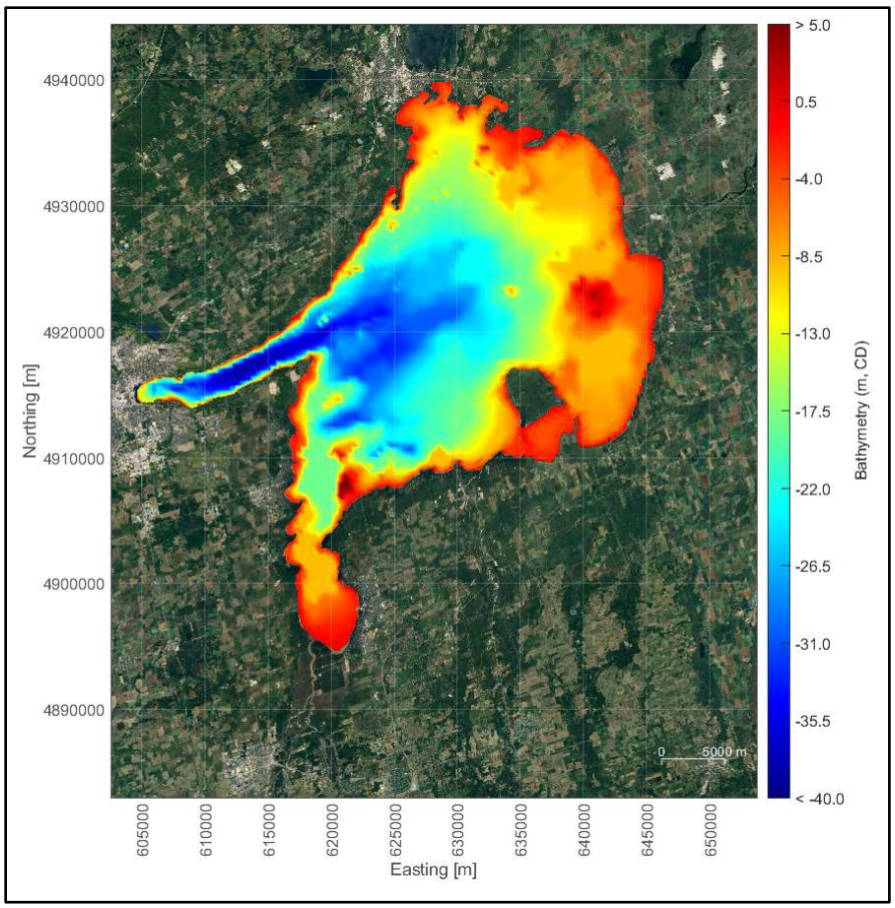


Figure D-36 DEM of Lake Simcoe (CD)

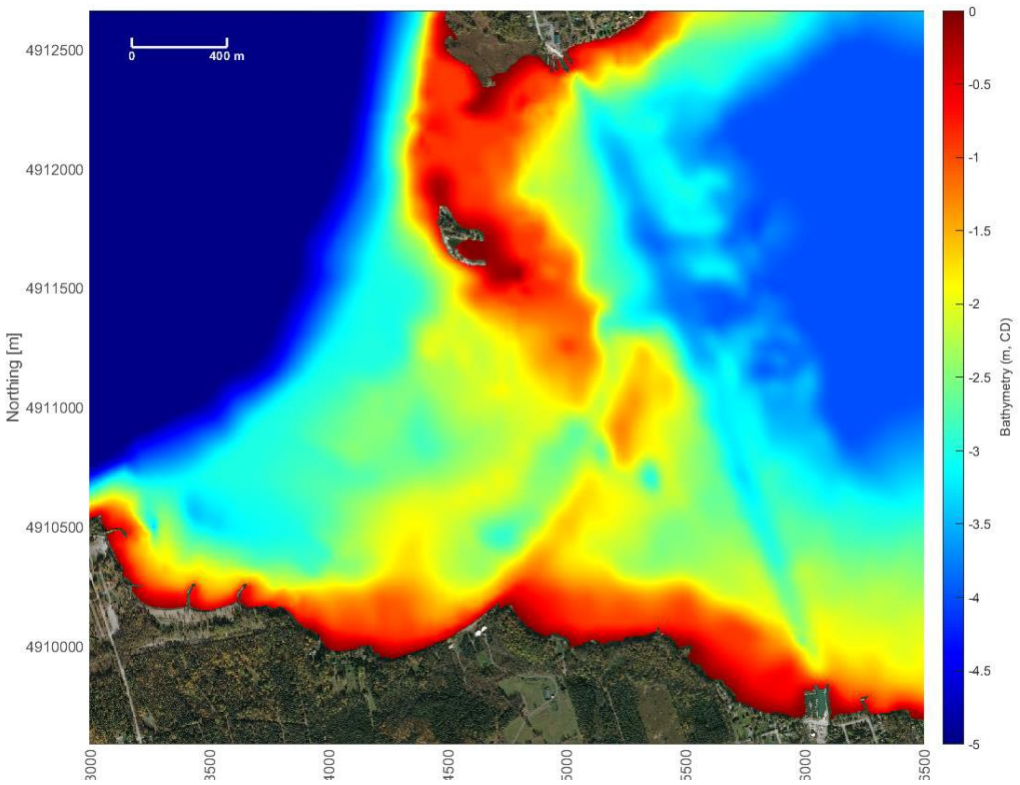


Figure D-37 DEM of Lake Simcoe in the Study Area (CD)

14.7.3 Ice Regime

This section presents an overview of Lake Simcoe ice processes in the study area and potential ice-related constraints for the proposed Project.

14.7.3.1 Freeze Up Date

The GIFN provided information regarding freeze-up dates in the strait, between 1852 and 2020 (163 available years). **Figure D-38** illustrates this data. The following observations can be made:

- Freeze-up dates vary from early December to early February.
- A positive trend can be observed in freeze-up dates (dashed line), meaning that Lake Simcoe freezes later than before.
- Freeze-up mainly occurred in late December or January for period between 1990-2020, whereas it used to occur mainly in December for the period between 1852-1900.
- The average trend is +12 days over a century. Warmer air temperatures could explain this positive trend in freeze-up dates.

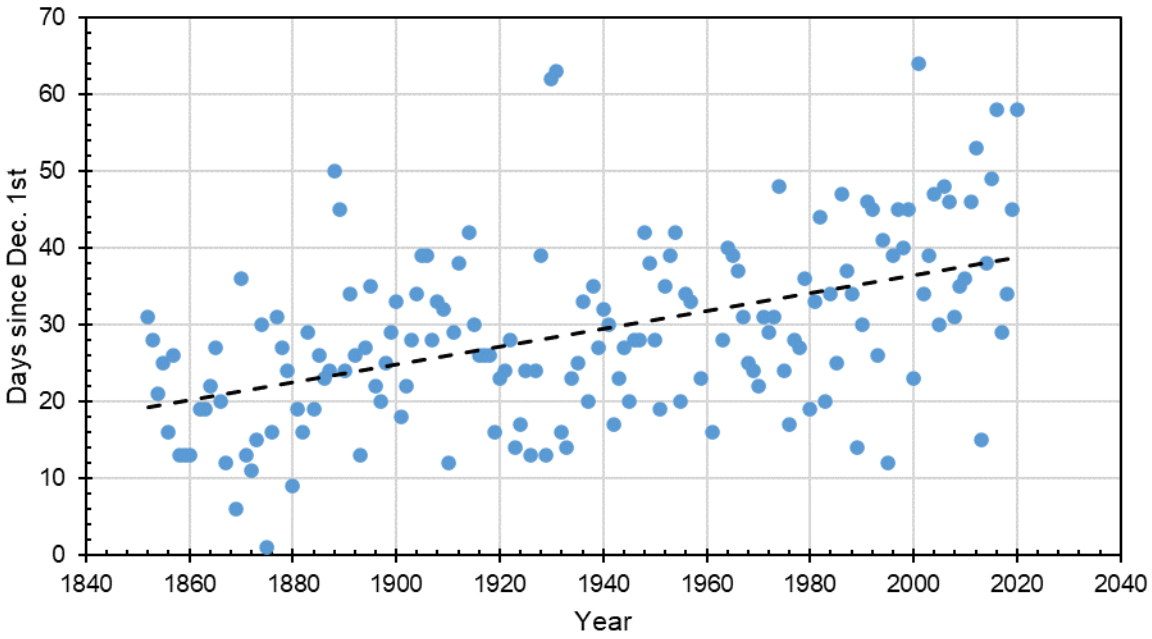


Figure D-38 Freeze-up Dates Between 1852 and 2022. Data Courtesy of the GIFN

14.7.3.2 Thaw Date

Thaw data for the period between 1853-2021 (167 available years) was also provided by the GIFN. **Figure D-39** illustrates this data. The following observations can be made:

- Thaw dates vary from late March to early May.
- A negative trend in thaw dates (dashed line) can be observed, meaning that Lake Simcoe thaws earlier than before. Thaw mainly occurred from mid-April to early May for the period between 1853 to 1980, whereas thaw dates have been scattered mainly during April for the last decades. The average trend is -6 days over a century. Warmer air temperatures, combined with later freeze-up dates (meaning a shorter freezing period and thinner ice covers), could explain this negative trend.

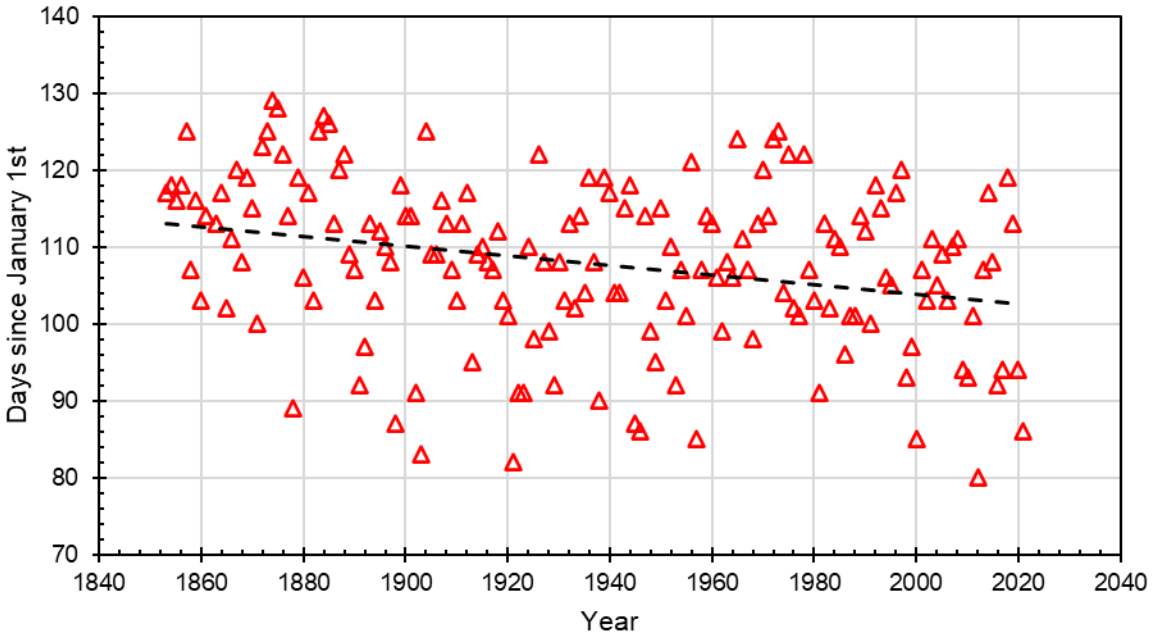


Figure D-39 Thaw Dates Between 1853 and 2012. Data Courtesy of the GIFN

14.7.3.3 Ice Period Duration

Duration of the ice period was derived from the freeze-up and thaw dates provided by the GIFN. **Figure D-40** presents the ice period duration between 1853 and 2021. Currently, the GIFN operate ice breakers to maintain the ferry route during freeze-up dates. The use of ice breakers has historically compromised ice build up, which results in lack of ice stability

Data shows a negative trend, which indicates a reduction of the ice period. The average trend is -18 days over a century.

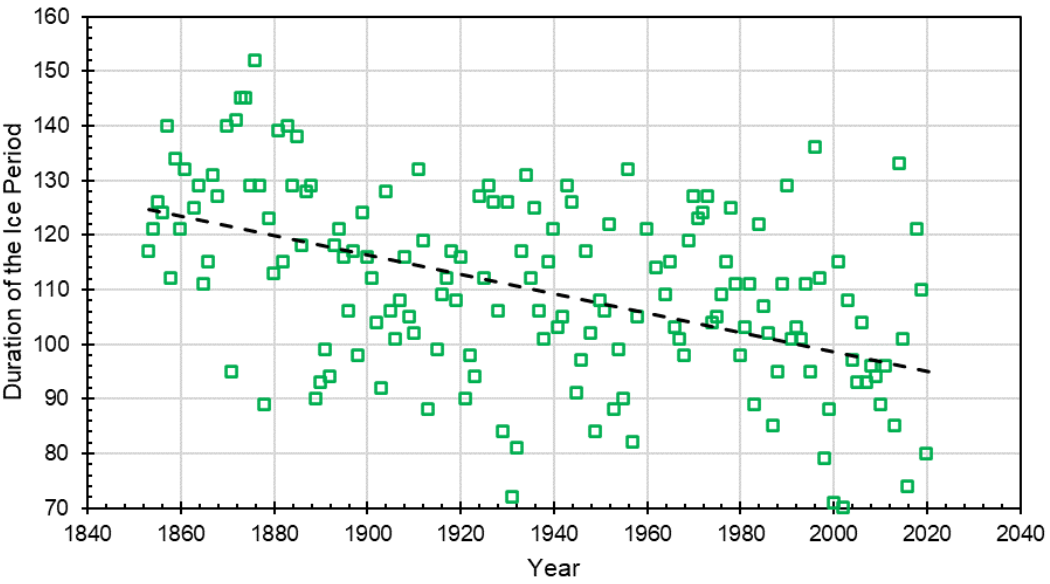


Figure D-40 Ice Period Duration Between 1853 and 2021. Data Courtesy of the GIFN

14.7.3.4 Satellite Imagery Analysis

Historical satellite images and photos were reviewed to describe the ice regime in the study area. Findings are summarized below.

Typically, the lake ice cover first forms in the strait between Georgina Island and mainland (**Figure D-41**); then, the ice cover gradually establishes itself over the entire lake.

Historical satellite images show that the lake ice cover undergoes changes during the winter. **Figure D-42** shows the presence of cracks and ice accretion stripes, proof to the evolution of the ice cover. The presence of ice accretion stripes indicates movement of the ice sheets coming from the west, most likely due to the influence of prevailing winds. Ice accretions stripes were observed over the last 5 years, which suggests that this phenomenon is common.

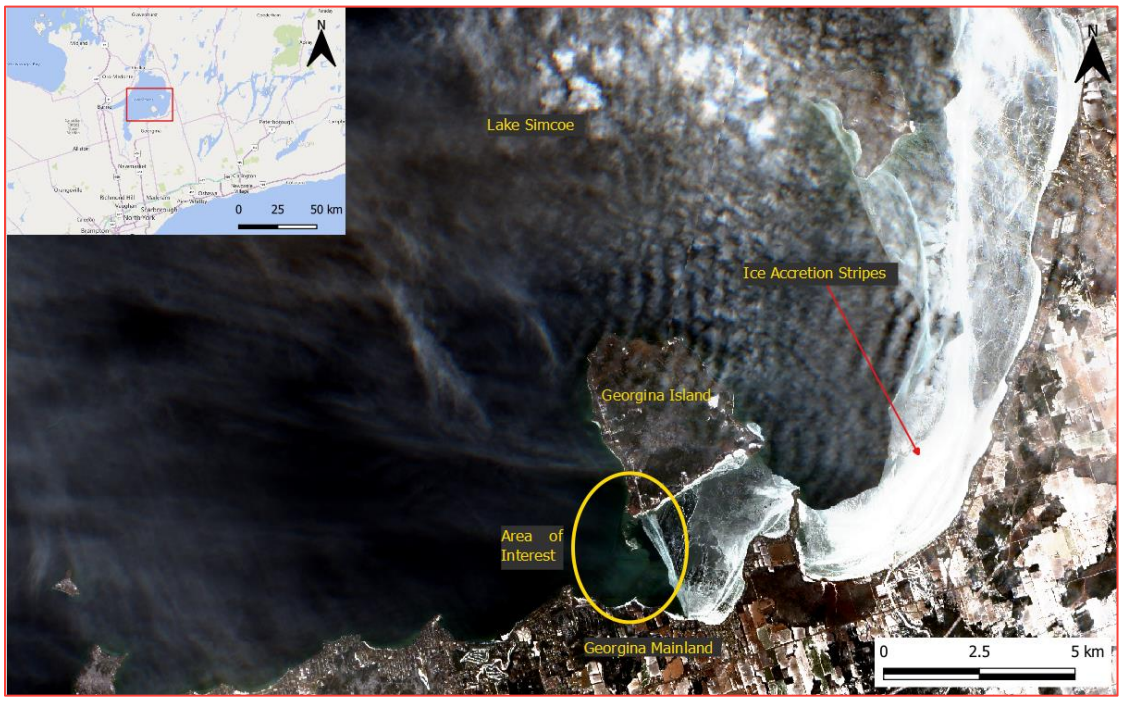
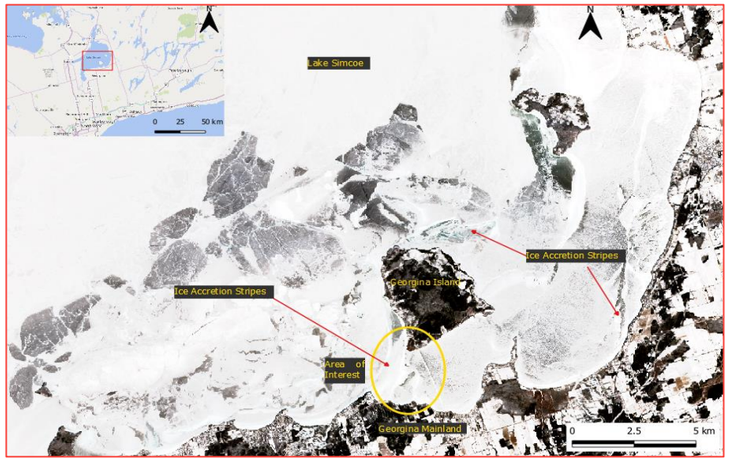
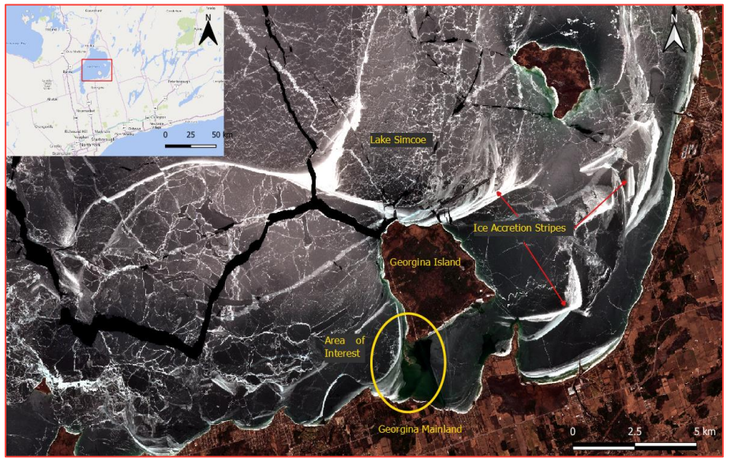


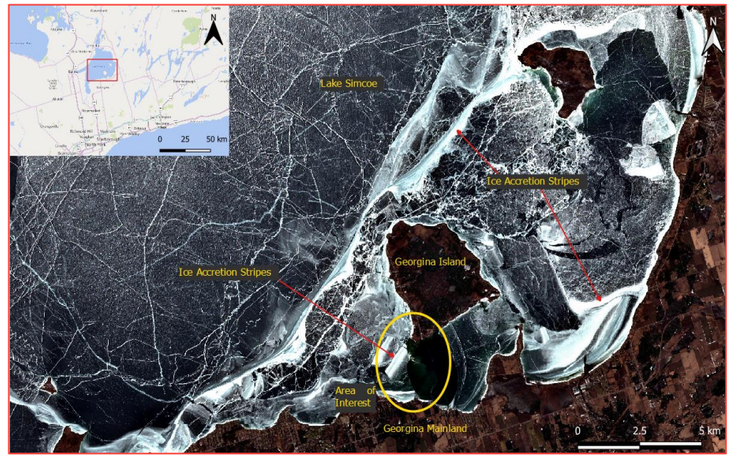
Figure D-41 Ice Conditions on Lake Simcoe – January 2, 2020. Sentinel-2 Imagery



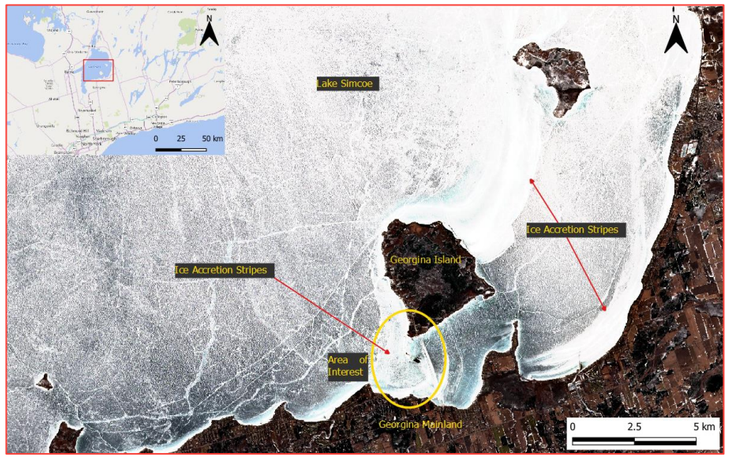
a. January 16, 2022



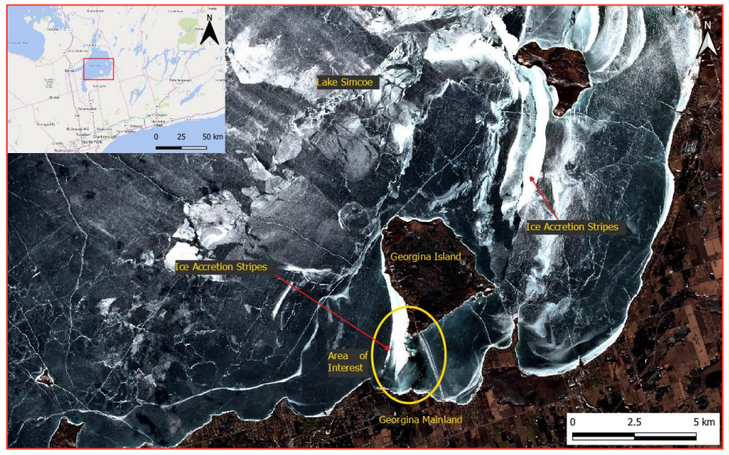
b. March 22, 2021



c. March 22, 2022



d. March 23, 2019



e. March 3, 2018

Figure D-42 Ice Conditions on Lake Simcoe – 2019-2022. Sentinel-2 Imagery

Ground photos show that large ice accumulations (few metres high) can form on the lake shoreline. These ice buildups are generated when strong wind pushes the lake ice on the shore. For example, buildups have occurred in the GIFN Community in March 2021, as shown in **Figure D-43**.

→ Observer close to shoreline

→ Observer away from shoreline

Figure D-43 Ice Buildup in the GIFN Community in March 2021

Figure D-44 shows the ice conditions on Lake Simcoe on April 22, 2018. The lake ice cover was broken into multiple ice rafts, and those rafts were concentrated on the west part of the lake. Ice also accumulated in the study area.

Moving ice coming from the west can result in significant forces to the proposed Fixed Link. This constraint needs to be considered in the design of the Fixed Link.

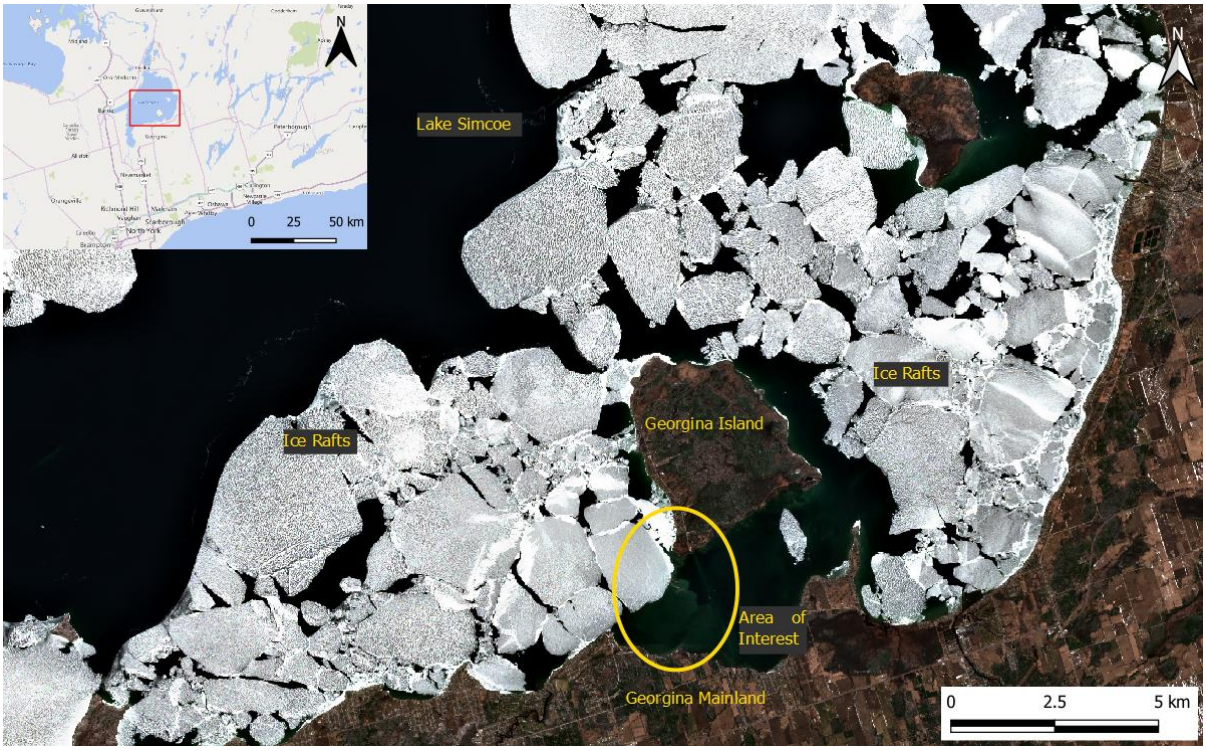


Figure D-44 Ice Conditions on Lake Simcoe – April 22, 2018. Sentinel-2 Imagery

14.7.3.5 Ice Thickness

No ice thickness data is available for Lake Simcoe. Therefore, ice thickness is evaluated based on a thermal growth equation (Carter Consultants, 2013):

$$h = 0.035\ \alpha\ \beta\ \sqrt{AFFD}$$

Where h is the ice thickness (m), α is the ice growth coefficient (m°C-½d-½), Accumulated Freezing Degree Days (AFDD) is the accumulated freezing degree days over the ice period, and β is a coefficient to account for the probability of occurrence.

The estimated ice thicknesses are provided below using AFDD of 696°C, ice growth coefficient of 0.9 and coefficient β of 1.0 (for 2-year return period) and 1.2 (100-year return period).

- 2-year ice thickness: 0.8 m
- 100-year ice thickness: 0.9 m.

More details of ice thickness estimates will be provided in the Coastal Engineering Report upon completion. (WSP, 2024).

14.7.3.6 Summary of Existing Costal Environment conditions

The following list summarizes the relevant findings:

- Historical data show that freeze-up happens later than before, and thaw happens sooner than before. Consequently, the ice-covered period for Lake Simcoe is shorter (-18 days over a century).

- Ice accretion stripes typically appear near the west shore and near the project area. Those stripes are probably the result of moving ice coming from the west due to sustained winds during freeze-up.
- In spring, large ice sheets can be driven by wind towards the west shore and the project area. Large ice buildups along the shoreline can result from these movement and cause damage to the structures.
- According to climate projections, precipitation and air temperature are likely to increase in future years. This situation could trigger more rainfall during winter and shorter freezing period, which could both result in thinner icer cover. A thinner ice cover in the future could lead to more frequent ice movement and buildups.

14.7.4 Lake Sediments

Lakebed and shoreline sediment samples with the study area were collected on October 6, 2022, and these samples were sent to the laboratory to conduct sediment particle size analysis. **Figure D-45** Shows the location of sediment samples collected.

Table D-12 presents the sediment composition for the lakebed sediment samples. The lakebed sediment can be categorized as either fine sand with silt or silt with fine sand except for one sediment sample. **Table D-13** presents the sediment composition for the shoreline sediment samples.

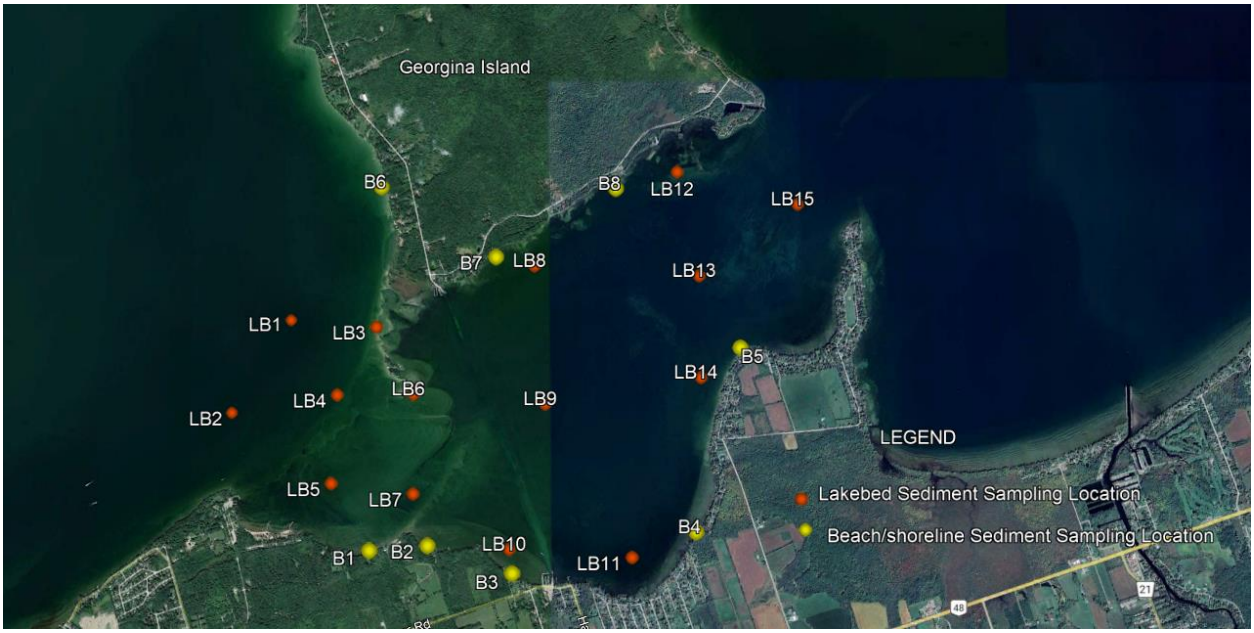


Figure D-45 Sediment Sampling Locations

Table D-12: Lakebed Sediment Composition

Sediment Sample ID#	% Gravel		% Sand			% Fines		Description	D_{50} (mm)
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
LB1	0.0	0.0	0.0	0.3	75.4	18.5	5.8	Fine sand with silt	0.091
LB2	0.0	0.0	0.0	0.5	64.4	26.1	9.0	Fine sand with silt	0.085
LB3	43.9	52.7	1.6	1.8				Gravel	18.2
LB4	0.0	3.3	4.5	4.6	73.3	12.0	2.3	Fine sand with silt	0.138
LB5	0.0	2.3	0.1	1.8	85.4	7.7	2.7	Fine sand with silt	0.149
LB6	0.0	0.0	0.0	5.4	84.1	7.7	2.8	Fine sand with silt	0.173
LB7	0.0	4.9	0.6	2.2	78.2	11.5	2.6	Fine sand with silt	0.159
LB8	0.0	0.0	0.0	5.9	14.7	67.4	12.0	Silt with fine sand and clay	0.016
LB9	0.0	0.0	0.0	1.8	9.5	74.8	13.9	Silt with fine sand and clay	0.013
LB10	0.0	0.0	0.0	3.4	26.9	60.4	9.3	Silt with fine sand and clay	0.040
LB11	0.0	0.0	0.0	3.6	10.0	73.4	13.0	Silt with fine sand and clay	0.021
LB12	0.0	5.9	2.8	10.6	41.9	31.9	6.9	Fine sand and silt with clay	0.170
LB13	0.0	0.9	1.7	7.6	34.4	40.4	15.0	Fine sand and silt with clay	0.047
LB14	0.0	0.0	0.0	3.3	52.2	36.7	7.8	Fine sand with silt	0.081
LB15	0.0	0.0	0.0	3.6	61.6	28.1	6.7	Fine sand with silt	0.107

Table D-13: Lake Shoreline Sediment Composition

Sediment Sample ID#	% Gravel		% Sand			% Fines		Description	D_{50} (mm)
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
B1-AW	0.0	6.7	1.7	7.6	78.5	4.4	1.1	Fine sand with gravel and silt	0.251
B1-BW	0.0	0.2	0.0	0.7	89.8	7.2	2.1	Fine sand with silt	0.123
B2-AW	0.0	7.9	8.8	23.0	55.3	4.0	1.0	Sand with gravel and silt	0.372
B2-BW	0.0	0.2	1.3	6.4	79.9	10.2	2.0	Fine sand with silt	0.197
B3-AW	0.0	0.3	0.0	3.9	46.8	44.2	4.8	Fine sand and silt	0.076
B3-BW	0.0	0.0	0.0	0.6	42.6	51.1	5.7	Fine sand and silt	0.064
B4-AW	19.8	13.8	2.9	16.1	33.8	11.3	2.3	Sand with gravel and silt	0.494
B4-BW	0.0	4.5	6.6	16.9	57.7	10.9	3.4	Sand with silt	0.134
B5-AW	62.3	18.4	3.0	7.7	5.6	2.3	0.7	Gravel with sand	22.8
B5-BW	66.8	6.6	2.3	4.5	16.1	2.7	1.0	Gravel with sand	28.2
B7-AW	65.4	4.7	0.6	3.1	19.5	5.8	0.9	Gravel with sand	31.4
B7-BW	0.0	2.5	1.7	8.1	57.6	25.7	4.4	Fine sand with silt	0.114
B8-AW	54.6	15.2	5.9	13.0	8.7	2.0	0.6	Gravel with sand	21.2
B8-BW	63.3	11.1	3.7	4.9	14.5	2.0	0.5	Gravel with sand	35.2

14.7.5 Wind Conditions

Wind data from the following sources was used to characterize the project site wind conditions:

- Environment Canada Barrie-ORO climate station (ID: 6117700).
- National Oceanic and Atmospheric Administration (NOAA) Coupled Forecast System Model Version 2 (CFSv2) data. CFSv2 is based on a re-analysis program for all meteorological products generated by NOAA's National Center for Environment Prediction.

Locations of the wind stations are shown in **Figure D-46**.

Figure D-46 Locations of Wind Data: Barrie ORO Station and CFSv2 Model Data Point Location

Time series of hourly wind speed and wind rose for the data at Barrie ORO station are shown in **Figure D-47** and **Figure D-48**, respectively. Prevailing winds and the highest wind speeds at the project site are from north, northwest and west.

An extreme value analysis on the winds was performed on Barrie ORO wind data to determine extreme wind speeds from 16 compass directions. Barrie ORO wind data was selected for the extreme value analysis as it had the longest period of hourly wind data. The extreme wind speeds for the 5, 10, 25 ,50 and 100-year return periods are presented in **Table D-14** and **Table D-15**. The highest winds come from the west and west northwest with a 100-year return period of approximately 19 m/s. For further information, refer to Section 2.5 of Appendix Y.

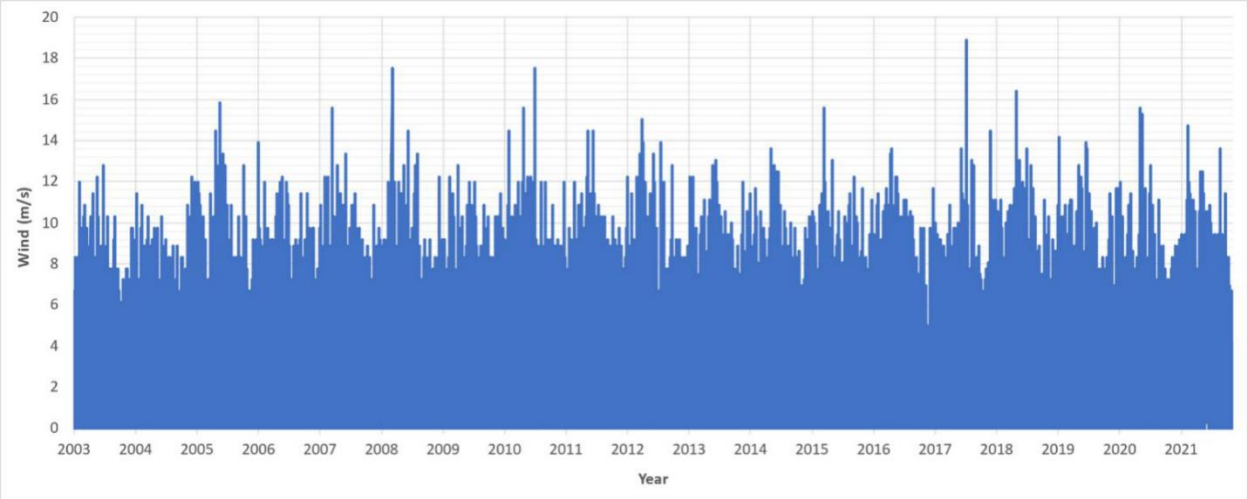


Figure D-47 Time Series of Wind Speed at Barrie ORO Station

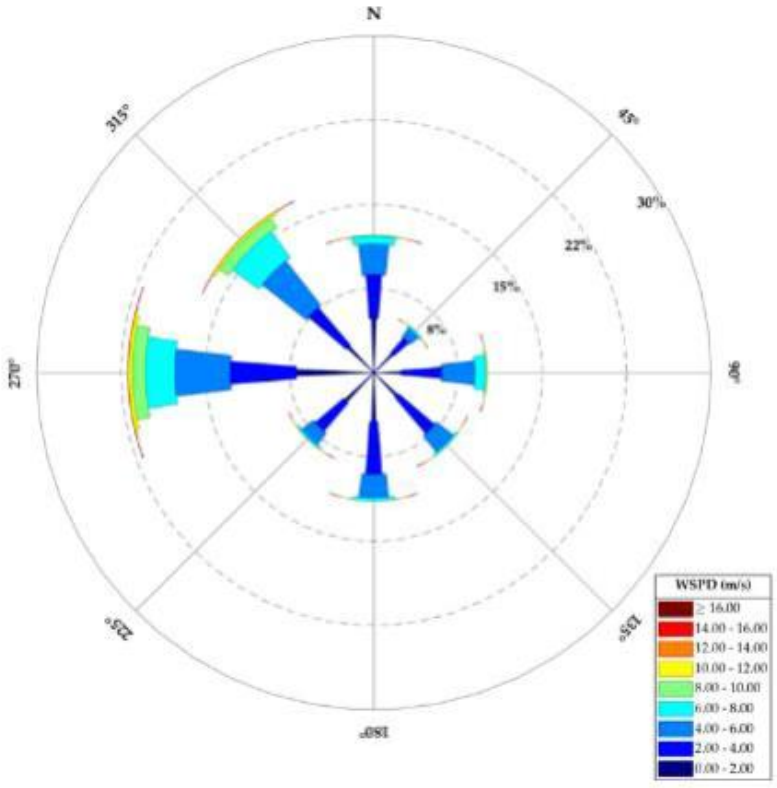


Figure D-48 Wind Rose – Barrie ORO Data

Table D-14: Extreme Wind Speeds at Barrie ORO Station (Omnidirectional)

Return Period (Year)	Return Wind Speed (m/s)
5	16.6
10	17.2
25	17.9
50	18.4
100	18.9

Table D-15: Extreme Wind Speeds at Barrie ORO Station

Return Period (Year)	N	NNE	NE	ENE
			Windspeed (m/s)	
5	11.1	10.2	9.7	9.5
10	11.7	11.1	10.1	10.0
25	12.3	12.2	10.6	10.5
50	12.7	12.9	11.0	10.9
100	12.9	13.6	11.2	11.3
Return Period (Year)	**E**	**ESE**	**SE**	**SSE**
			Windspeed (m/s)	
5	10.6	11.4	8.6	8.6
10	11.2	11.9	8.8	8.9
25	12.0	12.6	9.0	9.1
50	12.6	12.9	9.1	9.3

Return Period (Year)	N	NNE	NE	ENE
			Windspeed (m/s)	
100	13.1	13.3	9.2	9.4
Return Period (Year)	**S**	**SSW**	**SW**	**WSW**
			Windspeed (m/s)	
5	8.0	8.8	10.5	11.0
10	8.6	9.2	11.2	11.4
25	9.2	9.7	12.2	11.7
50	9.7	10.0	13.1	11.9
100	10.1	10.3	14.1	12.2
Return Period (Year)	**W**	**WNW**	**NW**	**NNW**
			Windspeed (m/s)	
5	14.3	16.7	13.4	10.0
10	15.8	17.4	14.1	10.2
25	17.9	18.2	14.9	10.4
50	19.4	18.8	15.5	10.6
100	20.9	19.4	16.0	10.6

14.7.6 Wave Climate

A field work program was conducted to collect currents and wave conditions near the project site in support of the hydrodynamic and wave modeling. A bottom-mounted ADCP, Sentinel WH 1200 Model, was deployed to collect current and wave conditions for two (2) months from October 5 to November 30, 2022. The ADCP deployment location is shown in **Figure D-49**.

Figure D-49 ADCP Deployment Location

Figure D-50 presents the recorded time series of depth-averaged current velocity and the direction the currents are coming from along with the wind speed and the direction from the CFSv2 atmospheric model. Both wind and current directions indicate where they are coming from in respect to the true north.

The recorded ADCP maximum velocities of 0.10 - 0.12 m/s corresponds with wind speeds of approximately 35 m/s coming from the 300 degrees (northwest). Additionally, the lower velocities ranging from 0.01 - 0.04 m/s suggest relatively calmer flow conditions. The velocity current profile (**Figure D-51**) indicates a well-mixed environment, with no significant changes in flow velocities throughout the water column. The absence of velocity variations suggests a homogeneous water mass, lacking stratification or localized flow patterns. The direction indicates where the currents are coming from in respect to true north.

Figure D-52 displays the recorded wave heights, wave period and direction along with wind speeds and direction from the CFSv2 atmospheric model. An intense northwest wind event

occurred in the early hours of October 26 and November 7 resulting in wave heights reaching 0.8 to1.0 m. The direction indicates where the waves are coming from in respect to true north. The wave rose diagram further illustrates that the majority of the highest wave heights originate from the west to northwest direction, aligning with the areas of largest fetches (**Figure D-53**).

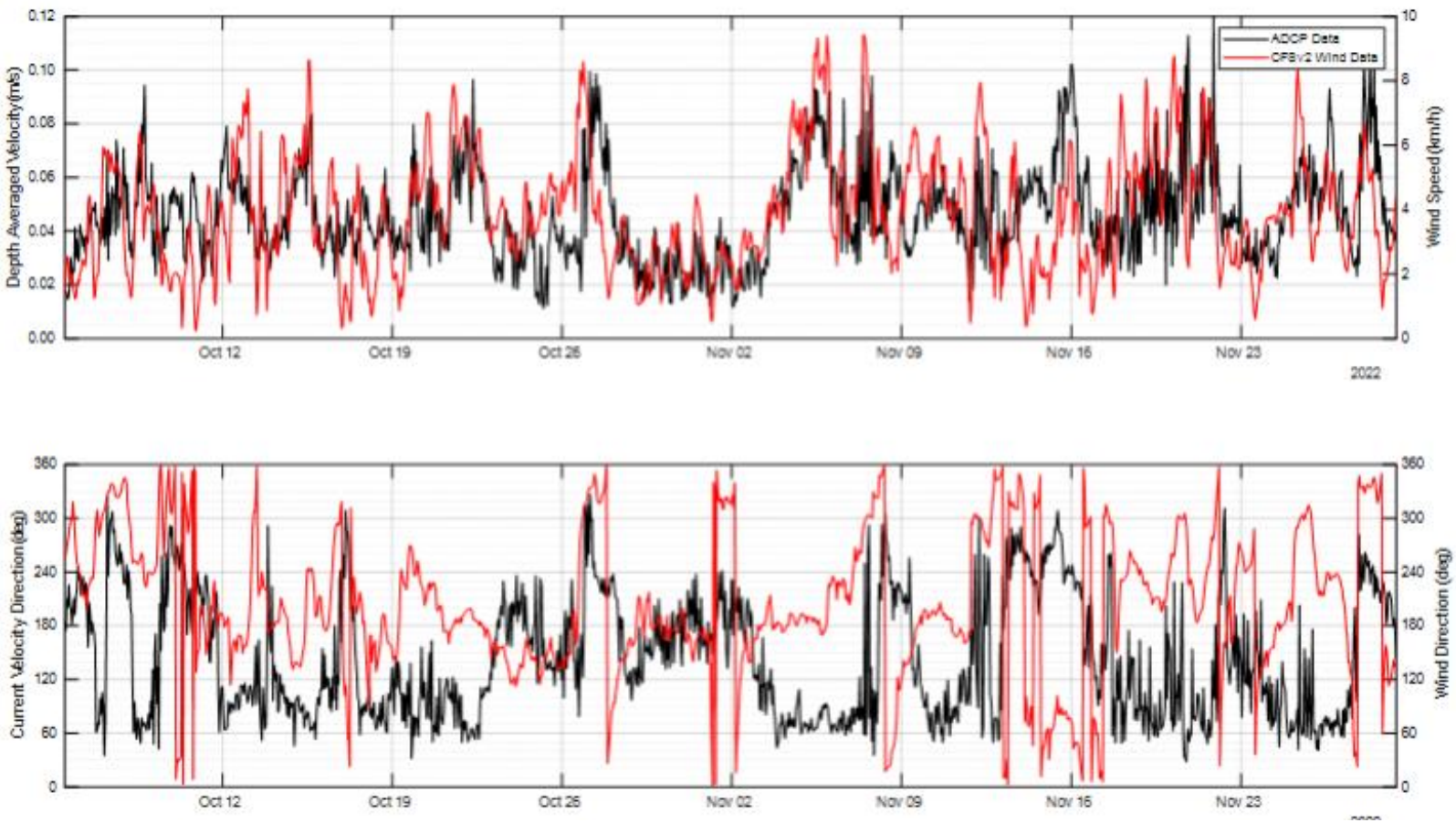


Figure D-50 Measured Depth-Averaged Velocities and Direction

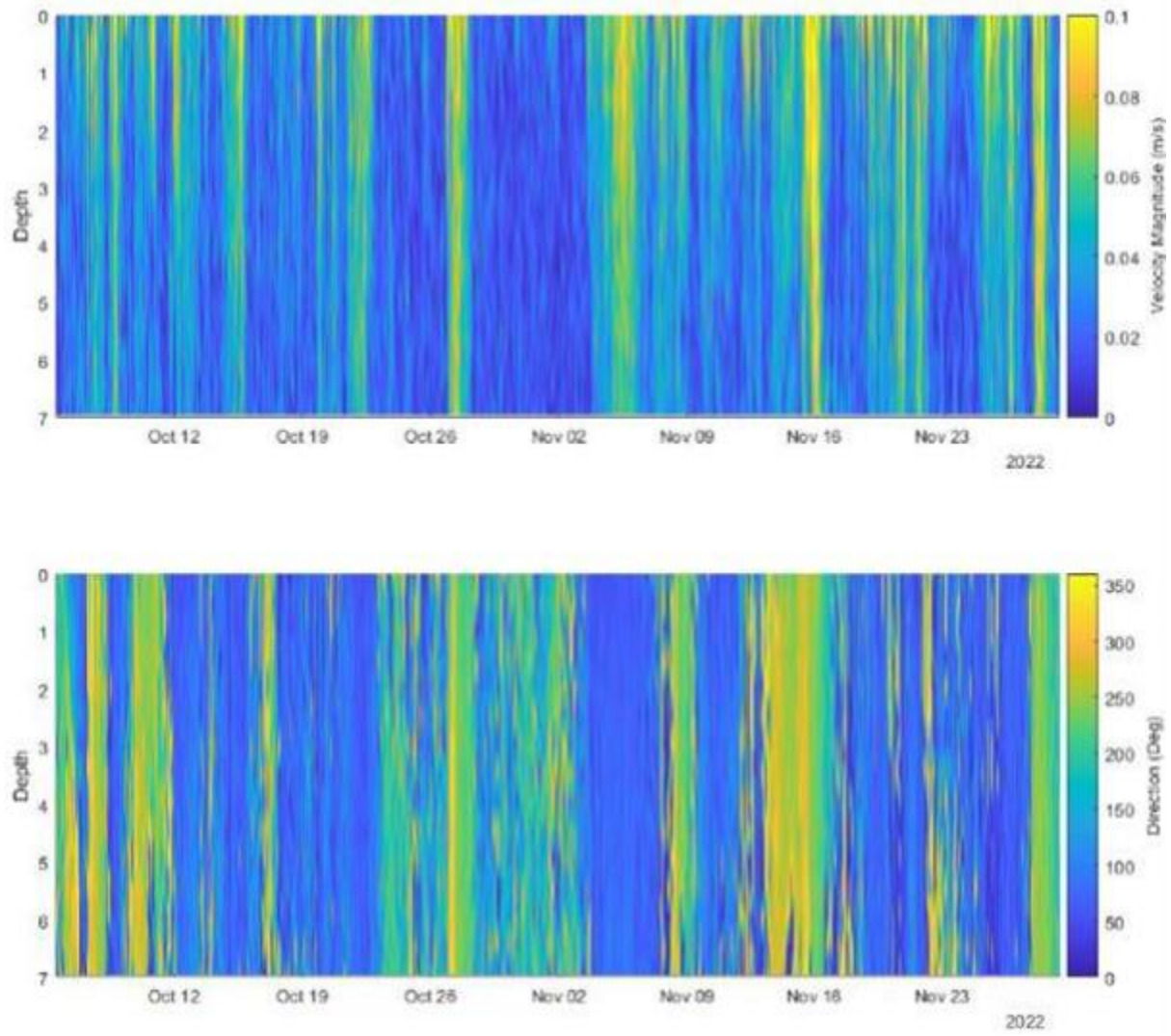


Figure D-51 ADCP measured velocity magnitude and direction

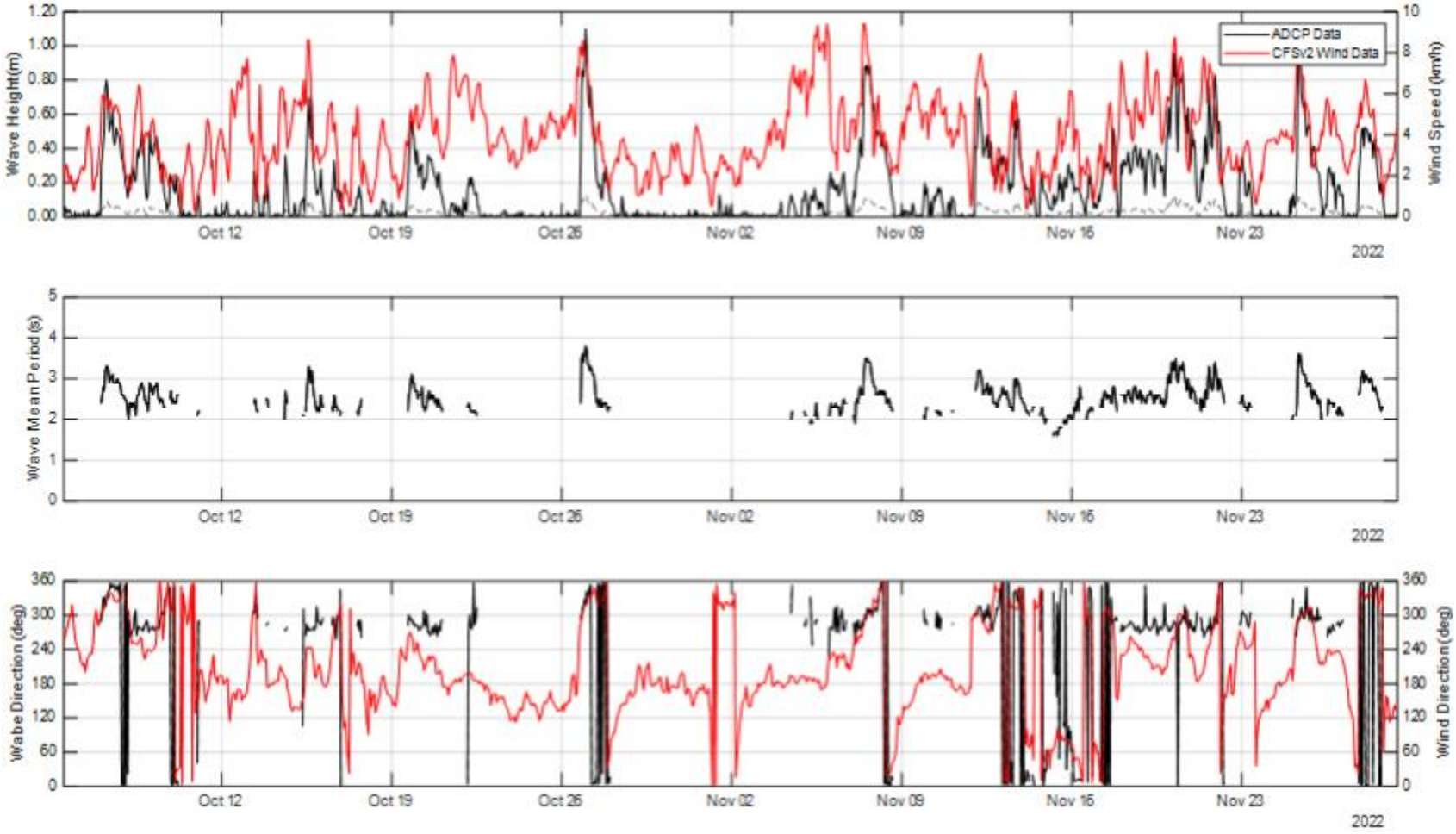


Figure D-52 ADCP Measured Significant Wave Height, Direction and Period (black) with Associated Wind Speed (red)

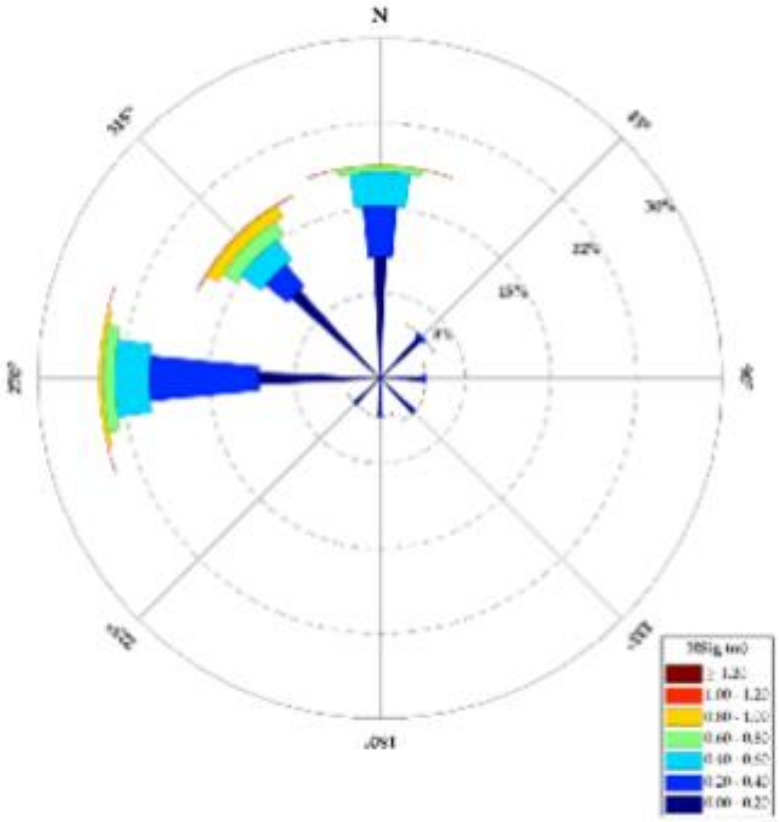


Figure D-53 Wave Rose from ADCP

Recorded wave conditions for the study area are available for short-term from October 5 to November 30, 2022. Therefore, wave hindcasting was conducted to predict the wave conditions within the study area using the Delft3D-Wave model. Wind speeds and bathymetry were input into the Delft3D-Wave model to model wave generation and propagation. The extreme wind speeds from **Table D-15** were used to predict the extreme wave conditions from each compass direction. Wave conditions were hindcasted at two locations in the vicinity of the study area (**Figure D-54**).

The extreme wave conditions are provided in **Table D-16** and **Table D-17** for the two hindcast locations, respectively. The project site experiences the largest waves from the west-northwest and west, reaching approximately 1.0 m significant wave height. This is expected due to the highest wind speeds and largest fetches to the hindcast location 1. The largest wave conditions at the Location 1 are depth-limited as the water depth at this location is shallow.

Figure D-54 Wave Hindcast Locations

Table D-16: Extreme Significant Wave Heights and Associated Peak Period for Location 1

LOCATION 1								
Return Period (Year)	N		NNE		NE		ENE	
	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)
5	0.82	3.95	0.64	3.59	0.48	2.23	0.37	2.23
10	0.87	3.95	0.71	3.59	0.51	2.23	0.39	2.23
25	0.93	3.95	0.80	3.95	0.53	2.23	0.41	2.23
50	0.97	3.95	0.85	3.95	0.55	2.23	0.42	2.23
100	0.99	3.95	0.91	4.35	0.57	2.45	0.44	2.23
	E		ESE		SE		SSE	
	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)
5	0.40	2.23	0.42	2.23	0.29	1.84	0.23	1.67
10	0.42	2.23	0.44	2.23	0.30	2.03	0.24	1.84
25	0.45	2.45	0.46	2.45	0.31	2.03	0.25	1.84
50	0.47	2.45	0.47	2.45	0.31	2.03	0.26	1.84
100	0.49	2.45	0.48	2.45	0.31	2.03	0.26	1.84

LOCATION 1								
	S		**SSW**		**SW**		**WSW**	
	Hs (m)	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**
5	0.23	1.52	0.36	2.7	0.60	3.26	0.76	3.26
10	0.25	1.52	0.38	2.70	0.65	3.26	0.78	3.59
25	0.27	1.67	0.41	2.70	0.72	3.26	0.81	3.59
50	0.30	1.67	0.43	2.70	0.78	3.59	0.84	3.59
100	0.31	1.67	0.45	2.97	0.86	3.59	0.85	3.59
	W		**WNW**		**NW**		**NNW**	
	Hs (m)	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**
5	1.18	3.95	1.48	4.35	1.13	3.95	0.75	3.59
10	1.33	4.35	1.55	4.35	1.20	3.95	0.77	3.59
25	1.54	4.35	1.64	4.78	1.29	4.35	0.80	3.59
50	1.68	4.78	1.69	4.78	1.34	4.35	0.81	3.59
100	1.84	4.78	1.74	4.78	1.40	4.35	0.82	3.59

Table D-17: Extreme Significant Wave Heights and Associated Peak Period for Location 2

LOCATION 2								
Return Period (Year)	**N**		**NNE**		**NE**		**ENE**	
	Hs (m)	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**
5	0.58	3.95	0.47	2.45	0.42	2.45	0.39	2.23
10	0.61	3.95	0.51	2.45	0.43	2.45	0.41	2.45
25	0.65	3.95	0.58	2.70	0.45	2.45	0.43	2.45
50	0.68	3.95	0.60	2.70	0.47	2.45	0.44	2.45
100	0.69	4.35	0.64	2.97	0.48	2.45	0.46	2.45
	E		**ESE**		**SE**		**SSE**	
	Hs (m)	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**
5	0.39	2.23	0.40	2.23	0.25	1.67	0.21	1.52
10	0.42	2.45	0.42	2.23	0.26	1.84	0.22	1.67
25	0.45	2.45	0.44	2.23	0.26	1.84	0.23	1.67
50	0.47	2.45	0.46	2.23	0.27	1.84	0.23	1.67
100	0.49	2.45	0.47	2.23	0.27	1.84	0.24	1.67
	S		**SSW**		**SW**		**WSW**	
	Hs (m)	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**	**Hs (m)**	**Tp (m)**
5	0.18	1.38	0.29	2.7	0.48	3.26	0.60	3.26
10	0.20	1.38	0.31	2.7	0.51	3.26	0.62	3.59
25	0.22	1.38	0.32	2.70	0.56	3.59	0.64	3.59
50	0.23	1.38	0.34	2.70	0.61	3.59	0.65	3.59
100	0.25	1.52	0.35	2.97	0.67	3.95	0.67	3.59

LOCATION 2								
	W		WNW		NW		NNW	
	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)	Hs (m)	Tp (m)
5	0.88	3.95	0.97	4.35	0.82	3.95	0.55	3.26
10	0.94	4.35	0.99	4.35	0.86	3.95	0.56	3.26
25	0.99	4.35	1.00	4.35	0.90	3.95	0.57	3.26
50	1.02	4.78	1.01	4.78	0.92	4.35	0.58	3.59
100	1.05	4.78	1.02	4.78	0.93	4.35	0.58	3.59

15. DESCRIPTION OF HEALTH, SOCIAL, AND ECONOMIC CONTEXT

A description of the health, social and economic context in the region where the project is located, based on information that is available to the public or derived from any engagement undertaken.

15.1 Future Studies

Several ongoing and future studies are being developed and are listed in **Section 5.4**. Results from these studies are included in the following sections.

15.2 Health

15.2.1 Emergency and Health Care Services

Health care services to GIFN are hindered by inconsistent methods of transport to Georgina Island during winter months and the reliance on one ferry operating with limited capacities during spring, summer, and autumn months. Ambulance service in winter months is currently a challenge as ambulances cannot travel on ice and stretchers cannot fit in an airboat. As a result of access difficulties, the overall costs of services from the hourly rates are higher than average and there are greater costs for equipment and maintenance of equipment. 24/7 service across all health care offerings is not possible due to complexities of accessing the island and emergency service would have to be delivered via air medical services. With a reliable Fixed Link, visiting doctors can more easily and affordably access Georgina Island to provide members of GIFN with essential health care service.

15.2.2 Safety and Security

GIFN members are not immune from criminal activity on the Island today. Some concerns were raised through engagements that crime on the Island may increase as more criminal elements have easier access to the Island. Although this may be true, the benefit of the Fixed Link to the community will be access to crime prevention and police services. Currently, GIFN does not have 24/7 timely police services on the Island presently. The Georgina Island Police have been serving the community since 1978 under the Ontario First Nation Policing program. The First Nation currently have three officers and one civilian employee that are not on duty 24 hours per day, 7 days per week. During times when there is no on duty officer serving, the community relies on police services to assist from other jurisdictions. The current transportation system doesn't allow for these services to arrive in a timely manner and pose a current weakness in the community's reaction to crimes.

More important to the community than police response times is the access to key support services for those living in potentially dangerous circumstances. People living in potentially abusive households or caught in dangerous living circumstances beyond their control cannot access the protections that others in the country can. The current transportation system limits the ability of Children and Family Services to provide necessary, immediate responses to dangerous situations of family violence on the Island. According to the Native Women's Association of Canada's, Violence Against Aboriginal Women Factsheet, "*Aboriginal women 15 years and older are 3.5 times more likely to experience violence than non-Aboriginal women"*

and "rates of spousal assault against Aboriginal women are more than three times higher than those against non-Aboriginal women." Many times during the year, family care workers will not travel to the Island leaving a very vulnerable part of the community exposed to dangers.

Finally, the community has many internally driven legal avenues to reduce crime on their own. The community has their own cannabis by-law that ensures that certain recreational drugs are managed and fully understood by the community. The community was also one of the initial signatories of the *First Nation Land Management Act* giving the community full jurisdiction to protect their lands. Added to this, the ability of the First Nation to control access to the Island in a much more formal way with the Fixed Link is considered a deterrent. From tolling access to the Island to documenting travellers to the Island, the community will examine actions that will protect the community much more than the current transportation system would. The community has the experience, the mechanisms and the will to protect themselves and make laws to support their needs as the transportation system evolves to the Fixed Link.

15.2.3 COVID-19 Pandemic

At the beginning of the pandemic, GIFN leadership decided to limit access to the island, for the protection of community health. This choice, which was in the best interests of the community, has magnified the health response issues of the current transportation system. For example, the Island closure impacted the momentum of the Fixed Link Project as stakeholder meetings and community engagements regarding the Fixed Link were either rescheduled for times when public health measures had relaxed or switched to virtual options. As well community members experienced increased challenges in accessing cultural practices due to public health protocols, lack of ability to travel to communities due to lockdown measures, increased fear/concern surrounding contracting the virus and the shutdown of recreational activities such as sports, entertainment, cultural gatherings, and family vacations. Close living quarters also impacted mental health, especially in cases of unhealthy emotional and physical situations for women, children, and 2SLGBTQQIA+ (Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, Asexual, and Additional Sexual Orientations and Gender Identities) peoples as a non-exhaustive list.

In response to the pandemic and Island closure, GIFN entered into a six-month commercial agreement with Drone Delivery Canada Corp. (DDC). Dated July 30, 2020, the agreement was established with the assistance of DDC sales agent Air Canada, and the Pontiac Group. DDC's drone delivery platform was crucial to limit person-to-person contact on its island ferry service by transporting COVID-19-related cargo like personal protection equipment (PPE), hygiene kits, test kits, test swabs, among other goods. This Project was not successful and did not provide a plausible for solution for several reasons pertaining to the weather uncertainties of the Island community. Technology as health care support failed to provide an effective solution in this case.

15.2.4 Country Foods

The country foods and medicinal sources for the GIFN include, but are not limited to, the list presented in Table D-18.

Table D-18: Country Food Sources on Georgina Island

Type	Species
Fish	Lake whitefish (*Coregonus clupeaformis*) Lake herring (*Coregonus artedii*) Burbot (*Lota lota*) Northern pike (*Esox lucius*) Yellow perch (*Perca flavescens*) Smallmouth bass (*Micropterus dolomieu*) White sucker (*Catostomus commersoni*) Pumpkinseed (*Lepomis gibbosus*) Brown bullhead (*Ictalurus nebulosus*) Rock bass (*Ambloplites rupestris*) Pumpkinseed (*Lepomis gibbosus*) Black crappie (*Proxis nigromaculatus*) Rainbow smelt (*Osmerus mordax*) Muskellunge (*Esox masquinongy*)
Mammals	Eastern gray squirrel (*Sciurus carolinensis*) Red squirrel (*Tamiasciurus hudsonicus*) Eastern cottontail (*Sylvilagus floridanus*) Snowshoe hare (*Lepus americanus*) White-tailed deer (*Odocoileus virginianus*) American black bear (*Ursus americanus*) North American beaver (*Castor canadensis*) Muskrat (*Ondatra zibethicus*)

Type	Species
Birds	Canada goose (*Branta canadensis*) Canvasback (*Aythya valisineria*) Mallard (*Anas platyrhynchos*) Redhead (*Aythya americana*) Wood duck (*Aix sponsa*) Hooded Merganser (*Lophodytes cucullatus*) Common goldeneye (*Bucephala clangula*) American widgeon (*Mareca americana*) American black duck (*Anas rubripes*) Greater scaup (*Aythya marila*) Lesser scaup (*Aythya affinis*) Bufflehead (*Bucephala albeola*) Blue-winged teal (*Spatula discors*) Gadwall (*Mareca strepera*) Green-wigned teal (*Anas carolinensis*) Northern pintail (*Anas acuta*) Northern Shoveler (*Spatula clypeata*) Rudy duck (*Oxyura jamaicensis*) Ring-necked duck (*Aythya collaris*) Ruffed grouse (*Bonasa umbellus*) Mourning dove (*Zenaida macroura*) Eastern Wild Turkey (*Meleagris gallopavo silvestris*)
Reptiles	Painted turtle (*Chrysemys picta*) Common snapping turtle (*Chelydra serpentina*)
Plants	American Ginseng (*Panax quinquefolius, Panacis quinquefolis*) White Cedar (*Thuja occidentalis*) Wild Crabapple (*Malus coronaria*) Morel (*Morchella esculenta*) Fiddlehead (*Polypodiopsida* or *Polypodiophyta*) Wild Ginger (*Asarum canadense*) Wild Mint (*Mentha arvensis*) Ramp/Leek (*Allium tricoccum*) Wild asparagus (*Asparagus officinalis*) Chaga (*Inonotus obliquus*) Sweetgrass (*Hierochloe odorata, Anthoxanthum nitens*) Wild rice (*Zizania palustris*) Sweet Flag (*Acorus calamus*) Crinkle Root (*Cardamine diphylla*)

Further information regarding country foods was gathered during consultation calls pertaining to other First Nation allies, who confirmed that the list was considered comprehensive and satisfied the consultation departments' lists of the First Nations. Consultation departments indicated a need to periodically review and possibly update this list as possible impacts may be identified over the duration of the Project.

15.2.5 Existing Drinking and Recreational Water Sources

Based on a review of *The Georgina, Fox and Snake Islands Subwatershed Plan* (2017) drinking water within the study area is provided through private wells (see Section 4.3 MECP water well records) and surface water takings from Lake Simcoe. According to LSRCA (2017), the GIFN provides drinking water to approximately 109 households on Georgina Island. This supply system has been in place since 1993 and intakes water from Lake Simcoe approximately 345m off the western shore and treats it through the Georgina Island Water Treatment Plant.

15.3 Social

15.3.1 Population and Demographic

As outlined in the Fixed Link Socio-Economic Study (2021) (**Appendix B**), the main population of the First Nation reserve resides on the largest Island, Georgina Island. In 2021, it was recorded that approximately 179 of the 618 GIFN band members permanently reside on the island. The GIFN is governed by an elected band council, consisting of one chief and four councillors.

15.3.1.1 Regional Population

According to the 2021 census (Statistics Canada, 2022a), the total populations of counties, districts, regions or single-tier municipalities located within 25 km of Georgina Island is nearly 2.5 million people, and within 50 km of the community was in excess of 2.5 million people, with Muskoka Region included (**Table D-19**:). The total population of counties, districts, regions or single-tier municipalities located within 100 km of Georgina Island is very substantial, and growing area (nearly 7 million people) and includes the Greater Toronto Area (GTA) and most of the Golden Horseshoe population. It is understood that portions of these district municipalities or regions may extend beyond 100 km, but for the purposes of this DPD, they have been included in their entirety.

Table D-19: Population of County/Districts/Municipalities Near GIFN (Statistics Canada, 2022a)

Distance from GIFN	Total Population
Within 25 km	2,482,742
Within 50 km	2,549,416
Within 100 km	6,942,475
Ontario	14,223,942

Within the primary market (25 km), there are over 840,000 households (**Table D-20**). This number increases dramatically to over 2.5 million households for districts/municipalities included in the range of 100 km, half of all Ontario dwellings (Statistics Canada, 2022a).

Table D-20: Regional Dwellings Totals

Range	Total Dwellings
Within 25 km	920,456
Within 50 km	968,016
Within 100 km	2,762,269
Ontario	5,929,250

The average income per household within the local region is moderately higher than the Ontario average. Within Ontario, the median household income is almost $91,000. Within the primary market area (25 km), the average family income is over $82,000 (**Table D-21**) (Statistics Canada, 2022a). This difference is notable when assessing household purchasing power - an examination of the households within 100 km also shows an income larger than the Ontario average. The difference is less significant, however, and over the next five years is expected remain in line with Ontario averages. In other words, the area currently showing the largest income growth is the group within the local market (Statistics Canada, 2022a).

Table D-21: Regional Household Median Income

Range	Household Median Income (Statistics Canada, 2022a)
Within 25 km	$82,000
Within 50 km	$93,000
Within 100 km	$84,000
Ontario	$91,000

The local population surrounding the study area is more than 5.4 million (within a 1.5 hour driving radius). The preferred alignment of the Fixed Link would be located within an approximately 5-minute drive on the mainland to Sibbald Point Provincial Park, one of the most popular parks in Ontario with 70,000 visitors per year. Georgina Island is within proximity of numerous seasonal activities and prime cottage country, which brings more cottagers and tourists to the area in summer months. Approximately 280 resorts, bed and breakfasts, farming accommodations and campgrounds exist within the immediate area of Georgina Island and the current Aazhaawe ferry terminal on the mainland. Local tourism infrastructure is currently in place to support the demand and is fully operational. Accordingly, a commercial presence within the GIFN community is strong and tourism in the area has favourable conditions for growth.

15.3.1.2 GIFN Population

As of 2021, Georgina Island has a total population of 231 people. The population has declined by 11.5 percent from the 2016 census. In the last two censuses, GIFN population declined by 44 people, an average decline rate of 3.2% per year from 2016 to 2021. First Nations or persons with Registered or Treaty Indian status make up 67% of the total population.

Based on the Census data from 2001 to 2021, the GIFN population (which includes both GIFN Members and non-members) has shown a decreasing trend. The population percentage change

between 2016 to 2021 was 11.5%. As of 2021, there are 550 private dwellings on the Reserve and 112 dwellings which are occupied by usual residents (Statistics Canada, 2021) .

15.3.1.2.1 POPULATION BY SEX

Based on 2021 data from the Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) First Nation Profiles, GIFN has a total membership of approximately 936 members of which approximately 209 reside on the island and 726 live off the island (CIRNAC, 2021); GIFN, 2019). Of the 209 members that reside on the island, approximately 98 are male and 111 are female as identified in the following table (CIRNAC, 2021).

Table D-22: GIFN Registered Population

Residency	Number of People
Registered Males on Own Reserve	98
Registered Females on Own Reserve	111
Registered Males Off Reserve	353
Registered Females Off Reserve	373

The most recent census did not provide gender statistics for Georgina Island, but as of the 2019 registered membership, 53.8% of people were registered female members living within Georgina Island, and 46.1% of people were registered males also living within the community (Table D-23).

Table D-23: Population by Sex for GIFN

	GIFN	
	Number	Percent (%)
Total	261	100
Male	120	46.1
Female	140	53.8

15.3.1.2.2 Population by Age

Georgina Island has a median age of 44.65 years old and an average age of 41.3. The largest population is the age group between 55 and 59 years old, and the least populated age group is 85+ years old. 66% of the population are in the working age group between 15 to 64 years old, while 25.7% make up the younger population which will be a part of labour force in less than two decades.

Table D-24: Population by Age for GIFN

	GIFN	
	Number	Percent (%)
Total Population	260	100
Children (14 years old and under)	45	17.3
15 to 64 years old	165	66
Seniors (65 years old and older)	45	17.3

15.3.1.3 Vulnerable Population Groups

Based on annual data from Statistics Canada, Indigenous women, girls and 2SLGBTQQIA+ people continue to experience higher rates of violence. Despite only making up 4 per cent of the Canadian population, Indigenous women and girls represent 28 per cent of homicides perpetrated against women in 2019 and are 12 times more likely to be murdered or missing than non-Indigenous women in Canada. Indigenous women are also more likely to be affected by all types of violent victimization. Data from Statistics Canada's Homicide Survey show that the rate of homicide among Indigenous women in 2019 was more than 7 times higher than among non-Indigenous women, at 4.01 per 100,000 population compared with 0.55 per 100,000 population — a number that is even higher for Inuit women and Indigenous women in the North (Canadian Centre for Justice and Community Safety Statistics, 2021). Gender-based violence is prevalent in the province and needs serious action, and where this issue is predominantly felt is in First Nations across Canada, with more than 3,000 missing and murdered Indigenous women and girls.

Additionally, the Canadian Femicide Observatory for Justice and Accountability's annual report into femicide noted that in 2020, approximately one in five female victims killed by a male accused was an Indigenous woman or girl (Canadian Femicide Observatory for Justice and Accountability , 2020).

In addition, data from Statistics Canada's Survey of Safety in Public and Private Spaces (2018) demonstrates that Indigenous women with a disability are approximately 2 times more likely than Indigenous women without a disability to have been sexually assaulted since the age of 15; and about 1.5 times more likely than non-Indigenous women with a disability to have been sexually assaulted since the same age (Statistics Canada, 2019). A 2019 study also shows that Indigenous women and women living with a disability experience gender-based violence in public settings, while online, as well as sexual assault at higher rates.

A study published in 2020 has also shown that women and 2SLGBTQQIA+ people were more likely to be sexually assaulted than men and non-2SLGBTQQIA+ people and found a higher prevalence of violent victimization among Indigenous 2SLGBTQQIA+ people than those who were not Indigenous.

In Ontario, the Ontario Association of Interval & Transition Houses (OAITH) collects, analyzes, and publishes provincial statistical information related to violence against women. Their Annual Femicide List covering November 2020 to November 2021 period 58 women and girls ranging in

age two to 84 were murdered in Ontario (OAITH, 2021). Their Annual Femicide List reports 53 women and girls, aged 8 to 88, were murdered between November 2021 and November 2022 (OAITH, 2022). The subsequent list, covering November 2022 to November 2023, shows an increase to 60 victims, with ages ranging from 7 to 90 (OAITH, 2023). These documents are based on mainstream media sources and other publicly available resources (e.g., local and national newspapers and TV clips) (OAITH, 2024).

15.3.1.4 Seasonal Population Changes

Seasonal influx of non-GIFN cottagers and tourists in the summer months is reported (**Table D-26**), and in a recent Health Impacts Assessment survey 43 participants indicated this influx is one of the reasons for causing additional strain on both the ferry and the GIFN community as a whole (Intrinsik, 2021).

Seasonal passenger vehicle trip percentages are based on community knowledge, provided from the Transportation Manager of GIFN. It is presumed that ferry passenger vehicles during Spring (March 20 – June 21) consists almost entirely of community members (staff, families, etc.) and that ferry passenger vehicles during Fall (September 22 – December 21) consists again of mainly community members, but to a lesser extent than the Spring season. The influx of passenger vehicle trips in the Summer, versus Spring and Fall is between 20,000 and 33,000 from 2009-2019, which can be attributed to seasonal visitors.

Impacts on the community include longer ferry wait times which contribute to easy access to island residences and mainland emergency healthcare or recreational activities.

15.3.2 Education

According to GIFN website, there is an elementary school for children from kindergarten to Grade 5 with an attached community library on the island. The community library offers programs such as skills upgrading, early learning literacy computers for children and E-learning. Individuals such as the Aboriginal Student Advisor, Education Manager and Post-Secondary Education Coordinator can be contacted and are available for assistance for those seeking higher education. For Grades 6 through 12, students need to travel from the island to the mainland.

In 2016, 70.4% of GIFN members aged 25 to 64 had a high school diploma or equivalency certificate, compared with 86.3% in Canada (Statistics Canada, 2016).

In the GIFN community, 7.4% of people aged 25 to 64 had a bachelor's degree or higher in 2016, while 25.9% had a college, Collège D'enseignement General et Professionnel (CEGEP) or other non-university certificate or diploma as their highest level of education, and 18.5% had an apprenticeship or trades certificate or diploma as their highest level of education (Statistics Canada, 2016) (**Table D-25**).

Table D-25: Level of Education for GIFN

Education by highest certificate, diploma, or degree	Chippewas of Georgina Island First Nation			
	Total Number[a]	Percentage	Male[a]	Female[a]
Total Population (aged 15 years and over)	215	100	100	115
No certificate, diploma, or degree	50	23.26%	25	30
Secondary (high) school diploma or equivalency certificate	50[b]	23.26%	25	25
Apprenticeship or trades certificate or diploma	30	13.95%	20	10
College, CEGEP or other non-university certificate or diploma	60	27.91%	20	35
University certificate or diploma below bachelor level	10	4.65%	0	0
University certificate, diploma, or degree at bachelor level or above	15	6.98%	0	15
Bachelor's degree	10	66.67%	0	10

[a] Users should be aware that the estimates associated with this variable are more affected than most by the incomplete enumeration of certain Indian Reserves and Indian settlements in the 2016 Census of Population. For more information on Aboriginal variables, including information on their classifications, the questions from which they are derived, data quality and their comparability with other sources of data, refer to the Aboriginal Peoples Reference Guide, Census of Population, 2016 and the Aboriginal Peoples Technical Report, Census of Population,2016.

[b] Total – Secondary (high) school diploma or equivalency certificate for the population aged 15 years and over in private households – 25% sample data.

15.3.3 Recreational Resources

Lake Simcoe provides a vast number of recreational opportunities for locals and tourists alike, is a source of drinking water for municipal surface water intake for Georgina Island, supports a substantial fishery and, as well as being a significant natural heritage feature, provides people with beautiful scenery. As such, the preservation of the lake and the rest of the natural heritage features within the watershed results in a significant cost savings in municipal infrastructure that would otherwise be needed to watershed residents and users (LSRCA, 2017).

Recreational opportunities exist within GIFN on Georgina Island; however, recreational, and social activities could have expanded offerings for GIFN members on the mainland. Aazhaawe Ferry scheduling and inconsistent ferry operations do not provide flexible opportunities for recreation offerings off territories.

15.3.3.1 Indigenous Fishing Huts

The GIFN community sets up ice fishing huts on the east and west sides of the ice road, and along the existing ferry line, and to fish for yellow perch in the winter (**Figure D-55**) This area may shift from the east to the west depending on ice road conditions during a winter. Fishing within the Sand Island area is avoided as ice can be treacherous due to currents. No other fishing areas were identified by indigenous communities. These areas are not located within proximity of the proposed Fixed Link alignments.

Information regarding fishing areas may be enhanced with results from further engagement with other Indigenous communities (see **Section 4**) to verify whether they have traditional practices such as hunting, gathering, fishing, and trapping (e.g., whether there are fishing points that may be used by other Indigenous communities) and whether they are concerned about impacts to those activities as a result of the project.

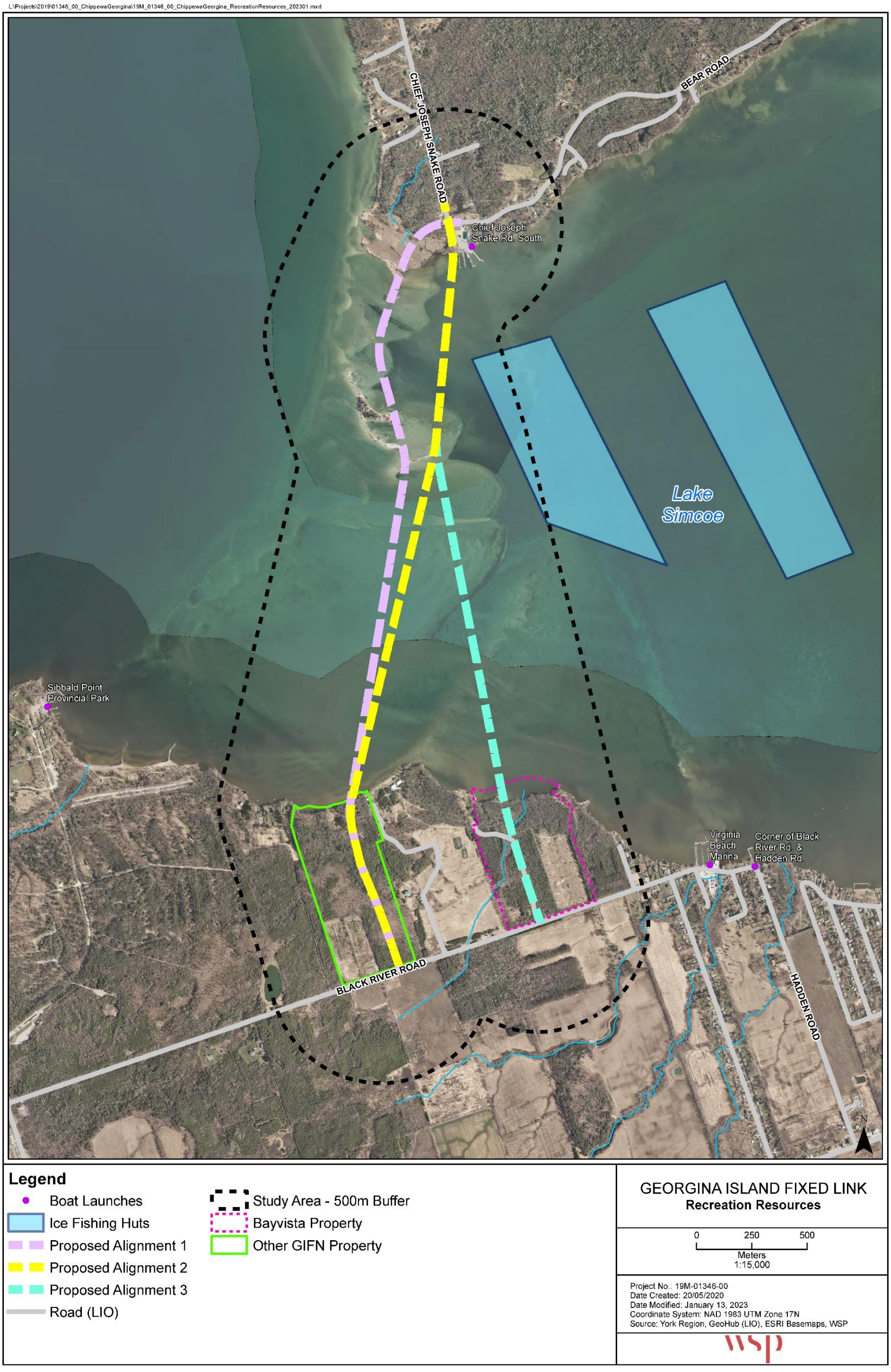


Figure D-55 Georgina Island Recreational Resources

15.4 Transportation and Traffic

This section of the report describes the existing travel characteristics, road network, transit services and active transportation network, traffic data and the results of existing intersection capacity analysis. The detailed TIS is provided in **Appendix N**.

15.4.1 Existing Travel Characteristics

Please refer to **Section 15.3.1** for a description of the existing demographics. The current transportation options to travel between Georgina Island and the mainland include the Aazhaawe Ferry, water taxi, personal watercraft, the ice roads network (**Figure D-56**) (during appropriate winter conditions), or “the Scoot” airboats (Intrinsik, 2021).

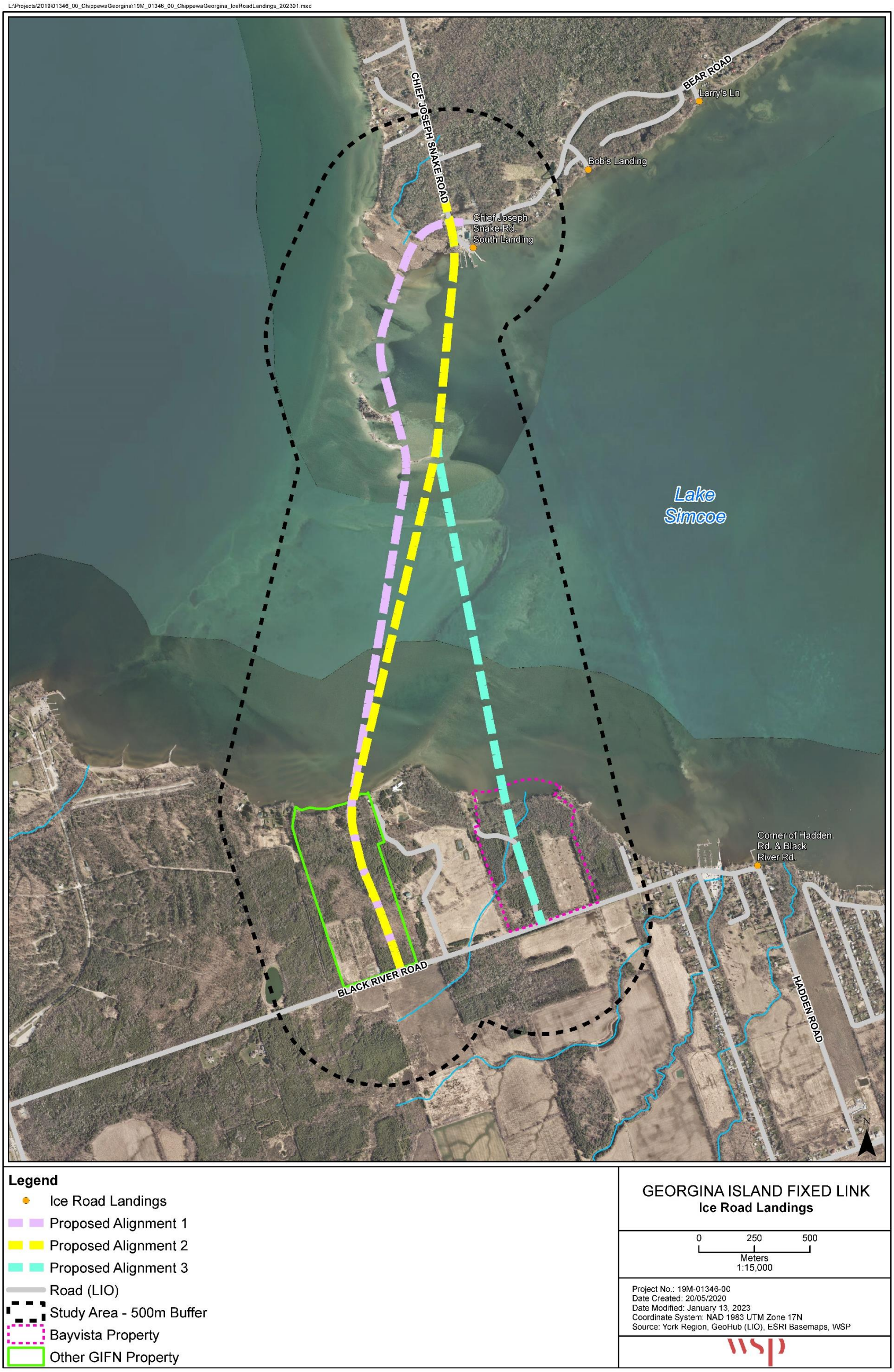


Figure D-56 Georgina Island Ice Roads Landing Locations

The ice roads network currently consists of one landing location on the mainland side, at the corner of Hadden road and Black River Road, and three landing locations on the island side, at Chief Joseph Snake Road: south landing, Bob's Landing, and Larry's Lane. The ice roads typically consists of two-three lanes depending on the consisitency and stability of the ice. **Figure D-57** shows an aerial view of the ice roads network conecting Georgina Island and the mainland. The ice road is considered safe for travel when it reaches a thickness of at least 30 cm.

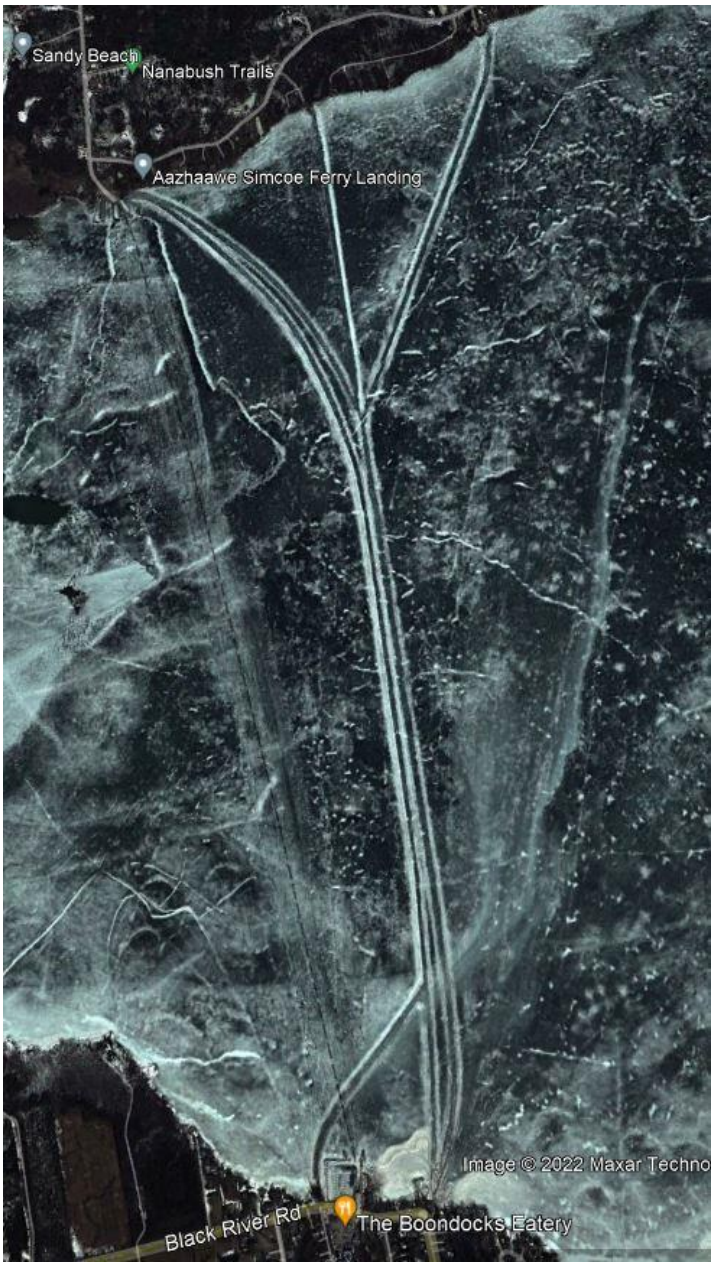


Figure D-57 Georgina Island Ice Roads Network

The Aazhaawe Ferry is the main mode of transportation as it is available for majorityof the year. The ferry can carry up to 18 cars and there is cabin space for 50 walk-on passengers. When the Aazhaawe Ferry is inaccessible due to weight and ice formation, the airboats ice road is used. The airboat is utilized during the winter freeze-up and spring thaw seasons. An airboat can seat up to four to five passengers not including the driver.

The water taxi is available for GIFN community members only and typically operates during spring and summer months.

The total ferry passenger vehicle trips between 2009 and 2019 are provided in **Table D-26** (WSP, 2022). The table shows that the total number of passengers vehicle trips ranged between 121,500 (2010) to 164,250 (2019). The number of passenger vehicle trips is the highest during Summer (June 22 to September 21) at around 45% of annual trips followed by Fall (September 22 to December 21) at 30%, Spring at (March 20 to June 21) at 20% and Winter (December 22 to March 19) at 5%.

Table D-26 Total Ferry Passenger Trips (2009 to 2019)

Year	Total Number of Passenger Vehicle Trips	Winter (5%)	Spring (20%)	Summer (45%)	Fall (30%)	Difference (Summer-Spring)	Difference (Summer-Fall)
2009	153,000	7,650	30,600	68,850	45,900	38,250	**22,950**
2010	121,500	6,075	24,300	54,675	36,450	30,375	**18,225**
2011	123,300	6,165	24,660	55,485	36,990	30,825	**18,495**
2012	129,600	6,480	25,920	58,320	38,880	32,400	**19,440**
2013	128,850	6,443	25,770	57,983	38,655	32,213	**19,328**
2014	121,500	6,075	24,300	54,675	36,450	30,375	**18,225**
2015	122,400	6,120	24,480	55,080	36,720	30,600	**18,360**
2016	163,800	8,190	32,760	73,710	49,140	40,950	**24,570**
2017	136,575	6,829	27,315	61,459	40,973	34,144	**20,486**
2018	126,450	6,323	25,290	56,903	37,935	31,613	**18,968**
2019	164,250	8,213	32,850	73,913	49,275	41,063	**24,638**
TOTAL	**1,491,225**	**74,561**	**298,245**	**671,051**	**447,368**	**Avg. = 33,891**	**Avg. = 20,335**

Students are bussed to Sutton on the mainland for grades 6, 7, and 8. Secondary school students are bussed to Pefferlaw. Some students board on the mainland during the winter periods due to the lack of transportation options (Neegan Burnside Ltd., 2008).

15.4.2 Area Roadway Network

The ferry terminal on Georgina Island connects to Chief Joseph Snake Road. On the mainland side the ferry terminal has a driveway that connects to Black River Road. The characteristics of the roadways within or in the vicinity of the study area are summarized as follows:

- **Chief Joseph Snake Road** is a north-south roadway on Georgina Island that changes it orientation to a general east-west direction at the north end of the island before it connects to Loon Road. The Town of Georgina OP, Schedule E – Roads Plan, 2016 identifies the roadway as a local roadway. This roadway has a two-lane cross-section, consisting of one lane in each direction. The posted speed limit is 40 km/h. This roadway has no sidewalks. Based on the photo logs from a field visit on September 8, 2022, there is a speed bump on Chief Joseph Snake, north of Bear Road.
- **Bear Road** is an east-west roadway on Georgina Island that connects between Chief Joseph Snake Road and Loon Road. The Town of Georgina OP, Schedule E – Roads Plan, 2016 identifies the roadway as a local roadway. This roadway has a two-lane cross-section, consisting of one lane in each direction. The posted speed limit is 40 km/h. This roadway has no sidewalks.
- **Black River Road** is an east-west local roadway. East of Park Road, it is under the jurisdiction of the Town of Georgina. West of Park Road, the roadway is under the jurisdiction of York Region and is identified as Regional Road 80 in the York Region Road Identification Network Map. This roadway has a two-lane cross-section, consisting of one lane in each direction. Approximately 100 m west of Doyle Beach Lane Road, the posted speed limit is 70 km/h, and east of this section the speed limit reduces to 40 km/h. This roadway has no sidewalks; some sections have a gravel shoulder.
- **Park Road (Regional Road 18)** is a north-south arterial roadway under the jurisdiction of York Region. This roadway has a two-lane cross-section, consisting of one lane in each direction. The posted speed limit, north of Black River Road is 60 km/h and the posted speed limit, south of Black River Road is 70 km/h. This roadway has no sidewalks; it does have gravel shoulders on both sides of the roadway north and south of Black River Road.

15.4.3 Existing Transit Service

YRT does not provide local transit near the site. The closest fixed local transit route to the site is Route 50 (Queensway), which provides bus service between a bus stop in Sutton located on High Street at Burk Street and Newmarket Terminal Platform 1. The section of Route 50 (Queensway) near the site is shown in **Figure D-58.** The operating frequency during the AM and PM peak periods is 30 minutes.

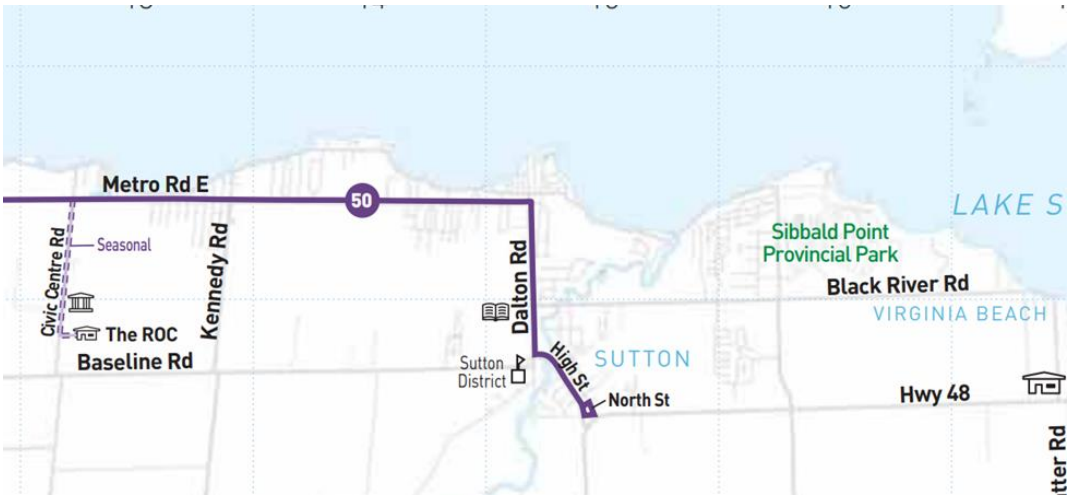


Figure D-58 Existing YRT Transit Service (YRT, 2002a)

Currently, Georgina Island residents are serviced at the ferry terminal at Virginia Beach by MOR North (connecting to conventional service Route 50 – Queensway), MOR Sutton-Pefferlaw, and MOR 65+.

MOR is YRT's on-request transit service. It is a ride-sharing service that allows residents to request transit within select service areas. The MOR for Sutton-Pefferlaw is available on weekdays (7 am to 10:45 pm) and weekends/holidays (8 am to 7:45 pm). Travellers can be picked up at a curbed-address within the Sutton-Pefferlaw service area and dropped off at one of the seven locations shown in **Figure D-59** or vice versa.

Figure D-59 Mobility on Request Sutton-Pefferlaw (YRT, 2002b)

MOR 65+ is an on-request transit service for seniors 65 years and older. The service is offered for seniors who want to try taking public transit using a smaller vehicle. The desired destination location should be within 5 km of the ferry terminal at Virginia Beach.

15.4.4 Existing Active Transportation Infrastructure

None of the roadways in the study area (Chief Joseph Snake Road, Bear Road, Black River Road and Park Road/Regional Road 18) have sidewalks.

The Town of Georgina OP Schedule F (Active Transportation Plan) identifies Black River Road and Hadden Road as part of their existing cycling network. There are no infrastructure provisions for cyclist along these roadways and cyclists need to share the roadway with vehicles.

15.4.5 Traffic Data

WSP arranged with Horizon Data Services to collect TMC and ATR data in September 2022. The locations where the data was collected is shown in **Figure D-60**.

Figure D-60 Locations for Traffic Data Collection (Google Earth, 2022)

The details of the traffic data such as the dates and times when the data was collected, the turning movement count and ATR sheets are provided in the TIS, provided in **Appendix N**. York Region required that summer weekend traffic be assessed in this study in the TOR correspondence. The conversion of non-summer to summer traffic and weekday to weekend traffic is also detailed in the TIS.

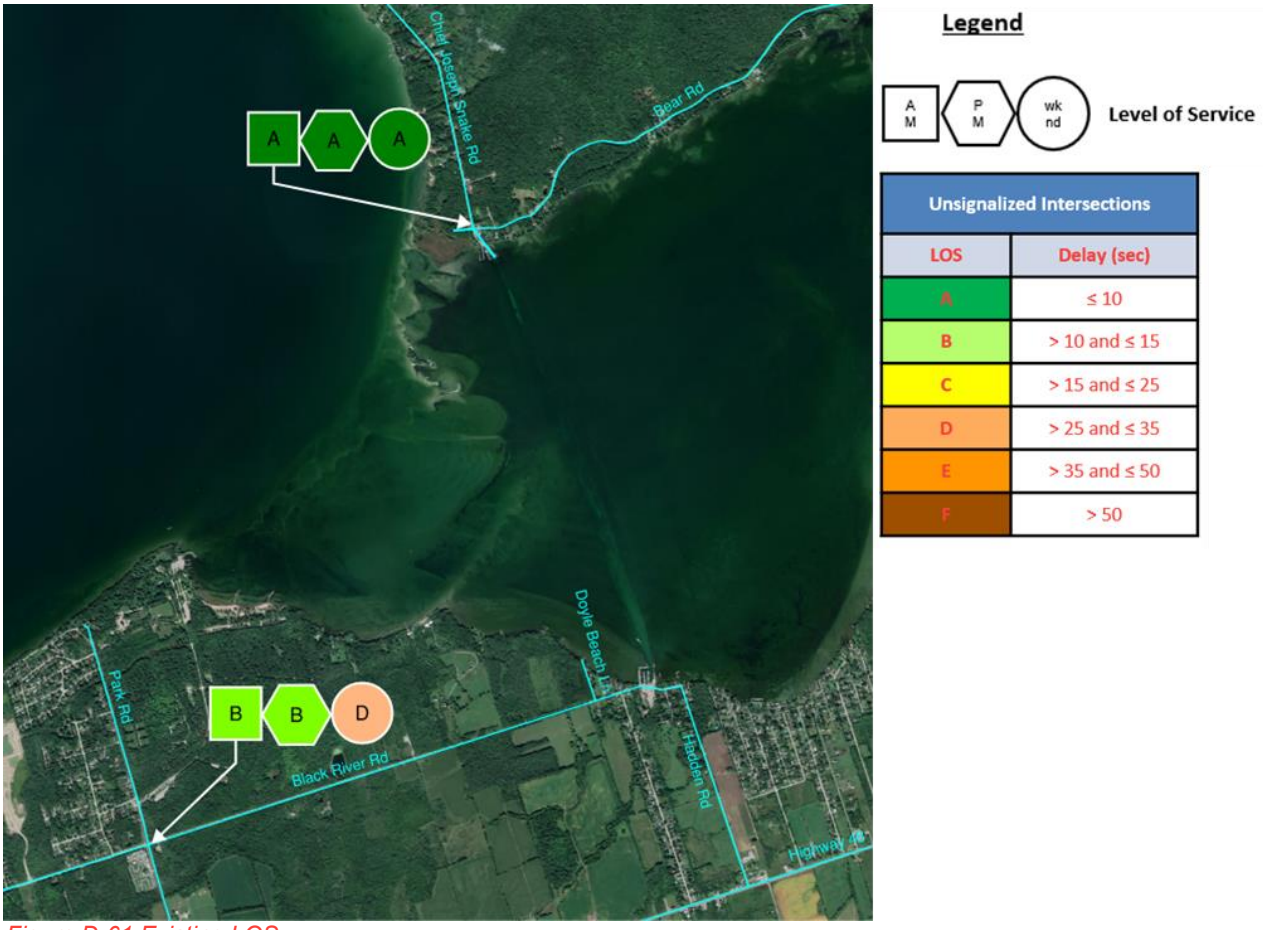


Figure D-61 Existing LOS

15.4.6 *Existing Intersection Capacity Analysis*

The operations of study intersections were analyzed using the Synchro 11 traffic analysis software. The details of the methodology, Synchro input parameters and Synchro result sheets are provided in the TIS, provided in **Appendix N**.

Intersection capacity analysis provides an indication of traffic operations based on calculations of volume-to-capacity ratio (v/c) and delays for individual movements at an intersection. Level of Service (LOS) denoted by the letters ‘A’ through ‘D’, represent satisfactory traffic operations. LOS denoted by the letters ‘E’ and ‘F’ represent congested traffic conditions.

The operation of the existing intersection is schematically shown in **Figure D-61**.

The results show that the study intersections operate at LOS ‘D’ or better during the weekday a.m., p.m. and summer weekend peak hours under existing conditions with no critical

movements. The intersection of Park Road and Black River Road operates at LOS ‘B’ during the weekday peak hours and LOS ‘D’ during the summer weekend peak hour. This is expected because there is much higher seasonal traffic along these two roadways.

Overall, under existing conditions, there are no capacity constraints at the study intersections.

15.4.7 Planned Improvements

15.4.7.1 Planned Roadway Improvements

Based on York Region’s response to the TOR, and per the Region’s 2022 10-Year Roads and Transit Capital Construction Program, there are no road improvements scheduled in the study area (York Region, 2022a). The York Region 2022 Transportation Master Plan (TMP) also does not identify roadway improvements in the study area (York Region, 2022b).

15.4.7.2 Planned Transit Improvements

The Region’s 2022 10-Year Roads and Transit Capital Construction Program does not identify any capital transit improvements in the study area. The York Region 2022 TMP also does not identify transit improvements in the study area.

WSP received feedback from YRT and STSYR during study consultation to understand if there is a potential for public transit service and school bus service on the island once the Fixed Link is constructed.

In summary, the potential for future public transit on the island and the Fixed Link cannot be determined at this time and further consultation will be needed closer to completion of the Project. This will be included as a recommendation for future steps in the Project.

15.4.7.3 Planned Active Transportation Improvements

The York Region 2022 TMP identifies active transportation improvements within the study area. Map 1 of the TMP (2051 Regional Cycling Network) identifies cycling facilities on Black River Road, west of Park Road (Regional Road 18) and on Park Road (Regional Road 18), from Lake Simcoe to Ravenshoe Road as shown in Figure D-62 (York Region, 2022b). Map 2 of the TMP (2051 Regional Trail Network) identifies a trail of regional significance where the eastern segment of the trail will be along Black River Road where the Fixed Link is proposed to connect as shown in Figure D-63. The trail of regional significance is part of the proposed Lake to Lake Route, which is a proposed 121 km recreational and commuter cycling and walking trail that will connect Lake Simcoe to Lake Ontario.

The planned active transportation infrastructure in the study area along with the proposed multi-use trail on the Fixed Link will significantly improve the facilitation of active transportation travel.

Figure D-62 2051 Regional Road Cycling Network Near the Study Area (York Region, 2022b)

Figure D-63 2051 Regional Trail Network (York Region, 2022b)

15.5 Navigation

In 2024, WSP delivered a Coastal Engineering Report for the Project's preferred alignment, incorporating existing data on boat traffic within the study area (**Appendix Y**). The marine navigational chart below indicates that there is no recommended vessel track across the water along the proposed Fixed Link (**Figure D-64**).

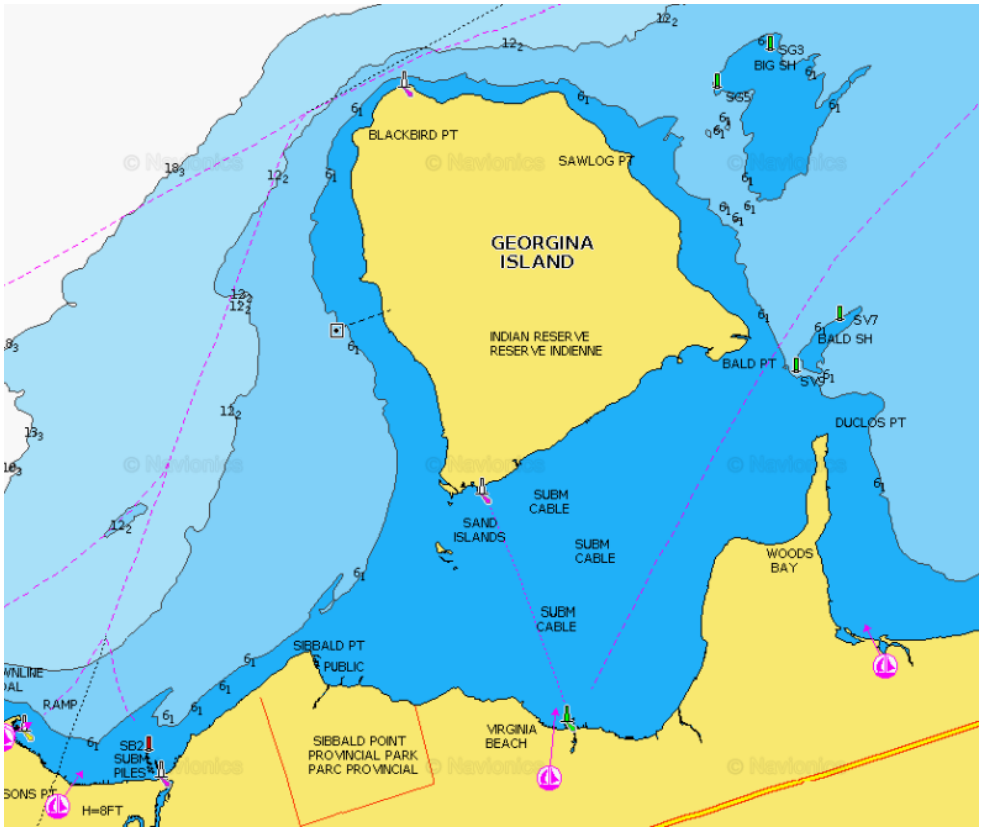


Figure D-64 Recommended Vessel Track (NAVIONICS, 2022)

Currently, the waterway across the proposed Fixed Link is primarily used by recreational boats and sail boats and details of these boats are provided below (C. Kinsella, Personal Communication, November 7, 2022):

- Maximum draft of the boats using the waterway is 1.8 m.
- Maximum height of the sailboat approximately 6 m.
- Maximum number of boats pass through the waterway in summer is between 100 and 200.

In addition to the above, the following boat categories were used for to assess potential effects to boat navigation within the study area:

- Small, motorized boats (length < 5 m)
- Medium motorized boats (length 5 m to 8 m)
- Large, motorized boats (length > 8 m)

To further understand the Project's impacts to navigation, a navigation impact assessment (i.e., Navigation Impact Study) has been carried out as part of the Project's Coastal Engineering report (**Appendix Y**). It describes the bridge dimensions, boat traffic through the bridge openings, navigation requirements related to the vertical clearance between the vessel and the bridge and channel width and assess the impacts to navigation due to the construction of proposed bridge and causeway. The results can be found in **Section 20.9**.

There are currently three boat launches located on the mainland at the Corner of Black River Road and Hadden Road, Sibbald Point Provincial Park, and Virginia Beach Marina (Figure D-55). On Georgina Island there are two boat launches one located within proximity of the Aazhaawe Ferry landing at Chief Joseph Snake Road south and the other is located the far east of the island at East point Marina on Milne Road. These boat launches are typically mostly used during the summer by the GIFN community and other recreational boaters and sail boats and in the winter for the airboats. All boat launch locations are located far from the proposed alignments and as such access to existing boat launches will likely remain unrestricted during the development of the Project.

15.6 Land Use

15.6.1 Georgina Island

The Chippewas of Georgina Island First Nation includes Georgina Island (1,295 ha), Snake Island (133 ha), Fox Island (19 ha), Sand Island (4 ha) and Gravel Island (0.4 ha). The First Nation residents reside on Georgina Island, while Snake, Fox and Sand Islands are "surrendered lands" and are currently leased to cottagers (according to the First Nation web site there are about 227 cottage lots on Snake Island, and about 64 lots on Fox Island) (Neegan Burnside Ltd., 2008). The Land Use Plan is included as Figure D-65.

On Georgina Island, there is an administration building, a health centre, a police station, a fire hall, and a community centre. As well, the island children attend a two-classroom school until Grade 5, and there is a daycare for infants and toddlers. A church, the community centre and an outdoor rink provide opportunities for the community to gather for various events.

The community buildings and most residential structures are centralized on the eastern and western shores providing community members with easier access to local services. The GIFN has undeveloped Lake Simcoe shoreline and excellent proximity to Highway #12 and Highway #48 leading directly from the GTA to the northern cottage regions. Georgina Island is only accessible by the Aazhaawe Ferry during the spring, summer, and autumn months of the year and by airboat or ice road during the winter months.

In addition, the First Nation territory includes the parcel of land (Part of Lot 24 and 25 and road allowance between Concessions 7 and 8) in Georgina Township that is occupied by the Virginia Beach Marina and the ferry terminal. The Virginia Beach Marina includes a restaurant, boat storage and maintenance area and a boat refueling area (Neegan Burnside Ltd., 2008).

Most of the community's homes and community buildings are located on the west side of the island, along Chief Joseph Snake Road. Cottages occupy lots along the northwest, south and eastern portions of the island. There are approximately 330 cottagers on Georgina Island and about 227 cottage lots on Snake Island and approximately 64 lots on Fox Island. GIFN community buildings are concentrated in the area of Root Road. The community centre,

administration office, school, medical clinic, and water treatment plant are located along Chief Joseph Snake Road. The ferry terminal, located in the southwest comer of the island, is the main access point for residents, cottagers and visitors (Neegan Burnside Ltd., 2008).

The Virginia Beach Marina Parcel is located approximately 7 km east of the community of Sutton. Virginia Beach is the main access point via the ferry to Georgina Island and includes a restaurant operated by the First Nation. This area is approximately 0.4 ha not including the in-water boat marina.

Three inactive landfills were identified on Georgina Island (Neegan Burnside Ltd., 2008). An active landfill is located adjacent to the sewage lagoon. The sewage treatment system on Georgina Island consists of a two-cell lagoon and raised tile bed. The system has been in operation since 1993. The sewage system is used to treat septage pumped from septic tanks and holding tanks. A water treatment plant is also located on the island (Neegan Burnside Ltd., 2008).

15.6.2 Mainland

The study area on the mainland is located within the Greenbelt Plan (Government of Ontario, 2017), not including those on First Nation lands. The Greenbelt Plan identifies where urbanization should not occur to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape. The Greenbelt Plan includes lands within, and builds upon the ecological protections provided by, the Niagara Escarpment Plan (NEP) and the ORMCP. Lands within the study area are designated as Protected Countryside Shoreline Areas Policy (Government of Ontario, 2017). The Protected Countryside lands identified in the Greenbelt Plan are intended to enhance the spatial extent of agriculturally and environmentally protected lands currently covered by the NEP and the ORMCP while at the same time improving linkages between these areas and the surrounding major lake systems and watersheds. The Greenbelt Plan builds upon the existing policy framework established in the PPS, issued under section 3 of the *Planning Act*, and its implementation through municipal OP policies and maps (Neegan Burnside Ltd., 2008).

Land use within the study area is characterized in The York Region OP (November 2005) and the Town of Georgina OP. The Regional OP identifies Significant Natural Features, Significant Forest Resources and the Regional Greenland System (particularly around Georgina Island and Duclos Point) and Rural Policy Areas within the study area (Neegan Burnside Ltd., 2008). The objectives of the Significant Natural Features and Forest Resources policies are to ensure that the features and functions are preserved, to ensure no loss of wetland function and to protect forested areas. The objective of the Rural Policy Areas is to retain the rural character of the lands and the viability of existing agricultural operations.

The Town of Georgina OP identifies Environmental Protection Areas, Core Conservation Lands and Waters, Lake Simcoe Shoreline and forest resources within the study area. The purpose of these policies is to identify and protect components of the Greenlands System (Neegan Burnside Ltd., 2008).

Figure D-65 GIFN Land Use Plan – Georgina Island

15.7 Cultural Heritage Resources

15.7.1 Archaeological Resources

A Marine Desktop Archaeological Assessment Report (2022) (**Appendix Q1**) and Marine Archaeological Impact Assessment (2025) (**Appendix Q2**) were completed to address the portion of the study area situated in Lake Simcoe, while the remainder of the study area was addressed in a separate Stage 1 Terrestrial Archaeological Assessment Report (**Appendix R**).

15.7.1.1 Marine Archeological Resources

The marine desktop archaeological assessment reviewed accessible primary and secondary sources, including cartographic resources, to assess the potential for archaeological resources within the study area defined in the report (**Appendix Q1**). This assessment was also supplemented by a visual inspection completed on 9 and 10 October 2022, which was undertaken on foot and primarily focussed on the shoreline areas around the study area and vicinity of the three Proposed Route Alignments at that time, which provided the ability to observe features and landscapes that may influence the archaeological integrity of specific areas.

The potential for underwater archaeological resources is detailed in Section 3.6 of the Marine Desktop Archaeological Assessment report (**Appendix Q1**). All items within the Ministry checklist (i.e., Ministry of Citizenship and Multiculturalism's *Criteria for Evaluating Marine Archaeological Potential* checklist), in addition to other project specific attributes that reflect the potential for submerged archaeological resources, were considered and addressed within Section 3.6, therefore exceeding the requirements of the Ministry checklist.

The review concluded that there are no registered archaeological sites within the preferred alignment, and the features identified during the site inspection (timber rock filled docks) will be avoided by the alignment and will not be directly impacted. However, the Marine Desktop Archaeological Assessment Report indicated in its assessment that identified nearshore areas have retained archaeological potential. Based on the marine desktop archaeological assessment and review of the study area landscape, the inundated areas identified as possessing archaeological potential (**Appendix Q1**) should be visually assessed by an archaeologist during a snorkel survey to provide the ability to identify cultural material that may be visible above the marine substrate, including artifacts and cultural features.

Based on the assessment of archaeological potential within the study landscape, the nearshore area defined as being between the existing water level and the 217 masl elevation contour line are inferred to represent areas that have retained moderate archaeological potential. This area would also include the former terrestrial landscape along the shorelines and islands inundated following construction of the Trent-Severn Waterway in the 1920s (Parks Canada, n.d.), the segment of the former land bridge within the northwestern portion of the study area, the area of former resource extraction including the wild rice fields east of the Sand Islands, and the potential for abandoned watercraft within close proximity to shore. Although the Sand Islands are currently above the waterline, they are within the marine landscape and are also considered to be areas of archaeological potential. The remaining portions of the study area are considered to possess low potential for submerged archaeological resources (**Figure D-66**).

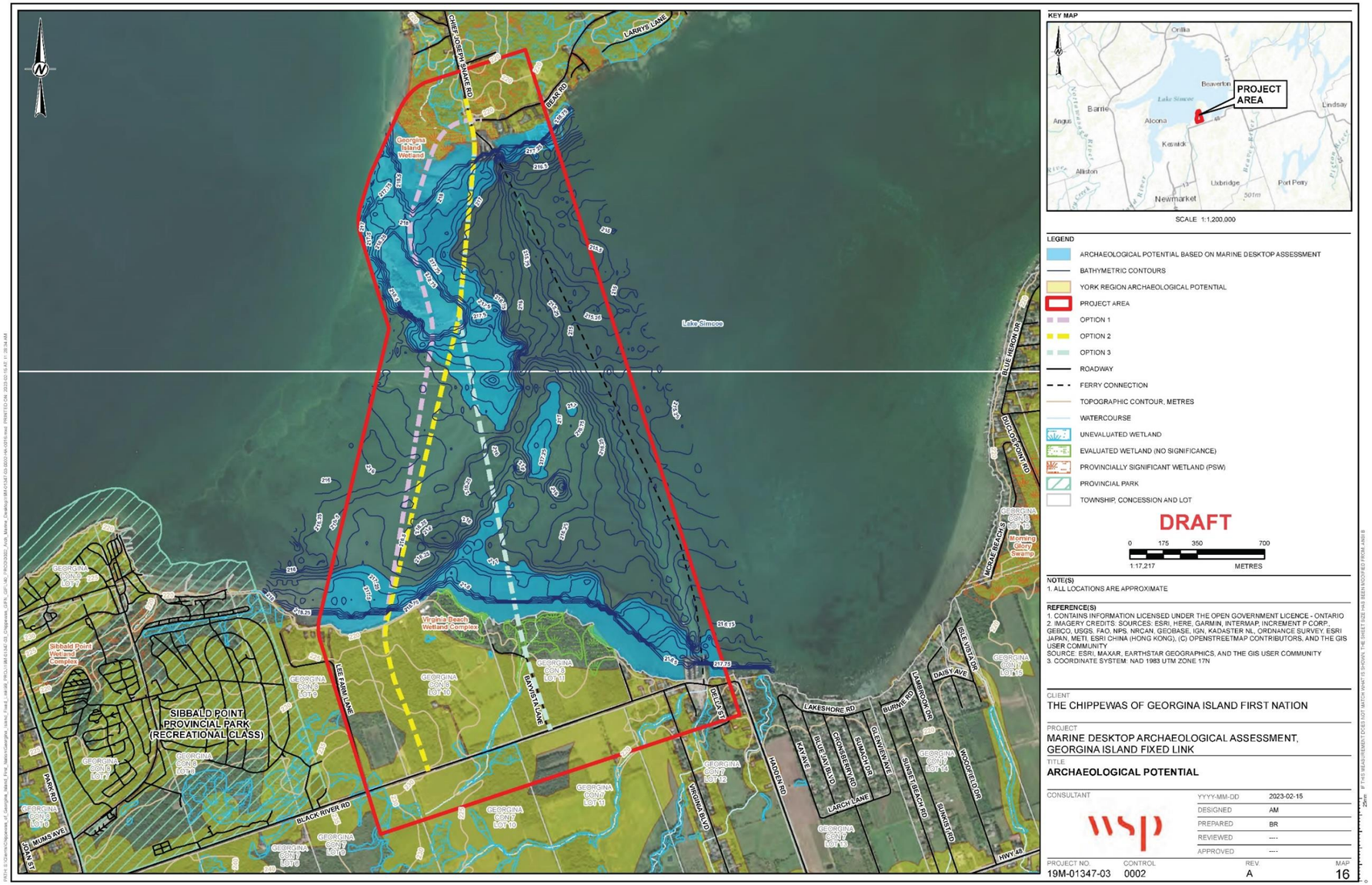


Figure D-66 Marine Archeological Potential

In November and December 2024, WSP completed field work for a Marine Archeological Impact Assessment (**Appendix Q2**), which was completed for the preliminary geotechnical investigations. The principal objectives were to identify archaeological material in the recovered sediments and characterize the submerged substrate, as it relates to buried areas of archaeological potential. The work consisted of screening the sediments recovered from the geotechnical investigation in the offshore area situated in between the southwest tip of Georgina Island and the mainland areas east of Sibbald Point Provincial Park. A total of 8 boreholes were recovered along the path of the current proposed alignment (per the October 2025 design plan). The boreholes were spaced out at approximately 250-meter intervals, adjusted to what was feasible based on the underwater landscape. No sediments were screened below the level of glacial till and homogenous clay. (**Appendix Q2**).

This investigation provided insight into the stratigraphy of the buried substrate and associated archeological potential of the submerged landscape. Select boreholes (i.e., BH24-O-02; BH24-O-04; BH24-O-05; BH24-O-06; BH24-O-08; see Figure 7 of **Appendix Q2**) revealed a stratigraphic sequence that can be correlated with an undisturbed paleosol. The distinct layering of organic material observed in multiple samples indicates that there is potential for an intact archaeological landscape in the lakebed substrate. While such submerged archaeological sites do present significant methodological challenges in their study, they also offer unique advantages. The underwater aspect of their contexts holds exceptional potential for their preservation without disturbance from later human occupation. When a paleosol is water-logged, it can create an anaerobic environment which helps preserve organic remains such as settlement layers, artifacts, and ecofacts. Further investigation will be necessary to properly assess these zones and mediate any impact.

15.7.1.2 Terrestrial Archaeological Resources

The historical context for areas identified as possessing potential for archaeological resources within the terrestrial landscape is included in Section 2.3 "Contextual Study Area History" of the Stage 1 Terrestrial Archaeological Assessment draft report (**Appendix R**). The types of potential artifacts and features associated with historical land use within the study area include those connected with both Indigenous peoples (including the Chippewas of Georgina Island) and the Euro-Canadian Colonial settlers, comprising land use extending during a period of over 10,000 years.

The Stage 1 terrestrial archaeological assessment reviewed accessible primary and secondary sources, including cartographic resources, to aid in the assessment of potential for archaeological resources within the study area. This assessment was also supplemented by a visual property inspection completed on 9 and 10 October 2022, which was completed on foot and primarily focussed on the areas of the three project alignment options.

The archaeological potential model developed by York Region and ASI (2014) was used as the base plan for assessing the potential for archaeological resources within the terrestrial study area (**Appendix R**). Consultation of this planning document was undertaken to establish a foundational baseline of archaeological potential within the study area, although the document is intended to be an overview of a large area rather than identify discrete intricacies within specific locations and as it only includes attributes of archaeological knowledge up to its (ASI & York

Region, 2014) publication date, the current Stage 1 archaeological assessment included a review of this model and refinement where required.

Review of the York Region and ASI archaeological potential model confirmed it identified potential within areas of previous 19th century structures, a 100 m buffer around 19th century transportation routes (**Appendix R**) and identified archaeological potential for the Ego Farm, a listed heritage property (Town of Georgina, 2022). The York Region and ASI potential model also incorporated information and mapping provided by the GIFN to include their traditional family hunting trails, travel corridors and hunting territories within the study area (ASI & York Region, 2014).

Areas from the York Region and ASI model where no archaeological potential was identified were confirmed during this Stage 1 visual inspection and included the asphalt roadways comprising Black River Road, Della Street and Virginia Boulevard in Georgina Township and Chief Joseph Snake Road and Bear Road within the study area on Georgina Island. The marina areas comprising graded land, asphalt and buildings at the Virginia Beach marina in Georgina Township and the marina and associated infrastructure on Georgina Island were also confirmed to no longer possess archaeological potential. The residential houses and standing structures within the study area identified in the York Region and ASI potential model were confirmed to no longer possess archaeological potential based on the Stage 1 visual inspection and review of 21st century aerial imagery (**Appendix R**).

Additional areas of archaeological potential identified for this Stage 1 assessment that were not included in the York Region and ASI archaeological potential model include an area in Lots 9 and 10, Concession 8, the area in Lot 11, Concession 7 and the wetland area along the Lake Simcoe shoreline in Lots 10 and 11, Concession 8. All three areas are situated within 300 m of a water source and were identified as possessing archaeological potential in accordance with Section 1.4, Standard 1ciii in the MCM Standards and Guidelines (2011), which indicates “no areas within 300 m” of “water sources” “can be recommended for exemption from further assessment” unless there is clearly defined landscape disturbance that has negated the potential for archaeological resources.

Areas that were identified as possessing archaeological potential from the York Region and ASI potential model (**Appendix R**) but were determined to no longer possess archaeological potential during this Stage 1 archaeological assessment include the property at 33 Lyall St that was previously assessed and no further archaeological assessments were recommended (**Appendix R**) and the landscape disturbance areas in Lots 9 and 10, Concession 8, north of Black River Road, where the topsoil has been removed and displaced materials have been deposited (**Appendix R**).

Based on the review and integration of the York Region and ASI archaeological potential model, and the refinement of the areas of archaeological potential based on this Stage 1 archaeological assessment, Figure D-67 reflects the areas identified as possessing archaeological potential within the study area terrestrial landscape.

KEY MAP

SCALE 1:1,200,000

LEGEND

- ARCHAEOLOGICAL POTENTIAL BASED ON STAGE 1 ASSESSMENT
- YORK REGION ARCHAEOLOGICAL POTENTIAL MODEL
- PREVIOUSLY ARCHAEOLOGICALLY ASSESSED AND NO FURTHER ASSESSMENTS RECOMMENDED
- LANDSCAPE DISTURBANCE IDENTIFIED DURING STAGE 1 VISUAL INSPECTION
- PROJECT AREA
- OPTION 1
- OPTION 2
- OPTION 3
- ROADWAY
- FERRY CONNECTION
- TOPOGRAPHIC CONTOUR, metres
- WATERCOURSE
- UNEVALUATED WETLAND
- EVALUATED WETLAND (NO SIGNIFICANCE)
- PROVINCIALLY SIGNIFICANT WETLAND (PSW)
- PROVINCIAL PARK
- TOWNSHIP, CONCESSION AND LOT

DRAFT

0 162.5 325 650
1:16,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
THE CHIPPEWAS OF GEORGINA ISLAND FIRST NATION

PROJECT
STAGE 1 TERRESTRIAL ARCHAEOLOGICAL ASSESSMENT, GEORGINA ISLAND FIXED LINK

TITLE
ARCHAEOLOGICAL POTENTIAL

CONSULTANT

YYYY-MM-DD	2023-02-15
DESIGNED	AM
PREPARED	BR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	MAP
19M-01347-03	0001	A	17

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Figure D-67 Stage 1 Terrestrial Archaeological Potential

15.7.2 Built Heritage Resources and Cultural Heritage Landscapes

In 2022, WSP prepared a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (Cultural Heritage Report) for the Project (**Appendix O1**), which documented known and potential BHRs and CHLs within the study area. Property visits were conducted via publicly accessible lands on October 21, 2022, to record the existing conditions of the study area. The field review was preceded by a review of available historical and current aerial photographs and maps. These photographs and maps were reviewed for any potential BHRs and CHLs that may be extant in the study area. One CHL and one BHR was identified and are presented in **Table D-27**. Mapping of these BHRs and CHLs are presented in Figure D-68 (**Appendix O1**).

The Cultural Heritage Report identified Lake Simcoe, including the marsh and associated shoreline, as a potential CHL. WSP recommended that a CHER be completed given that direct impacts were anticipated to this potential CHL. The CHER was completed by WSP in June 2024, confirming that Lake Simcoe is a CHL. The preparation of the CHER was informed by applicable MCM guidance documents (Refer to **Appendix O2**).

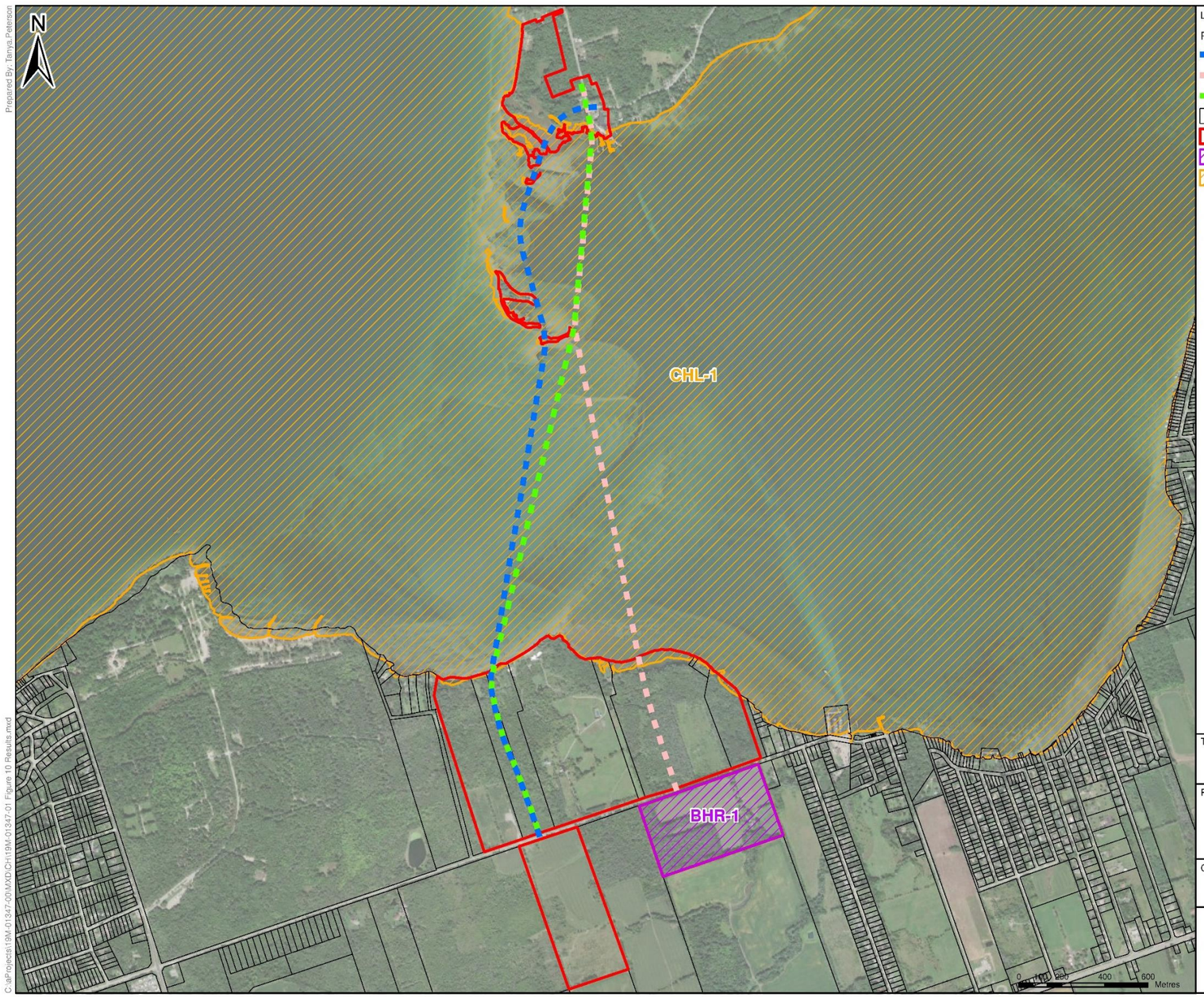
Upon the completion of archival research, community engagement, field investigations, and *O. Reg. 9/06* evaluation, WSP determined that the section of Lake Simcoe within the study area has local CHVI for its historical/associative and contextual value. WSP prepared a high-level cultural heritage integrity analysis and determined the Lake Simcoe is an evolved landscape that has been impacted by the change in water levels caused by the construction of the Trent Severn Waterway and surrounding environmental factors. Based on this evaluation, WSP prepared a draft Statement of CHVI and list of heritage attributes for the study area. The statement and the list of heritage attributes can be found in Section 6 of **Appendix O2**.

The CHER recommended the completion of a Heritage Impact Assessment (HIA) to assess the impacts of the proposed work, identify conservation strategies, and recommend mitigation measures to conserve the heritage attributes of the CHL.

Table D-27 Identified BHRs and CHLs with Known or Potential CHVI

BHR or CHL #	Resource Type	Location	Heritage Recognition	Description on Known or Potential CHVI	Photograph
BHR-1	Residential	7577 Black River Road	Listed on the Georgina Heritage Register	The Ego Farm offers significant historical context for Georgina due to its association with Angus Ego. The property this house resides on was originally owned by Silas Eames, a military man who was called upon by Captain Lee to protect York County during the 1837 Rebellion led by William Lyon Mackenzie. The land was then purchased by Angus Ego, who constructed this brick house sometime in the 1850s. Ego is significant due to his connections to early Georgina, acting as the township clerk and then reeve of Georgina from 1857 to 1862. Ego was also the treasurer of the township from 1872 to 1877. In the 1960s this house was also notable for being owned by Donald R. Martin, a member of the federal Progressive Conservative party in the 1960s. The Ego Farm is located at 7577 Black River Road in Georgina.	

BHR or CHL #	Resource Type	Location	Heritage Recognition	Description on Known or Potential CHVI	Photograph
CHL-1	Body of water	Lake Simcoe, including marsh and associated shoreline	Identified in consultation with GIFN	During the October 21, 2022, field review a GIFN representative identified Indigenous CHVI within Lake Simcoe.	



LEGEND:

PROPOSED ALIGNMENT
- OPTION 1
- OPTION 2
- OPTION 3

PROPERTY BOUNDARIES
CULTURAL HERITAGE STUDY AREA
BUILT HERITAGE RESOURCE
CULTURAL HERITAGE LANDSCAPE

TITLE: RESULTS

PROJECT: CULTURAL HERITAGE REPORT
GEORGINA ISLAND FIXED LINK
YORK REGION, ONTARIO

CLIENT: CHIPPEWAS OF GEORGINA ISLAND FIRST NATION

	PROJECT NO.:	REVIEWED BY:
wsp	19M-01347-01	EG
	DATE: NOVEMBER 2022	FIGURE: 10

Prepared By: Tanya Peterson

C:\aProjects\19M-01347-00\MXD\Ch\19M-01347-01 Figure 10 Results.mxd

Figure D-68 Identified BHRs and CHLs with Known or Potential CHVI

15.8 Economic Context

15.8.1 Employment

In the last two censuses, Georgina Island First Nation employment rates grew by 7.9%, an average growth rate of 0.8% per year from 2011 to 2021. A growing employment rate reflects positive economic conditions in the community and implies that people looking for a job are getting matched to an employer. The effects of the COVID-19 pandemic on industry reflect the minor employment rate decrease of 0.3% from 2016 to 2021 (Statistics Canada, 2022a).

In 2016, the population of GIFN in the labour force was 130 individuals, out of which approximately 96% were employed (**Table D-28**). 29% of the working population was employed in public administration, while the other 71% was split between seven other industries as illustrated in **Figure D-69** (Statistics Canada, 2016)

Table D-28 Labour Force Status for GIFN

Labour Force Status	Chippewas of Georgina Island First Nation			
	Total Number[a]	Percentage	Male[a]	Female[a]
Total Population (aged 15 years and over)[b]	215	100%	100	115
In the Labour Force	130	60.47%	65	65
Employed	125	96.15%	60	60
Unemployed	10	7.69%	0	0
Not in the Labour Force	80	37.21%	35	50

[a] Users should be aware that the estimates associated with this variable are more affected than most by the incomplete enumeration of certain Indian Reserves and Indian settlements in the 2016 Census of Population. For more information on Aboriginal variables, including information on their classifications, the questions from which they are derived, data quality and their comparability with other sources of data, refer to the Aboriginal Peoples Reference Guide, Census of Population, 2016 and the Aboriginal Peoples Technical Report, Census of Population, 2016.

[B] Labour force status for the population aged 15 years and over in private households – 25% Sample data. Refersto whether a person aged 15 years and over was employed, unemployed or not in the labour force during the week of Sunday, May 1 to Saturday, May 7, 2016.

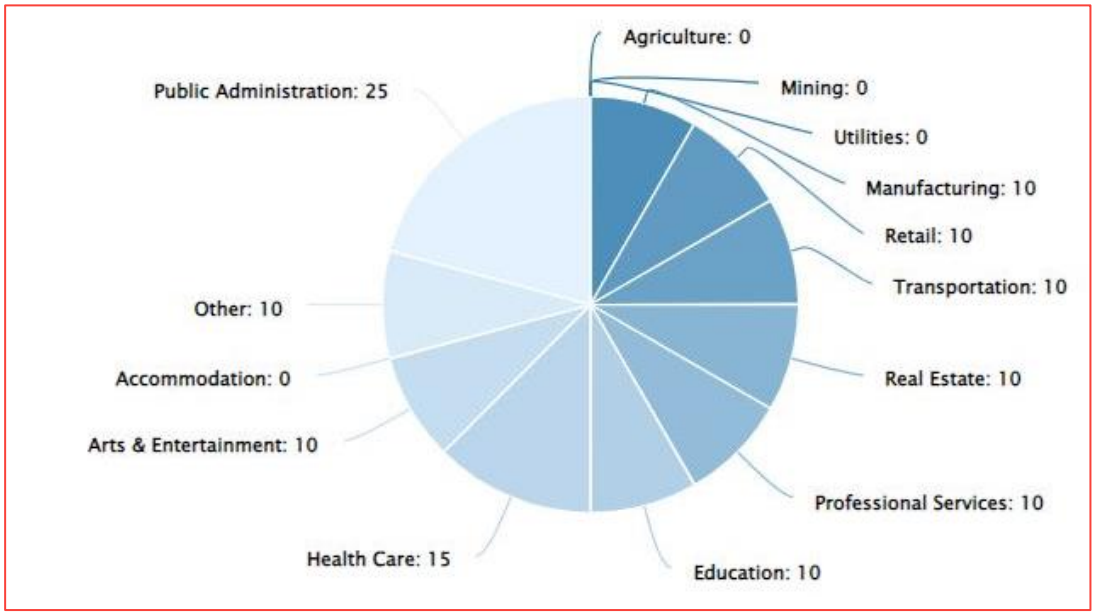


Figure D-69 GIFN Employment by Industry (Statistics Canada, 2022a)

15.8.2 Income

The median total income for GIFN in 2016 was $26,368 (**Table D-29**), which is significantly less than provincial median income of $33,539, and a national median income of $34,204 (Statistics Canada, 2016)With a population at 261 people at the time of the census, most inhabitants at of Georgina Island were above the low-income cut-off, or the income a person must earn to be part of the low-income group.

Table D-29 Income by Sex for GIFN

Income statistics in 2015	Total	Male	Female
Number of income recipients aged 15 years and over	200	90	110
Median total income	$26,368	$29,632	$25,504
Average total income	$36,627	$36,679	$36,583
Median after-tax income	$25,728	$29,632	$25,024
Average after-tax income	$34,684	$34,624	$34,735

The largest percentage of the population fell in the under $10,000 income group with 23.26% of individuals compared to Ontario which only had 15.3%, and Canada having 14% of individuals (**Table D-30**).

Table D-30 Total Income Groups in 2015 for GIFN

Income statistics in 2015	GIFN	
	Total	Percentage
Total income groups for the population aged 15 years and over in private households	200	100%
Under $10,000 (including loss)	50	23.26%
$10,000 to $19,999	35	16.28%
$20,000 to $29,999	35	16.28%
$30,000 to $39,999	25	11.63%
$40,000 to $49,999	10	4.65%
$50,000 to $59,999	10	4.65%
$60,000 to $69,999	10	4.65%
$70,000 to $79,999	0	0%
$80,000 to $89,999	15	6.98%
$90,000 to $99,999	10	4.65%
$100,000 and over	10	4.65%

15.8.3 Cost of Living

Cost of living for residents of Georgina Island can be expected to be at or near Ontario averages. Ontario is Canada's largest province and is one of the most expensive provinces on a cost basis. This is partially explained by the province having some of the highest housing costs in Canada, especially around the GTA, where 48% of Ontarians call home (WOWA, 2022).

15.8.3.1 Electricity

With 84% of residents being First Nations, costs associated with delivery for electricity are not incurred due to the On Reserve First Nations Delivery Credit from Hydro One, implemented July 1, 2017, resulting in a lower average monthly electricity bill. However, the Ontario Fair Hydro Plan was only promised for four (4) years, and the future of electricity pricing is unknown. As per the updated Community Energy Plan (CEP) for Georgina Island (2018), electricity is the most common energy type for space-heating used year-round in residential and seasonal residential sectors (Cambium Aboriginal Inc., 2019c).

15.8.3.2 Propane & Natural Gas

Propane is the second most common energy type used for space heating in both the year-round residential and seasonal residential sectors. Propane is supplied the community by Budget and Superior Propane and delays due to freezing and thawing seasons on Lake Simcoe do occur for the community so propane must be pre-ordered at times during the year, compounding costs for residents (Intrinsik, 2021). Propane has also seen unprecedented price increases (~28%) in the last 12 months due to supply chain issues caused by the ongoing war in Ukraine.

Natural gas is not currently available in the community, but the construction of a Fixed Link would provide potential for natural gas infrastructure to be established in the community.

15.8.3.3 Internet

Internet in the community is provided by Xplornet and Bell Communications. Internet connectivity has been historically poor, but a new connection in 2021 has improved access to community buildings. Many individual households' connections are established wirelessly. Costs associated with internet would be consistent with other local municipalities. As Internet access improves across households, the quality of Internet who must work from home or within band facilities will improve (York Region, 2021).

15.8.3.4 Housing

From the 2021 census, 73% of families owned their homes, with the remaining 9% renting their home. Housing prices on First Nations have been historically lower due to standards set by the First Nation itself to ensure homes are affordable for members, or due to the value placed on dwellings that reside on leased lands (Statistics Canada, 2022a). This may differ to some degree for cottages located on lakefront. Costs associated with renting on a First Nation have also remained lower than regional averages due to a decreased access to services that are available outside of communities. Although both real estate and rental costs have increased significantly since 2020, It can be expected that costs associated with housing/renting would be lower than off-reserve.

15.8.3.5 Food And Essentials

Food costs for residents of Georgina Island can be expected to be higher than mainland residents due to the added element of transportation. Georgina Island does not currently have any grocery or convenience stores available, and residents must travel to nearby centres to shop for essentials. Costs for food and everyday items have risen dramatically during 2022 due to supply chain issues and lingering effects from the COVID-19 Pandemic.

15.8.3.6 Transportation

Transportation costs in Ontario are also some of the highest in Canada, with car ownership and associated insurance premiums being high as well. Many Georgina Island residents must travel by vehicle to the mainland for education, employment, essential services, social and recreation activities. Residents of the community must also carry comprehensive insurance for their personal vehicles, for the purposes of crossing an ice-road, resulting in higher-than-average premiums. From the updated CEP, 80% of transportation energy use between 2014 and 2017, was by the residential and seasonal residential sectors (Cambium Aboriginal Inc., 2019c).

15.8.3.7 Childcare

Childcare provided by Niigaan-Naabiwag Child Care Centre, for members of Georgina Island is subsidized by the federal government, but for the purposes of cost of living, it has been included. Members who reside outside the community but wish to take advantage of subsidized childcare must transport their children to the facility within the community, thus incurring additional risks/costs of transportation, and ferry wait times (CIPS, 2022).

15.8.4 Businesses

Community and membership have tried many business ventures over the past 10 years. Some were an attempt to reach the tourism market, whereas others were designed to reach an external goods and services market. At the present time, there are very few ventures operating on a full-time basis. This limited economy is the direct result of the community's island location. The table below illustrates the businesses that are operational today. Refer to **Appendix B** for businesses that were established and are currently closed, and the type of ownership structure in place.

Table D-31 GIFN Ventures Past and Present

Business Name	Service	Location	Ownership
Island B&B	Weekly cottage rental	Georgina Island	Privately owned
Big Canoe Cabin Rentals	Angler accommodation	Georgina Island	Privately owned
Other Private Cottages	Weekly and seasonal cottage rentals	Georgina Island	Privately owned
Virginia Beach Marina	Marina, Restaurant, Fuel Boat Storage and Repair	Georgina Island	First Nation owned
Aazhaawe Ferry Service	Car and person ferry	Georgina Island	First Nation owned
Island View Business Centre	Small Business Centre	Mainland	First Nation owned
Tobacco Trails	Cigarettes and Lottery	Mainland	First Nation owned
Daawegamig	Cannabis Products	Mainland	First Nation owned

15.8.5 Tourism

Georgina Island is situated in the prosperous Regional Tourism Organization (RTO) Zone 6 – also known as the Central Counties. The Central Counties has a population of over 2 million people, residing within over 670,000 households (Central Counties Tourism, 2019). Tourism in Central Counties is an increasingly significant contributor to economic growth. The retention of businesses and services in the area is increasingly dependent on visitor spending, resulting in nearby economies investing heavily in attracting those visitors.

From the RTO Zone 6 visitor profile survey in 2018, Cultural Sampling, Attraction to Nature and Ecological Lifestyle scored as the highest social values in the survey (Central Counties Tourism, 2018). With GIFN being the larger of two First Nations located in this zone, the addition of a Fixed Link will provide a definite opportunity for Georgina Island to provide these unique experiences to visitors with existing or with new businesses. The construction of a Fixed Link, connecting Georgina Island to the mainland will provide easy, and regular access to and from Georgina Island and contribute to the growth of the local tourism sector.

Owing to high demand in tourist opportunities within the Georgina Island area, overbearing and uncontrolled tourists and overuse of the existing land base are potential risks with expanded tourism potential. As such, overuse of the current ferry system is a threat to local community members relying on service to the mainland. A fixed link would alleviate these demand pressures. A controlled and secure bridge would also ensure access to the island and use of the Fixed Link would not be overused, particularly during summer months, which bring considerably more tourists to the area.

While minor positive impacts to tourism are possible, no significant positive or negative impacts to tourism are expected as a result of the Project. The intent of the Project is not to increase future development or tourism on Georgina Island.

PART E. FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS OR MUNICIPAL INVOLVEMENT AND EFFECTS

16. POTENTIAL FEDERAL FINANCIAL SUPPORT

A description of any financial support that federal authorities are, or may be, providing to the project.

The GIFN understand the substantial costs that will be associated with this Project and are well positioned to take this Project on financially. For community planning purposes, the GIFN Chief and Council have separated the Project into two separate phases: Planning/Design and Construction.

GIFN believes that, as part of the Treaty relationship with the Crown, the federal government has financial obligations pertaining to the transportation costs for the Island. As the first step in the assessment and shared responsibility, the Chippewas of Georgina Island will engage the federal government in negotiations pertaining to the seven generations cost burden of transportation. As the options are jointly compared, the First Nation and the federal government will assess the most efficient and effective financing package to pay for this Project

The financing mix will be determined during the negotiation process; however, the mix will be a combination of First Nation equity, Treasury Board support and loan support from the CIB, which is in discussions with the GIFN with respect to financing the Project construction. The community has initiated the processes required to be considered for financial support through an initial meeting, which included a presentation by the CIB to the First Nation Council verifying accelerator funds, as well as verifying project eligibility for loan proceeds under CIB lending terms and conditions. Regular Project updates are also provided to the CIB.

It is estimated that the remaining 20% of the Project would be funded through a combination of Long-Term Investments, own-source revenues and other government equity-based funds. Due to the uncertainty of government programming over the Project lifecycle, the GIFN community is unable to gauge what amounts may be available from each source in the long term. For that reason, the GIFN is operating on the assumption that it will be required to support the full 20% of equity needed and is willing to do so if required.

It should be noted that any funding with respect to the Project from a federal department (e.g., CIB) would be conditional upon the Project receiving a positive decision statement from the Minister of Environment and Climate Change Canada after an IA, or a decision by the IAAC that no IA of the Project is required (IAA, section 8).

Section 18 provides a list of the potential federal authorities requiring authorizations for the Project, and whether they are anticipated to provide financial support.

17. FEDERAL LANDS THAT MAY BE USED FOR THE PROJECT

A description of any federal land that may be used for the purpose of carrying out the project.

Georgina Island First Nation Reserve No.33 consists of four separate land masses. There are three separate islands (Georgina Island, Snake Island, and Fox Island) which lie approximately 3 km off the southern shore of Lake Simcoe, and a small acreage located at Island Grove on the mainland (Georgina Island Fixed Link Secretariat, 2021).

Georgina Island First Nation Reserve No.33 are federal lands as defined in the IAA. The Fixed Link will connect the mainland with Georgina Island. Any submerged lands under Lake Simcoe that were once dry lands belonging to Georgina Island, Sand Island or Gravel Island before the water levels of Lake Simcoe rose are also federal lands as defined in the IAA (see **Section 13.3**) (**Figure D-1**).

18. PERMITS, LICENSES, AND APPROVALS

A list of the permits, licenses, or other authorizations that may be required by jurisdictions that have powers, duties or functions in relation to an assessment of the project's environmental effects.

If the project requires a federal authority to:

- exercise a power or perform a duty or function to permit the project to be carried out, in whole or in part; or
- provide financial assistance to a person, to enable the project to be carried out, in whole or in part.

The description should identify the specific power, duty or function of, or financial assistance from, a federal authority to which the effects are linked.

This should include of any greenhouse gas policies, legislative or regulatory measures applicable to the project.

In addition to the current IA process under the IAA, the proposed Project may be subject to required authorizations and approvals issued by:

- Fisheries and Oceans Canada (DFO),
- Transport Canada (TC),
- Environment and Climate Change Canada (ECCC),
- Ministry of the Environment, Conservation & Parks (MECP),
- Ministry of Natural Resources (MNR), and
- Ministry of Citizenship and Multiculturalism (MCM).

Table E-1 below provides a list of permits/licenses/approvals obtained relevant to Project planning and activities. It also provides a list of potential and anticipated permits, licences or

authorizations that may be required in the future for the Project, by the identified jurisdictions, in relation to the assessment and regulation of the Project's environmental effects.

Table E-1 Obtained Permits, Licenses, and Approvals

Approving Agency	Permits, Licenses, and/or Approvals	Date Approval/Permit/License Obtained	Financial Assistance/Support
Federal			
Fisheries and Oceans Canada (DFO)	A *Fisheries Act* paragraph 35(2)(b) Authorization will be required if the Project is likely to cause the harmful alteration, disruption or destruction to fish habitat and/or a *Fisheries Act* paragraph 34.4(2)(b) Authorization if the Project is likely to result in the death of fish. On July 12, 2024, WSP submitted a Request-for-Review (RfR) form to DFO for a geotechnical borehole investigation to be undertaken in 2024 on Lake Simcoe in support of the Project. In August 2024, DFO provided the review to WSP and noted that the proposed geotechnical investigation will not require an authorization under the *Fisheries Act*, the *Aquatic Invasive Species Regulations*, or the SARA.	N/A	None
Transport Canada (TC)	Approval under subsection 7(6) of the *Canadian Navigable Waters Act* (CNWA) for the proposed geotechnical borehole investigation.	October 11, 2024	None
Provincial			
Ministry of Natural Resources (MNR)	MNR Work Permit for the onshore and offshore geotechnical investigation activities as part of the Project's study phase.	October 4, 2024	None

Table E-2 Anticipated Permits, Licenses, and Approvals

Approving Agency	Permits, Licenses, and/or Approvals	Financial Assistance/Support
Federal		
Fisheries and Oceans Canada (DFO)	Another RfR will be submitted to DFO during the Detail Design phase to determine permitting requirements for future Project activities. It is anticipated that an Authorization will be required for the future Project activities.	None.
	Protection provisions of aquatic species under SARA could also apply to the Project.	
Transport Canada (TC)	Future Project activities will require approval under subsection 5(1) of the CNWA.	None.
Environment and Climate Change Canada (ECCC)	SARA permits may be required for the following terrestrial species listed under the SARA: Blanding's Turtle, Eastern Whip-poor-will, Least Bittern, Western Chorus Frog (Great Lakes/St. Lawrence population), Little Brown Myotis, Northern Myotis, Tri-colored Bat, and Butternut, on federal lands.	None.
Health Canada	No approval anticipated. However, Health Canada provides health-related expert advice and technical knowledge to support the assessment of potential impacts of the Project on human health.	None.
Canada Infrastructure Bank (CIB)	None.	CIB has been engaged since 2021 to initiate federal financial support for the Project.

Approving Agency	Permits, Licenses, and/or Approvals	Financial Assistance/Support
Provincial		
Ministry of the Environment, Conservation & Parks (MECP)	A construction temporary Permit to Take Water (PTTW), under Ontario *Water Resources Act* may be required.	None.
	Endangered Species Act, 2007 authorization (or registration) may be required for the following species: Blanding's Turtle, Butternut, Least Bittern, Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-coloured Bat. Any newly-listed species will also require consideration; however, per guidance from MECP, legal advice is required to determine whether the *Endangered Species Act, 2007* is applicable to Indigenous reserve lands within the study area. It is important to note that the amended *Endangered Species Act 2007* is still in force and remains the governing provincial legislation for species at risk. The *Species Conservation Act* (2025) will replace the current Act (2007) once proclaimed into force by the Lieutenant Governor in Council. During this interim period, the *Endangered Species Act, 2007* remains in place (Government of Ontario, 2025b). Under the amended *Endangered Species Act,* 2007, activities that result solely in the harassment of a species are no longer prohibited and do not require a permit or exemption. The Policy Guidance on Harm and Harass (Government of Ontario, 2025a) can help determine whether an activity constitutes harassment or escalates to harm or killing.	
	An Environmental Compliance Approval (ECA) issued under the *Environmental Protection Act* (EPA) may be required for equipment emitting air, waste or noise.	

Approving Agency	Permits, Licenses, and/or Approvals	Financial Assistance/Support
	Compliance with the Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300) may be required.	
	Compliance with *O. Reg. 419/05 – Air Pollution – Local Air Quality* may be required.	
Ministry of Natural Resources (MNR)	The use of public land and shore lands are regulated under the *Public Lands Act*. As such, a work permit must be obtained from MNR to undertake certain activities on public land and shore lands, and to occupy public lands in Ontario, a proponent must receive prior approval from MNR unless the use is permitted by regulation. Construction activities and/or occupation on provincial Crown land may require a work permit under the *Public Lands Act*.	None.
	A Wildlife Scientific Collector's Authorization (WSCA) and/or Licence to Collect Fish for Scientific Purposes, under the *Fish and Wildlife Conservation Act* may be required for wildlife and/or fish salvage activities during construction.	None.
Ministry of Citizenship and Multiculturalism (MCM)	Per *Ontario Heritage Act, Part VI*, it is expected that the proponent may be required to submit one or more archaeological assessment report to the MCM for review and acceptance. If the report complies with the Standards and Guidelines for Consultant Archaeologists (MCM, 2011), the report will be entered into the Ontario Public Register of Archaeological Reports, at which time a letter will be issued. A copy of the CHER, dated June 26, 2024, has been accepted by GIFN, and has been provided to the MCM for review and information purposes.	None.

Approving Agency	Permits, Licenses, and/or Approvals	Financial Assistance/Support
Ontario Ministry of Transportation (MTO)	Prior to initiating the TIS to inform the DPD, a TIS TOR was submitted to MTO for review. MTO confirmed that the proposed Project is outside its jurisdiction and no provincial highway intersections need to be assessed; thus, it does not have an expected approval role (see Appendix F for the correspondence).	
Regional/Local/Municipal		
Lake Simcoe Region Conservation Authority (LSRCA)	The LSRCA has confirmed that approvals will not be required under *Ontario Regulation 179/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation* under the *Conservation Authorities Act.* The LSRCA has confirmed throughout ongoing discussion in 2024 that it is not able, to or required to, issue a permit for the Project as the Project subject to is a federal matter and is subject to provincial legislation.	None.
Regional Municipality of York	According to the York Region Transportation Mobility Plan Guidelines for Development Applications (York Region, 2016), York Region and the nine local municipalities within York Region require development applications to provide a TIS to assess the impacts of the proposed development on the existing and future transportation network.	None.
Town of Georgina	York Region and the nine local municipalities within York Region require development applications to provide a TIS to assess the impacts of the proposed development on the existing and future transportation network	None.

PART F. POTENTIAL EFFECTS OF THE PROJECT

GIFN ENVIRONMENTAL PRINCIPLES

The GIFN have developed a set of Environmental Principles to be applied by community leadership, staff, members, advisors and service providers driving the Fixed Link Project. It is understood that some adverse environmental effects may be identified throughout the evaluation, design and construction phases of the Project. These Environmental Principles (**Appendix I**) are intended to maintain transparency, guide decisions and project evaluation activities to ensure that Mother Earth is respected at every stage of the process.

As a proud Chippewa Nation, the GIFN's culture and traditions are set in the Seven Grandfather Teachings. The Seven Grandfather Teachings are a set of Anishinaabe guiding principles passed down from generation to generation to guide the Anishinaabe to live a good life in peace and without conflict. Grandfathers gave seven teachings to share with the Anishinaabe people; love, respect, bravery, truth, honesty, humility, and wisdom.

The main concern that will continue throughout this Project is an ongoing community-based fear of accident and irreparable harm to Lake Simcoe. The potential of significant harm to the lake water and ecosystems during construction and operations may result in a community that is burdened with a protectionist mentality. This potential negative impact will result in GIFN community oversight and investigations. This process is intended to provide a 'good' path and intention consistent with Indigenous beliefs. Mitigation measures are intended to offset community fears and to provide context for community members to express concerns throughout the process.

The GIFN community has developed the following Environmental Principles, derived from the traditional teaching of the Seven Grandfathers, to guide this Project.

- Principles Guided by **The Teaching of Love**

    1. All Project processes will be examined thoroughly prior to the commencement of work to identify direct and indirect adverse impacts to all of Creation including plants, animals, water, land and air.

- Principles Guided by **The Teaching of Wisdom**

    2. All Project activities will be reviewed through technical and traditional expertise (Anishinaabeg/Western), respecting all opinions provided and applying the best appropriate actions that first and foremost ensure the health and safety of the community and all of Creation.

- Principles Guided by **The Teaching of Bravery**

    3. This principle requires workers and observers of this Project to have the courage to voice an opinion, and demand feedback about a Project activity that is having a negative impact, even when it might be met with negative consequences.

- Principles Guided by **The Teaching of Honesty**

    4. The honesty principle speaks to transparency about the potential impacts the Project will bring both temporarily and permanently, both positive and negative.

- Principles Guided by **The Teaching of Humility**

    5. This principle is to allow all knowledge shared for the purpose of the Project to have an equal platform and value.

- Principles Guided by **The Teaching of Respect**

    6. To all possible extents, actions taken to complete the Project will be done with the utmost respect to the natural environment, the community, the people, their peers and the impacts of actions.

- Principles Guided by **The Teaching of Truth**

    7. This principle requires that truth be the guiding force behind this Project. Truth will result in knowing, understanding and following these guiding principles as a whole, rather than teaching by teaching.

Refer to **Appendix I** (Fixed Link Project Environmental Principles) for a detailed description of how these principles can be integrated into the Project's processes and operations.

In addition to the Environmental Principles, the GIFN entered into an Environmental Management Agreement to enact environmental protection legislation on reserve. The band has developed a set of by-laws that ensure environmental impacts on reserve lands are prevented or minimized. In 2008, an environmental scan was conducted to identify the community's environmental issues and priorities. The following programs and services were developed to address the environmental needs of the community:

- Environmental Climate Change Adaptation
- Waste Management, Recycling Promotion & Education Coordinator
- Georgina Island FN Energy Plan
- Community Energy Champion
- Invasive Species Coordinator
- Forest Management/SAR Coordinator

The Chippewas of Georgina Island, as Anishinaabeg, are stewards of the land and waters and are entrusted to sustain Mother Earth for several generations ahead.

19. CHANGE TO THE ENVIRONMENT UNDER FEDERAL LEGISLATION

A description of any changes that, as a result of the carrying out of the project, may be caused to the following components of the environment that are within legislative authority of Parliament

- fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*;
- aquatic species, as defined in subsection 2(1) of the *Species at Risk Act* (marine plants); and
- migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994.*

19.1 Fish and Aquatic Habitat Protected under the Fisheries Act

19.1.1 Changes to the Environment

19.1.1.1 Construction

The existing fish and fish habitat conditions along the preferred alignment are summarized in **Section 14.2.2**, with further details available in the **Appendix T2**.

It is anticipated that the proposed works will result in harmful alteration, disruption or destruction of fish habitat (HADD) that will require DFO Authorization under the *Fisheries Act*. This was also noted in the following comment by DFO in the draft IPD (2021), “based on the draft IPD, it is likely that the proposed Project would result in physical impacts to fish and fish habitat. A *Fisheries Act* paragraph 35(2)(b) Authorization will be required if the Project is likely to cause the harmful alteration, disruption, or destruction to fish habitat. A *Fisheries Act* paragraph 34.4 (2)(b) Authorization will be required if the Project is likely to result in the death of fish.”

A high-level overview of the anticipated types of impacts is provided below with the expectation that, as the Project proceeds through further design phases, these impacts will become understood in further detail and quantified.

Anticipated direct impacts of the preferred route alignment of the Fixed Link include:

- Loss of fish habitat (permanent removal) in Lake Simcoe resulting from infilling for the causeway portions and the bridge pier areas;
- Localized removal and loss of riparian habitat along lake shoreline areas; and
- Potential for incidental fish mortality.

See **Section 14.2.2.2**for detailed descriptions about the existing fish and riparian habitat that could be impacted by the Project. The fish habitat with Moderate Sensitivity that could be impacted includes a small area of the Georgina Island PSW Complex (Cattail Mineral Shallow Marsh – MAS2-1) along its east edge, which is identified as potential Northern Pike and Muskellunge spawning habitat. A small area of this Moderate Sensitivity habitat will likely be removed by the short causeway section that joins the bridge to Georgina Island. In addition, small areas of Moderate Sensitivity multi-use fish habitat will likely be removed by the footprint areas of the northernmost piers, along with very small areas of this habitat associated with the

footprint of the central causeway (which contains mainly Low Sensitivity fish habitat – see below). These multi use fish habitat areas could be used by fish for spawning, rearing for young-of-the-year, refugia, and foraging (Cambium 2023b), and include abundant and relatively diverse aquatic vegetation communities (e.g., milfoil [SAS1-4], wild celery [SAS1-5] and pondweeds [SAS1-1]).

Low Sensitivity fish habitat areas that may be impacted by the Project are primarily associated with the deeper open water areas between the mainland nearshore connection and the Sand Islands and some shallower nearshore areas. These areas have potential to support more single use or non-reproductive life-cycle functions. Cambium noted that “while these areas are important as movement corridors and general habitat units, they are not anticipated to significantly contribute to the reproductive capacity of local fish communities” (Cambium Inc., 2023). The proposed footprint areas of the central causeway and the southern piers are mainly within Low Sensitivity fish habitat.

See **Appendix T2** – Figures 12 to 14 and see Section 14.3.2.1.3 of this report for more details.

Potential indirect impacts of the Fixed Link on fish and fish habitat during construction may include:

- Decreased habitat quality as a result of erosion and release of sediment;
- Decreased habitat quality as a result of accidental spills; and
- Decreased habitat quality and disturbance as a result of noise and vibration (potential disruption during fish spawning period).

Mitigation measures for these effects are identified in **Section 19.1.2.1**.

With regard to noise and vibration, a Noise Impact Assessment Report was prepared by WSP (see **Appendix V**)**,** based on potential aquatic receptors (28 fish species) that were taken from the GIFL Aquatic Existing Conditions Report for the Preferred Alignment (**Appendix T2** – Table 3). The qualitative assessment identified potential activities (e.g., piling driving) that could impact those species, especially during the spawning periods. Due to potential for impact to the fish species, a detailed underwater noise and vibration impact study will be undertaken during future design phases.

19.1.1.2 Operation

Potential longer-term impacts to fish and fish habitat after construction and during operation of the Fixed Link include:

- Changes to fish habitat and aquatic species diversity (fish, benthic macroinvertebrates) from altered wind and current patterns;
- Changes to and disruption of fish movement and / or migration patterns from altered wind and current patterns;
- Increase in the spread of invasive species (e.g., Phragmites, Starry Stonewort, Round Goby, Zebra Mussel);
- Disturbances to fish (e.g., lighting); and
- Decreased habitat quality as a result of contamination (e.g., road salt).

With regard to the potential change in lake currents from the Fixed Link, and how this might impact the fish habitat, species diversity, movement and/or migration patterns noted above, reference is made to the coastal engineering study and report entitled GIFL Coastal Engineering Report dated October 2024 (**Appendix Y**). This report was completed using hydrodynamic wave and sediment transport modeling in the vicinity of a proposed causeway and bridge openings along the preferred alignment. The key findings from this report that relate to longer-term impacts on fish and fish habitat are noted below.

- Changes to fish habitat and aquatic species diversity (e.g., fish, benthic macroinvertebrates) from altered wind and current patterns. From the Coastal Engineering Report (WSP, 2024) it is noted:
    - Prevailing winds and the highest wind speed at the Project site are from the north, northwest and west (p. 24).
    - The shoreline at the southern tip of Georgina Island has been advancing over the past 93 years at an annualized pace of 2.15 m per year and the shape of the shoreline has changed significantly, and wetlands have formed over the years (p. 74 - 75).
    - The construction of the bridge and causeway is not expected to pose significant erosion risks to the shorelines of Georgina Island and the mainland. The strategic placement of the bridge segments will allow longshore sediment transport to proceed uninterrupted. Although the proposed causeway may obstruct the eastward migration of the Sand Islands and shoals in the long term (>50 years), this is not anticipated to affect the shorelines of Georgina Island and the mainland. (p.87).
    - At the southern tip of Georgina Island, the short causeway section is expected to have minimal impact on sedimentation and erosion patterns, as it is adjacent to the ferry landing and marina, which already obstruct sediment transport along the shoreline. (p. 84).
    - The proposed bridge section (shown by the red dashed line in Figure 4-10) allows sediments to pass through, maintaining eastward sediment transport while allowing the highly dynamic southern tip of Georgina Island to migrate with minimal obstruction. Further south, the longer section of the causeway may block the eastward migration of the Sand Islands and shoals. However, as this section is flanked by open bridge segments on both sides, it is not expected to significantly impact sediment processes near the shorelines or cause noticeable shoreline changes. (p.84).
    - The causeway interrupts sediment movement, halting accumulation in previously active areas and stabilizing bed levels east and west of the structure, with erosion decreasing by up to 0.60 m. (p. 94).
    - The proposed causeway and bridge construction does not pose any significant risk for the erosion of the Georgina Island and mainland shorelines. (p. 95).
    - Minimal morphological changes at bridge piers #1 to #16 and at the Sand Islands and shoals post-construction can be observed ranging from 0 m to 0.20 m (Figure 3-19) after 1 year and 0 m to 0.40 m (Figure 3-21) after 25 years. (p. 63).

- Morphological changes at bridge piers #17 to #31 can be observed ranging from 0 m to 0.10 m (Figure 3-19) after 1 year and 0 m to 0.25 m after 25 years (Figure 3-21). It should be noted that local patterns of erosion and sedimentation in the immediate vicinity of the individual bridge piers will not be accurately captured due to the chosen mesh size. (p. 62).
- No change in morphology is observed in the vicinity of the shorelines post-construction after 25 years. The design will have minimal impact on the sediment processes along the shorelines of the mainland and Georgina Island. (p. 63).
- The proposed bridge-causeway design will have minimal impact on the Sand Islands and shoals sediment processes within the next 50 years. (p. 51).

As indicated above, the shoreline at the southern tip of Georgina Island (which includes the Georgina Island PSW Complex) and portions of the shoals and Sand Islands appear to be naturally slowly advancing/migrating to the east/southeast. The Georgina Island PSW Complex (Cattail Mineral Shallow Marsh, MAS2-1), which is classified as potential Northern Pike and Muskellunge spawning habitat with Moderate Sensitivity (see Section 14.3.2.1.2.3), will also likely slowly increase in size as a result. It is anticipated that the bridge section proposed in this area will allow the highly dynamic tip of Georgina Island and its habitat to continue naturally migrating slowly eastward with minimal obstruction. Furthermore, the small/short section of the proposed causeway in this area that joins the bridge to Georgina Island will have minimal impacts on this migration due to its location adjacent to the ferry landing and marina, which already obstruct sediment transport in this area.

With regard to the central causeway, the interruption of sediment movement will result in “halting accumulation in previously active areas and stabilizing bed levels east and west of the structure” (WSP, 2024). This stabilization of the bed levels over time in the vicinity of the causeway may result in minimal physical changes to the dominant Low Sensitivity fish habitat (e.g., generally deeper open water sections with some shallower areas) found in area. Small areas of aquatic weedbed communities (e.g., wild celery SAS1-5, stonewort SAS1-3) found in the vicinity of the central causeway are not anticipated to change greatly over time with consideration of the stable bed levels. The weedbeds are identified as Moderate Sensitivity, multi use fish habitat (see Section 14.3.2.1.2.3).

Minimal morphological changes have been identified at the bridge pier locations post construction; however, it was noted that local patterns of erosion and sedimentation in the immediate vicinity of the piers could not be accurately captured through the modelling. Further analysis and refinement of potential impacts of erosion and sedimentation around the piers and appropriate mitigation measures will be completed during future design phases.

As noted above, the Coastal Engineering Report (WSP, 2024) concluded that the proposed bridge-causeway design is not expected to pose significant erosion risks to the shorelines of Georgina Island and the mainland (and the associated fish habitat), and the Project will have minimal impact on the sediment processes in these areas.

Water quality (e.g., temperature, pH, turbidity, dissolved oxygen, conductivity) can impact fish species diversity and is related to the ability of a fish to tolerate certain conditions (e.g., higher water temperatures). In the case of the proposed central causeway, it is anticipated that strategic placement of the open bridge segments on the north and south sides of the causeway

should allow for adequate mixing/circulation of the waterbody from the west side to the east side and vice versa during storm events and/or windy conditions. In addition, mitigation measures as outlined in **Section 19.1.2** and the strategic placement of the open bridge segments should assist in minimizing potential water quality issues that can impact fish species diversity. Such measures will be investigated further during future design phases.

Generally, coolwater and warmwater fish species are known to utilize the aquatic habitat within the study area (Cambium Inc., 2023). Based on the fish species list for the study area (**Appendix T2**, Table 3), most (28 species) are intermediately/moderately tolerant to tolerant, to environmental perturbations or anthropogenic stresses, with the exception of Blackchin Shiner (*Notropis heterodon*) and Logperch (*Percina caprodes*), which are intolerant species. Based on the tolerance of the majority of fish species found within the study area, the preliminary consideration of coastal modeling impacts noted above, the strategic placement of the open bridge segments and the preliminary mitigation measures recommended, the diversity of fish species in the vicinity of the preferred alignment are not anticipated to be greatly affected. Potential changes in fish and benthic macroinvertebrate diversity will likely be investigated further during future design phases, as determined through consultation with DFO, as part of potential pre and post construction monitoring Authorization requirements.

- Change and disruption to fish movement and/or migration patterns from altered wind and current patterns. From the Coastal Engineering Report (WSP, 2024) it is noted:
    - During 100-year extreme storm conditions, bridge piers #1 to #16 and #28 to #31 have minimal impact on current velocities, with changes ranging from 0 to 0.05 m/s (5%), resulting in only minor alterations to the local hydrodynamics. (P. 51)
    - Post-construction, current velocities increase near the south end of the main causeway and in between Piers#17 to #27 due to the reduced flow area from the bridge-causeway construction, with a maximum 0.30 m/s (60%) increase during a 100-year extreme event. Velocities reduce by 0-0.10 m/s (90%) in the shadow zone during a 100-year extreme event. Minimal changes are observed along the shorelines of the mainland and Georgina Island, and near the Sand Islands and shoals. Post-construction, average current velocities increase by 0.01 m/s between the south end of the causeway and bridge pier #17. (p. 94)
    - In the 100-year easterly storm, peak depth-averaged current speeds reach 0.8 m/s. In the 100-year west-northwesterly storm, peak current speeds reach 1.0 m/s. In both extreme conditions, the peak current velocities occur in the shallower regions, near the Sand Islands, shoals, and in-between the mainland and Georgina Island. (P. 51)
    - During the windiest (April) and calmest (August) month, the average current velocity increases by 0.01 m/s and the maximum current velocity increases by 0.10 m/s, post construction (Table 3-4). (P. 51)
    - No change in current velocity is observed in the vicinity of the shorelines along the mainland and Georgina Island post-construction. (P. 51)

It is not anticipated that the swimming speeds of fish will be greatly impacted by the predicted post construction changes in current velocity, during their normal movement patterns. This will be analyzed further during future design phases and in consultation with DFO.

The strategic placement of the open bridge segments on the north and south sides of the central causeway, combined with the preliminary mitigation measures noted in **Section 19.1.2** below, should assist in alleviating potential changes to fish movement and migration patterns that could result from the proposed central causeway. This will be investigated further during future design phases.

- Increase in the spread of invasive species (e.g., Phragmites, Starry Stonewort, Round Goby, Zebra Mussel). The Fixed Link may result in an increase in visitors/fishermen to Georgina Island, which could result in accidental introduction of invasive species and lead to a possible reduction in the habitat suitability for fish. Preliminary mitigation measures noted in **Section 19.1.2** below will be investigated further during future design phases and should assist in minimizing this impact.
- Disturbances to fish (e.g., stationary lighting). Stationary lighting along the Fixed Link could attract fish at night and result in a change or disruption to fish movement and/or migration patterns. Preliminary mitigation measures noted in **Section 19.1.2** below, will be investigated further during future design phases and should assist in minimizing this impact.
- Contamination (e.g., road salt). Potential for contamination of fish habitat resulting from road salt and spills, if drainage is not properly contained, treated, and managed. Preliminary mitigation measures noted in **Section 19.1.2** below, will be investigated further during future design phases and should assist in minimizing this impact.

19.1.2 Mitigation Measures

19.1.2.1 Construction

DFO will be further engaged on the preferred alignment early in the Detail Design phase through the submission of a Request for Review (RfR). This will provide a detailed description and specific location of the proposed works along the preferred alignment, a description of the fish habitat (including the more sensitive areas), and the potential effects of the proposed Project on fish and fish habitat, as well as mitigation measures and residual or harmful effects. Once DFO officially confirms that Authorization under the *Fisheries Act* will be required, an Application for Authorization will then be submitted, along with offsetting measures designed to offset or counterbalance the residual or harmful adverse effects on fish and fish habitat that cannot be avoided. The proponent will work closely with DFO early in the Detail Design phase to develop an appropriate Offsetting Plan, which will be needed to acquire the Authorization.

In addition, a preliminary list of mitigation measures that can be applied to address the construction impacts outlined above is provided below. These measures will also help reduce the potential for incidental fish mortality and they will be confirmed and refined as the design progresses. Longer term impacts relating to potential changes in fish and fish habitat and operational impacts are described in **Section 19.1.1.2**.

- Potential use of steel sheet piles or armourstone to the reduce the footprint of some causeway sections found in more sensitive fish habitat and to provide containment of the work zone.
- An ESC Plan will be developed and implemented during all phases of construction and clean-up to prevent sediment laden runoff from entering the lake directly from the construction zone. At a minimum, the plan will address the following elements:

- Disturbed areas / construction zones that drain to the lake will be isolated using standard perimeter silt fencing to isolate the general construction zone up and downstream. The silt fencing will be heavy duty / reinforced fencing, but with no exposed mesh that might entangle wildlife. Silt fencing will be regularly inspected and maintained as required.
- In-water works will be isolated using appropriate techniques to be approved by DFO (e.g., sheet pile, armourstone, turbidity curtain) to maintain clean flow around and outside of the construction area. The isolation measures must adhere to DFO's Interim Standard for in-water isolation. If pumping is required, flow withdrawal hoses will be sited to avoid entrainment of fine sediment off the bed, and discharge hoses sited to prevent bed erosion and downstream sediment transport. Any dewatering pump intakes will be fitted with screens to prevent the entrainment or impingement of fish. All water intake screens must adhere to DFO's Interim Code of Practice: End-of-pipe fish protection screens for small water intakes in freshwater. No dewatering discharge will be released directly to the into the lake without appropriate treatment. Appropriate settling / filtration and energy dissipation measures will be used for discharge to ensure no erosion or sediment release occurs.
- All salvaged or stockpiled materials will be located a safe distance from the edge of the lake and stabilized to prevent migration of any sediment or other material to the lake.
- All work areas or other disturbed surfaces draining to the lake or watercourse and/or in the floodplains will be stabilized and re-vegetated with native species (e.g., native seed mix) as soon as feasible following construction.
- The ESC measures will be left in place, monitored and maintained in proper working order until all disturbed areas draining to the lake are fully stabilized, including establishment of vegetative cover, if required.

- In-water works should take place outside of the in-water work restriction timing window (to be established with MNR and DFO), to protect fish populations during their sensitive life periods (e.g., spawning).
- The contractor shall undertake a fish rescue in the zones isolated for the bridge and causeway works. Fish will be captured using appropriate techniques by a qualified person and transferred unharmed to an appropriate location in the lake. A Licence to Collect Fish for Scientific Purposes (from the MNR) will be obtained for this work.
- No equipment shall enter the lake except as outlined above and stipulated in the contract documents to construct the specified works.
- Activity will be controlled to prevent entry of any petroleum products, debris or other potential contaminants / deleterious substances, in addition to sediment as outlined above, to the lake. Storage, maintenance or refueling or maintenance of equipment will be conducted at least 30 m away from the lake. The Contractor will have an appropriate Spills Management and Response plan in place throughout construction, including spill control and absorbent materials, instructions regarding their use and notification procedures (see Section 20.4.2.5 for more details). Appropriate clearing and disposal of all construction-related debris will occur following construction.

- Every effort will be made to retain and protect as much of the natural vegetation as reasonably possible to help ensure shoreline stability and control erosion, and to expedite the re-colonization of native plant species.
- Construction will be carried out in accordance with the Clean Equipment Protocol for Industry (https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf). Specifically, construction equipment shall be inspected and cleaned prior to arrival on site to ensure non-native and invasive plant species are not being transported to and released on site.
- An experienced environmental inspector will be on-site and responsible for ensuring the ESC measures are functioning effectively and being maintained, and that the other mitigation measures are being implemented as intended.

Potential mitigation measures for noise and vibration impacts will also be identified and could include a restrictive timing window for the works (e.g., pile driving) that may impact fish during their sensitive life stages (e.g., spawning).

19.1.2.2 Operation

Preliminary recommended mitigation measures to minimize longer term and operational impacts to fish and fish habitat are listed below. These measures will be confirmed and refined as the design progresses.

- When developing the future offsetting plan in consultation with DFO, MNR's recommendation to disperse a mix of pea gravel, riverstone, rocks, woody debris and lunker logs in the vicinity of each bridge abutment to support fish spawning, will be incorporated.
- Bridge lighting should be designed to focus on the road and/or pedestrian walkways and should be directed away from the lake.
- Treatment of bridge deck drainage/runoff prior to entry into the lake should limit contamination potential. A plan for winter care of the bridge and causeway road surface should be established to minimize the use of salt.
- Promote educational opportunities (e.g., signage) to minimize the spread of invasive species.
- Incorporate a monitoring program to ensure mitigation measures are effective and incorporate adaptive management, where appropriate. For example, a water quality monitoring program measuring the pre-construction conditions and the post construction conditions along the preferred alignment should be developed and implemented during future design phases.

19.2 Aquatic Species at Risk Protected under the Species at Risk Act

Black Redhorse, a THR species under SARA has been found or potentially found in Lake Simcoe according DFO SAR mapping (DFO, 2024). However, the habitat for this species, "moderate to fast-flowing areas in large warmwater streams" (COSEWIC, 2015), is not found within the study area and this species is not anticipated within the Georgina Island sub-basin, or within the watercourses found in the study area (Cambium 2023b).

Furthermore, the following comment was received from DFO on the draft IPD (2021), "there are currently no aquatic species listed federally under SARA mapped for the proposed Project

locations. Contact Hannah Hancock (Hannah.Hancock @dfo-mpo.gc.ca) for updated information on Aquatic SAR." This will be confirmed again with DFO during future study phases.

At this time, construction of the Project is not anticipated to have any adverse effects on aquatic SAR; therefore, no additional effects to fish and fish habitat or mitigation have been identified.

19.3 Migratory Birds Protected under the Migratory Birds Convention act, 1994

19.3.1 Changes to the Environment

19.3.1.1 Construction

A full list of the bird species (including migratory birds) documented in the study area is provided in the GIFL Terrestrial Existing Conditions Report (Cambium Inc., 2023). Previous sections of this report (i.e., within **Section 14.2.3.1.2**) also summarize key findings relating to existing conditions for avian species, including avian SWH and avian SAR, in the study area.

With the implementation of appropriate mitigation measures during construction, including timing windows for vegetation removal, contractor awareness and encounter protocols, and nest sweeps (where and when appropriate), as further described below, construction of the Project is not anticipated to cause direct mortality to migratory birds, as defined under the *Migratory Birds Convention Act, 1994* (MBCA). However, construction activities are likely to have indirect effects on the suitability of surrounding habitats, due to construction disturbances, loss of habitat and modification of habitats within the study area.

The anticipated and potential indirect effects to migratory birds and their habitat during construction are outlined below. These potential effects will be further described, and quantified to the extent feasible, as the Project progresses through further design stages.

- Loss of habitat as a result of the construction of the Fixed Link.
- Decrease habitat quality as a result of release of construction generated sediment to adjacent retained habitats.
- Decrease habitat quality as a result of contaminants, fuels and other materials that may accidentally reach retained natural areas.
- Changes to drainage patterns (groundwater and/or surface water runoff) that can impact wetland vegetation, and in turn the quality of wetland habitat for migratory birds.
- Introduction of invasive species (e.g., Common Reed [*Phragmites australis*]) that may alter the quality of retained habitats for migratory birds.
- Disturbance (e.g., noise, vibration, dust, lighting, increased human activity / presence) that may temporarily reduce the suitability of adjacent habitats for use by migratory birds.

19.3.1.2 Operation

Operation of the Project has the potential to cause both direct and indirect impacts to migratory birds, as outlined below. Many of these potential impacts cannot be fully predicted or quantified; however, the impacts can be minimized and managed through appropriate design and mitigation measures, which will be developed as the Project progress through the Detail Design phase.

Potential direct impacts to migratory birds include:

- Direct mortality due to collisions with vehicles travelling on the Fixed Link.

Potential indirect impacts to migratory birds include:

- Reduced habitat suitability due to increased light, and noise from traveling vehicles.
- Reduced habitat suitability due to increased stationary lighting on the Fixed Link.
- Reduced habitat suitability resulting from the accidental introduction of invasive species (e.g., Phragmites).
- Potential for contamination of habitat resulting from spills and road salt, if spills and drainage are not properly contained, treated, and managed.
- Potential for ongoing edge effects to fragmented forest habitats on the mainland (e.g., noise, wind, sunscald, invasive species, predation), thereby reducing the quality and availability of interior habitat for area-sensitive bird species.

As noted in **Section 19.1.1**, the Coastal Engineering Report states that “at the southern tip of Georgina Island, the short causeway section is expected to have minimal impact on sedimentation and erosion patterns, as it is adjacent to the ferry landing and marina, which already obstruct sediment transport along the shoreline” (WSP, 2024, p. 84); therefore, notable changes to the characteristics of the wetland in this area are also not anticipated to occur. Likewise, “the proposed bridge section allows sediments to pass through, maintaining eastward sediment transport while allowing the highly dynamic southern tip of Georgina Island to migrate with minimal obstruction. Further south, the longer section of the causeway may block the eastward migration of the Sand Islands and shoals; however, as this section is flanked by open bridge segments on both sides, it is not expected to significantly impact sediment processes near the shorelines or cause noticeable shoreline changes” (WSP, 2024, p. 84). In other words, it is expected that the dynamics of the shoreline and wetland at the southern tip of Georgina Island will continue, and there are only minimal changes to the Sand Islands and shoals anticipated as a result of the Project, thus the impacts to migratory birds and their habitat are expected to be minimal as well.

19.3.2 Mitigation Measures

19.3.2.1 Construction

The development of appropriate mitigation measures for implementation during construction will serve to minimize the potential effects outlined above; however, full avoidance of these indirect effects is likely not possible.

A preliminary list of mitigation measures to minimize direct and indirect effects to migratory birds include the following. These measures will be confirmed and refined as the design progresses.

- Follow all measures outlined in **Section 19.1.2** for the protection of aquatic habitat to protect migratory bird habitat associated with the Lake Simcoe.
- Keep vegetation removals to a minimum and clearly delineate removal limits on contract drawings and in the field to avoid unnecessary disturbances to retained natural areas.
- Employ appropriate vegetation clearing techniques (e.g., trees to be felled away from retained natural areas, trimming of damaged branches and roots).

- Require that all construction machinery arrives on site in a clean condition and working order, and will be maintained free of fluid leaks, invasive species and noxious weeds. The Clean Equipment Protocol for Industry will be adhered to.
- Require that all equipment maintenance and refueling take place at a designated and properly contained maintenance area.
- Implement dust control using water, not chemical suppressants.
- Schedule vegetation clearing (including grubbing and tree / shrub / grass removal) and any construction activities in areas where migratory birds might nest (e.g., in culverts) outside of the Regional Nesting Period (approximately April 1 to August 31). The Contractor will be made aware that occasionally bird species will precede or exceed this core nesting period.
- No active nests of migratory birds will be removed, or birds or nests disturbed in accordance with the MBCA.
- The Contractor will be advised that all temporary brush piles and loose soil piles should be tarped or otherwise inspected regularly to prevent nesting as they provide potentially suitable nest sites for some species.
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing in that area might result in a contravention of the MBCA (i.e., potential harm or stress to nests, birds, eggs, or young), all activities must cease, and the Contract Administrator notified immediately.
- Any wildlife incidentally encountered during construction will not be knowingly harmed or harassed and will be allowed to move away on its own.

19.3.2.2 Operation

The development of appropriate mitigation measures will serve to minimize the potential effects to migratory birds and their habitat during operation; however, full avoidance of these effects is likely not possible. A preliminary list of mitigation measures to minimize the direct and indirect effects to migratory birds is provided below. These measures will be confirmed and refined as the design progresses and though any permitting processes relating to avian SAR.

- Incorporate stationary lighting designs that consider the effects to adjacent wildlife habitat (e.g., use of ‘full cutoff fixtures’ that place light directly on the road surface with no upward directed lighting and/or smart lighting that dims or turns off when not needed).
- Consider other design measures that could assist with minimizing noise and light disturbances to adjacent habitat (e.g., barriers).
- Incorporate appropriate salt management and SWM treatment measures into the design (e.g., use of oil-grit separators, bioswales, direct run-off away from retained natural areas).
- Incorporate mitigation measures to minimize edge effects, in particular edge effects to forest communities (e.g., edge plantings to help ‘seal’ the new forest edge).
- Incorporate a monitoring program to ensure mitigation measures are effective and incorporate adaptive management, where appropriate.

20. CHANGES TO ENVIRONMENT ON FEDERAL LANDS AND ELSEWHERE

A description of any changes to the environment that, as a result of carrying out the project, may occur:

- On federal lands
- In a province other than the province in which the project is proposed to be carried out; and
- Outside of Canada

Besides GIFN's reserve lands (**Section 13**), which are federal lands within the meaning of the IAA, there are no known federal lands within the local study area for the Project and the Project is not in proximity to the boundaries of another province or country. As a result, no changes to the environment are expected to occur on federal lands, in a province other than the province in which the Project is proposed to be carried out, or outside of Canada.

For due diligence, the following sections describe potential environmental effects that may occur within the province as a result of carrying out the Project, noting that potential effects within the federal government's mandates are described in Section 19 and are not repeated here.

20.1 Bedrock and Soils

20.1.1 Changes to the Environment

Based on a preliminary review of available geotechnical and geophysical data, it is anticipated that bridge piers will be installed in bedrock and that bedrock is shallow or exposed at the study area. Construction of pier foundation will have impact on the lakebed; however, there are available construction methods that can minimise the effects and limit it to the footprint of foundation. For example, the construction of foundation could be done by using liner for caissons (deep foundation) or sheet piling around the spread footing (shallow foundation). Therefore, the disturbance could be confined to the footprint of foundation.

On land, there will be soil disturbance during construction, for example during clearing, grubbing, topsoil stripping and grading for the new road and temporary workspaces. Such construction can also result in damage or loss of soils through compaction, admixing and rutting. Construction activities are expected to accelerate natural processes of erosion where vegetation is stripped away and soil is left exposed. As well, if shallow overburden is encountered, disturbance during construction may cause soil erosion and slumping that may require rehabilitation, specifically in the steep area adjacent to the river.

Accidental spills or leaks of contaminants during construction or operation could adversely impact soil quality.

Potential effects on bedrock and soils will be further determined following the completion of the Geotechnical and Geophysical Investigation Programs. Similarly, requirements to manage excess soils, and address the potential to encounter or disturb contaminated soils or sediments, will be informed by these programs and appropriate quality sampling, as discussed in Section

24, to determine types of waste and how the contractor will need to mitigate and manage such materials to prevent further dispersion and identify approved disposal methods.

No additional types of impacts to bedrock and soils are anticipated during Project operations.

20.1.2 Mitigation Measures

Implementation of adequate water quality controls at construction sites is crucial to ensuring downstream receiving waters and aquatic habitats are adequately protected. Proper planning, scheduling, and maintenance will also be a key factor in ensuring the effective control of erosion and sediment from a construction site. This includes measures such as the phasing of construction activities to ensure that land is left exposed for the minimum amount of time necessary.

In addition to the ESC methodologies highlighted in the following sections, the following precautions will be taken as a minimum during construction to mitigate impacts on the environment:

- Construction activity will be confined to designated work areas (includes access roads, maintenance areas, parking areas and haul routes). Areas on which no work is designated will be protected with suitable barricades.
- A Spills Management and Response Plan will be developed and will include a spills containment kit for fuels and any other potentially deleterious substances will be on site and immediately available, and all employees will be trained in the proper spill cleanup procedure. The kit will consist of, at the least, sufficient absorbent boom and swabbing material to initially contain a spill as well as protective gear for handling of hazardous chemicals. See section 20.4.2.5 for more details.
- Clearing, grubbing and topsoil stripping will only be performed immediately prior to commencing work in those areas. Work areas will be stabilized as soon as possible after work has been completed.
- Drainage ditches and other watercourses for surface water drainage will be properly maintained during construction, incorporating appropriate sediment retention measures.
- Equipment maintenance (fueling, cleaning, etc.) will be done in designated areas. No refueling will take place closer than 30 m from the watercourse. Equipment (including empty fuel or other containers) cannot be cleaned in the watercourse. Excess fuels, lubricants, pesticides, and other supplies will be removed from the site and disposed of in an approved manner.

Erosion Prevention Practices

Terrestrial construction is defined as any work that will occur on the mainland and Georgina Island. The following sections describe possible ESC practices that may be required for terrestrial construction.

This category is the first line of defense and includes measures that are intended to provide stabilization of exposed soils that will be implemented during construction on the mainland and island to prevent erosion, and thereby decrease the amount of sediment suspended in stormwater runoff from the site.

Measures that will be implemented to protect soil integrity and prevent erosion include the following:

- Minimize clearing during construction.
- Retain native vegetation in and around project activity and minimize soil disturbance as much as possible to prevent germination and establishment of invasive species.
- When undertaking activities such as stripping or excavating, remove and store topsoil separately; do not handle topsoil in wet or frozen condition; and replace excavated soil in the same order after excavation (topsoil nearest the surface).
- Remove all waste materials and ensure the site is reinstated to its original conditions, or better at the end of the work.
- Restoration activities will include the restoration of both topsoil and native vegetation.
- Revegetate as soon as possible within the growing season.
- If unfeasible, stabilize disturbed areas with erosion control blankets to keep the soil in place and prevent erosion in water bodies. Leave blankets in place until immediately before the commencement of revegetation work.

Sediment Control Practices

This category is the second line of defense after erosion prevention and includes measures that will be implemented during construction on the mainland and island to mitigate against erosion and prevent sediment-laden storm runoff from being conveyed off-site and into Lake Simcoe.

Sediment control practices may include the following:

- Sedimentation pond during construction prior to releasing into the lake
- Use of sedimentation fence (silt fence). Specifications indicated in **Section 19.1.2** should be considered to avoid wildlife entanglement.
- Use of Oil-Grit Separator during construction prior to releasing into the lake

In addition, mitigation measures in **Section 19.1.2** should be considered to avoid negative impacts to fish and fish habitat.

20.2 Natural Environment

The Project largely falls within federal lands in the form of First Nation Reserve Lands, including Georgina Island and Sand Islands, or First Nation-owned lands, i.e., land owned by GIFN, which include Bayvista Property and the West Property. Therefore, in addition to the potential effects discussed in **Section 19** (i.e., changes to fish and fish habitat, aquatic SAR and migratory birds), there is potential for other changes to natural environment features and functions on federal lands as a result of the Project. These include potential impacts to designated natural areas, potential impacts to vegetation communities including loss of wetlands and wetland function, and potential impacts to wildlife, wildlife habitat, SAR and culturally significant species. These potential impacts are summarized at a high level in the following sub-sections.

20.2.1 Designated Natural Areas

20.2.1.1 Changes to the Environment

The Project has the potential to affect various features and functions of the following Designated Natural Areas:

- Georgina Island PSW Complex
- Virginia Beach Wetland Complex (non-PSW)
- Stratum 2 Deer Wintering Area (i.e., SWH)
- Sibbald Point Provincial Park (Recreation Class)
- Greenbelt Policy Area (2017) (protected countryside – mainland only)
- Growth Plan for the Greater Golden Horseshoe (2019) (mainland only)

The Project will not have a direct effect on Sibbald Point Provincial Park as the preferred alignment is located approximately 500 m east of the park boundary. Likewise, the Virgina Beach Wetland Complex (non-PSW) overlaps the Bayvista Property, therefore the project will not have a direct effect on these mapped wetlands.

To avoid repetition, potential effects to various features (e.g., vegetation, wildlife, SWH, SAR) that are part of the Designated Natural Areas are discussed in the following sections.

20.2.1.2 Mitigation Measures

Effects to the designated natural areas will be avoided or minimized to the extent possible. As the design progresses, opportunities to refine the design to minimize effects, will be incorporated, as feasible. To avoid repetition, the mitigation measures to address those impacts, are discussed in the following sections.

20.2.2 Vegetation Communities (including Wetlands) and Flora

20.2.2.1 Changes to the Environment

Construction: The Project construction will result in the direct removal of vegetation communities, including wetlands. Opportunities to refine the design to minimize direct impacts to the more sensitive vegetation communities and wetlands will be incorporated as the design progresses. Direct effects to these features will be quantified during the Detail Design phase (e.g., the area of each vegetation type to be removed), and associated mitigation, restoration and/or compensation measures will be confirmed at that time, primarily in relation to federal permitting processes (e.g., quantifying SAR habitat impacts).

There is also potential for indirect effects to retained vegetation communities, wetlands and flora during construction. These include, but are not limited to:

- Release of construction-generated sediment to adjacent habitats.
- Vegetation clearing / damage beyond the working area.
- Spills of contaminants, fuels and other materials that may reach natural areas.
- Changes in drainage patterns (groundwater and/or surface runoff flow) that can impact dependent vegetation / wetland areas located either upgradient or downgradient. Blocking of

existing surface / subsurface drainage patterns can result in upstream and downstream vegetation dieback / condition changes. An increase in downstream runoff can result in erosion impacts on receiving vegetation.

- Spread of invasive species from within or off-site due to un-clean construction equipment.
- Edge effects resulting from the exposure of a new forest edge.

Operation: Project operation and maintenance has the potential to have ongoing effects to the retained vegetation communities, wetlands and flora. These include, but are not limited to:

- Damage from excessive or improper application of herbicides and pesticides for maintenance requirements.
- Damage to adjacent natural vegetation from roadway maintenance activities, such as salting and sanding, structure repairs, and ditch cleanout.

As noted in **Section 14.2.3.2.3**, most of the native vascular plant species documented within the study area are considered to be common or secure in the province (i.e., ranked S4 or S5), except for two vascular plant SAR: Black Ash and Butternut. These, and other SAR, are discussed in **Section 20.2.5**.

20.2.2.2 Mitigation Measures

Construction: Standard mitigation measures will be employed during construction to minimize the indirect effects to vegetation, including, but not limited to:

- Complete wetland and woodland staking and have the limits surveyed. Accurate features limits will be used to inform the detail design, permitting and any habitat compensation that may be required.
- Minimize the extent of construction-related disturbance. Defined construction access areas will be delineated to prevent unnecessary disturbance.
- Install temporary vegetation and tree protection measures (e.g., temporary fencing) to protect vegetation that does not require removal for purposes of the construction.
- Employ appropriate vegetation clearing techniques (e.g., felling trees away from retained natural areas).
- Avoid unnecessary traffic, dumping and storage of materials over tree roots.
- Develop and implement appropriate spills prevention measures and a Spills Management and Response Plan, including spill control and absorbent materials, instructions regarding their use and notification procedures. The plan will be maintained on-site at all times, and all personnel will be familiar with its implementation. No storage, maintenance or refueling of equipment will be permitted near natural areas.
- Require that vehicles, machinery, and heavy equipment arrive on-site in clean condition, including free of mud / soil / dirt from other locations and including clean wheel / tire / tracks, and will be maintained free of fluid leaks. To reduce the spread of invasive species, equipment will be thoroughly cleaned before being brought onsite and before leaving the site in accordance with the Clean Equipment Protocol.
- Implement edge management measures (e.g., planting to ‘seal’ the new forest edge), where appropriate.

- Review opportunities for restoration of retained natural areas and/or habitat creation / compensation measures. These may be required as part of federal permitting for SAR.

Operation: The potential effect of the Project operations on vegetation can be managed through design-related mitigation measures, including the following:

- Incorporate appropriate salt management and SWM treatment measures (e.g., use of oil-grit separators, bioswales, direct run-off away from retained natural areas).
- Incorporate vegetated filter strips wherever feasible.

20.2.3 Wildlife and Wildlife Habitat

20.2.3.1 Changes to the Environment

Construction: Potential construction effects on wildlife habitat are generally similar to those discussed for the vegetation communities, consisting of direct and indirect effects to habitat features (e.g., woodlands, wetlands, meadows), and temporary construction-related disturbance effects. The Project may also impact wildlife movement opportunities on the mainland with the introduction of a new north-south road. In addition, there is potential for incidental encounters with wildlife during construction. Opportunities to minimize impacts to wildlife and wildlife habitat through design measures will be integrated, as feasible.

Operation: Operation of the Project has the potential to have an ongoing effect to wildlife and wildlife habitat, including the following:

- Damage to adjacent natural habitats from roadway maintenance activities such as salting and sanding, structure repairs, and ditch cleanout.
- Increased wildlife-vehicle collisions as a result of a new north-south roadway and the Fixed Link infrastructure.
- Sensory disturbance through ongoing noise and lighting effects.
- Disruption of animal movement patterns.

20.2.3.2 Mitigation Measures

Construction: The mitigation measures outlined for reducing effects to vegetation and vegetation communities also apply to wildlife habitat, generally (e.g., minimize areas of disturbance, implement a Spills Prevention and Response Plan, implement edge management where appropriate). Additional wildlife-specific measures that will be employed during construction include, but are not limited to:

- Implement measures for the protection of migratory birds (see **Sections 19.3.2)**.
- Implement wildlife crossing structures, if feasible.
- Incorporate wildlife fencing to direct wildlife to crossing structure(s).
- Any wildlife incidentally encountered during construction will not be knowingly harmed and will be allowed to move away on their own. If they do not, the environmental inspector will capture and release any small wildlife (e.g., amphibians) stranded within the construction zone. If the animal is injured, a wildlife rehabilitator will be contacted.

- Install temporary ESC fencing to protect the adjacent watercourses and terrestrial / wetland habitats that will also function generally as exclusion fencing for turtles (or other small animals) that may inadvertently enter into the construction areas.

In addition, the Contractor will submit an Information Gathering Form (IGF) to the MECP's Species at Risk Branch to assess whether the Project will have impacts on the provincially-listed SAR and their habitat, and to provide further guidance to ensure the Proponent has fulfilled its due diligence.

Impacts and mitigation measures relating to specific SWH features and SAR are discussed in subsequent sections.

Operation: Design-related mitigation measures will be incorporated to manage these and other effects; these will be further refined at future study phases. Examples of measures to be included are:

- Implement wildlife crossing structures or designated terrestrial passages, where feasible.
- Incorporate wildlife fencing to direct wildlife to crossing structure(s).
- Incorporate stationary lighting designs that consider the effects to adjacent wildlife habitat (e.g., use of 'full cutoff fixtures' that place light directly on the road surface with no upward directed lighting and/or smart lighting that dims or turns off when not needed).
- Consider other design measures that could assist with minimizing noise and light disturbances to adjacent habitat (e.g., sound barriers).
- Incorporate appropriate salt management and SWM treatment measures (e.g., use of oil-grit separators, bioswales, direct run-off away from retained natural areas).
- Incorporate mitigation measures to minimize edge effects in particular edge effects to forest communities (e.g., edge plantings to help 'seal' the new forest edge).
- Incorporate a monitoring program to ensure mitigation measures are effective and incorporate adaptive management, where appropriate.

20.2.4 Significant Wildlife Habitat

20.2.4.1 Changes to the Environment

Construction: SWH are features that are afforded protection under the PPS, issued under the *Planning Act* in Ontario. Although the province does not have jurisdiction over federal lands, GIFN choose to study and evaluate SWH features to better inform the Project and enhance the overall understanding of the natural features and functions of the study area. As summarized in **Section 14.2.3.2.7**, several confirmed and candidate SWH features were identified within the study area, including:

- Amphibian Breeding Habitat (Woodland) – Confirmed
- Amphibian Breeding habitat (Wetland) – Confirmed
- Bat Maternity Colonies – Candidate
- Colonially-Nesting Bird Breeding Habitat (Ground) - Confirmed
- Colonially-Nesting Bird Breeding Habitat (Tree/Shrub) – Candidate

- Marsh Bird Breeding Habitat – Candidate
- Raptor Wintering Area – Candidate
- Reptile Hibernacula - Candidate
- SC and Rare Wildlife Species – Confirmed (Black Tern, Great Egret, Snapping Turtle, Eastern Wood-pewee, Wood Thrush, Monarch, Yellow-banded Bumblebee)
- Terrestrial Crayfish – Confirmed
- Turtle Nesting Area – Candidate
- Turtle Wintering Area – Confirmed
- Woodland Area Sensitive Bird Breeding Habitat – Candidate
- Waterfowl Stopover and Staging Areas (Aquatic) – Confirmed
- Deer Wintering Habitat (Stratum II) – Confirmed by provincial mapping

The development of two alignment alternatives that largely avoid the Georgina Island PSW Complex to the south of Georgina Island served to greatly minimize the potential for effects to a number of these SWH features that are associated with the Georgina Island PSW Complex. However, the preferred alignment does still result in potential for minor direct and indirect effects to the edge of the Georgina Island PSW Complex and may therefore also effect the associated SWH. The preferred alignment also has potential to have effects on the SWH features located on the West Property. The SWH features that have potential to be directly affected include:

- Amphibian Breeding habitat (Wetland) – Confirmed
- Bat Maternity Colonies – Candidate
- Colonially-Nesting Bird Breeding Habitat (Ground) - Confirmed
- Colonially-Nesting Bird Breeding Habitat (Tree/Shrub) – Candidate
- Marsh Bird Breeding Habitat – Candidate
- Raptor Wintering Area – Candidate
- Reptile Hibernacula - Candidate
- SC and Rare Wildlife Species – Confirmed (Black Tern, Great Egret, Snapping Turtle, Eastern Wood-pewee, Monarch, Yellow-banded Bumblebee)
- Turtle Wintering Area – Confirmed
- Woodland Area Sensitive Bird Breeding Habitat – Candidate
- Waterfowl Stopover and Staging Areas (Aquatic) – Confirmed
- Deer Wintering Habitat (Stratum II) – Confirmed by provincial mapping

These effects may be further quantified during future design phases. Opportunities to refine the design to minimize effects to some SWH features will be explored through the design process.

Operation: Additional types of potential effects of the Project on SWH features and functions are not anticipated beyond those identified for construction.

20.2.4.2 Mitigation Measures

Many of the mitigation measures outlined previously for vegetation, wildlife and wildlife habitat, and SAR will serve to mitigate the potential effects to SWH as well. These will be further refined as the design progresses and through the permitting process for SAR since many of the SAR habitats overlap with SWH features.

20.2.5 Species at Risk

20.2.5.1 Changes to the Environment

As summarized in **Section 14.2.3.2.8**, there were 11 federally and/or provincially protected (i.e., END and THR) SAR observed in the study area during Cambium's 2022 and 2023 field surveys or confirmed through background data review and agency consultation. The Project's direct and indirect effects to SAR and SAR habitat will be determined and quantified during Detail Design, and as part of federal SARA permitting processes.

20.2.5.2 Mitigation Measures

It is anticipated that a SARA permit will be required for several of the species that have been confirmed and whose habitat or individuals may be impacted by the Project. Permitting, including mitigation and compensation measures, will be determined in consultation with ECCC during the Detail Design phase.

It is expected that the mitigation required will include measures such as the following:

- Ensure the development of an avoidance and mitigation plan by a qualified biologist in accordance with all relevant legislation if the work proposed may impact a SAR species protected under federal or provincial law.
- Train all contractors in a site-specific SAR awareness.
- Ensure the work area is surveyed by a person trained in SAR identification prior to start-up to validate SAR absence. Further measures may be needed to continue the activity.
- In the event a SAR is encountered in the work area, allow it to move out of the work area voluntarily (without harassment). If it does not move, and construction activities would result in harm or disturbance to the animal, stop all activities and notify the qualified biologist (who may consult ECCC to discuss mitigation options).
- Prior to the control of undesirable vegetation / nest / small animal, ensure compliance of the activity under the SARA and the Ontario *Endangered Species Act, 2007*, the MBCA, and the Ontario *Fish and Wildlife Conservation Act*.
- Protect any federally or provincially protected tree species (seedling, sapling or tree). Implement all necessary protective measures, such as flagging the tree or installing protectors at the dripline or critical root zone (CRZ) of the tree, whichever is greater. Never prune or cut these species or trees without authorization from ECCC. Any flagging tape and protection measures used must be removed once work is completed.
- The location of or information related to SAR or sensitive ecological areas (e.g., nests, roosts or dens) is never to be disclosed to the public without ECCC authorization.

20.2.6 Culturally Significant Species

As summarized in **Section 14.2.4**, a list of culturally significant species was developed for the Project by CIPS, through direct engagement with the GIFN community, including verbal and written conversations with community members, staff, leadership, and summer students.

As these culturally significant species are plants and wildlife species, the previous sections that outline impacts to vegetation and wildlife (i.e., **Sections 20.2.2** and **20.2.3** and the associated mitigation measures, also apply to the culturally significant species.

20.2.7 Invasive Species

20.2.7.1 Changes to the Environment

The Project may result in additional, unwanted invasive species having easier access to Georgina Island or the West Property, and invasive species may be introduced during construction. Invasive species may have harmful impacts on culturally significant species and native species and habitats.

During operation, the Fixed Link may allow easier access for vehicles to travel back and forth; thus, allowing invasive species to travel more freely (e.g., on equipment and vehicles), than the Aazhaawe Ferry does.

Although works and studies have clearly indicated the island community is currently battling many invasive species, adding to the total number, type, and diversity of invasive species on the small land base of Georgina Island is of significant concern to existing resources.

20.2.7.2 Mitigation Measures

During construction, the contractor should follow best management practices such as:

- Train workers to identify the exotic invasive species present on site.
- At the start-up meeting, make the workers aware of the presence of invasive plants and the procedures they need to follow to prevent the spread of invasive plants.
- Identify the zones where invasive plant species are located prior to the commencement of work to prevent workers from entering those areas unnecessarily, and to ensure that appropriate procedures are followed to prevent the spread of invasive species in cases where they do enter those zones.
- If invasive species need to be disturbed, removed or trimmed, implement relevant best practices from the Ontario Invasive Plant Council for removal and disposal.
- Ensure management plans are consistent with federal standards under the federal Invasive alien species strategy (https://www.canada.ca/en/environment-climate-change/services/biodiversity/invasive-alien-species-strategy.html) (Environment Canada, 2004).
- Remove invasive plant species. Follow the Best Management Practices (https://www.ontarioinvasiveplants.ca/resources/best-management-practices/) for invasive alien plants established by the Ontario Invasive Plant Council.
- Before entering or leaving an area infested with invasive species, apply the procedures in the:

- Clean Equipment Protocol for Industry.
- Best Management Practices for Preventing the Spread of Aquatic Invasive Species

20.3 Groundwater / Hydrogeology

20.3.1 Changes to the Environment

As mentioned in Section 14.3, the project site overlaps with an HVA, an SWPA, and an IPZ-3, as such, both the surface water and groundwater could be easily exposed to contamination from human activities or natural processes; thus, activities such as the handling and storage of fuel and DNAPLs, and the handling, storage and application of road salt could impact water quality and introduce moderate drinking water threats during construction and operation.

Based on the existing conditions described in **Section 14.3** and **Appendix W**, excavations at the study area are expected to encounter groundwater. The hydraulic conductivity of the sandy soils of the overburden could allow for substantial groundwater inflow to an excavation, which contacts the aquifer materials. Under this assumption, excavations to a depth of > 2 mbgs may encounter groundwater inflow and dewatering of the aquifer below the excavation will be required to ensure excavation stability.

Due to the specific hydrogeological setting of the study area, detailed site-specific and Project-specific hydrogeological field investigations are required to sufficient lateral and vertical extents to understand the relationship between the proposed development and local groundwater and soil/ bedrock conditions. In particular, the impact of groundwater and potential proximity of the sandy aquifer must be addressed to ensure that the development does not result in temporary (i.e., construction) or long-term unstable conditions due to the proposed earthworks or built structures. These studies are being conducted in collaboration with the geotechnical, surface water and ecological disciplines. The Preliminary Hydrogeological Study provided recommended further hydrogeological investigations, which can be found in Section 5.1 of **Appendix W.**

Once the preferred construction methodology is selected, the detailed hydrogeological study will assess potential effects to existing hydrogeological resources resulting from the need to dewater during construction. Should the proposed development require temporary or permanent dewatering and/or groundwater or surface water diversion, site-specific investigations will assess the impacts of the dewatering and/or diversion on the local natural and built environments.

During dewatering, discharge water may be released to the environment. An uncontrolled discharge of water during dewatering could cause localized downstream flooding, erosion or sedimentation. Dewatering may be necessary to construct the bridge piers and abutments; the extent of this will be determined through further study.

Domestic groundwater wells were identified within the study area. Groundwater is used for potable water supply and therefore impacts to groundwater users is possible; however, groundwater dewatering is not anticipated to affect any groundwater drinking water supply sources in study area. This will be confirmed with the findings of the ongoing studies, and mitigation recommended if effects to water supply (e.g., quantity) are identified.

20.3.2 Mitigation Measures

For permanent installation of services or foundations that are below the water table, proper precautions should be taken to avoid uplift, groundwater channelization or instability. If foundation drainage systems (active or passive) are proposed, the potential groundwater quantities diverted through them should be assessed.

The ongoing site-specific investigations that will determine the baseline pre-construction conditions will also help to identify proposed mitigation strategies to address potential impacts. Specifically, permitting requirements, both for the water taking and for the water disposal and discharge, will be confirmed based on the results of the site-specific investigations. For construction dewatering projects, the MECP requires that water takings greater than 50 m^3/day and less than 400 m^3/day be registered online through the Environmental Activity and Sector Registry (EASR) system. For construction dewatering of more than 400 m^3/day and for long-term discharges of more than 50 m^3/day, a PTTW from the MECP is required. Depending on the receptors, water disposal/discharge may require permitting from the appropriate agencies.

Appropriate mitigation measures will be identified as a required part of the permit application process and installed during isolation and dewatering activities to manage discharge water, including appropriate ESC measures and ensuring that discharge water is properly filtered (i.e., filter bags, discharge across grassed areas, check dams) prior to discharge to Lake Simcoe. Conditions of such permits will be included as mitigation and monitoring requirements for the Project construction.

Should excavation work be necessary at depths that may interfere with underground aquifers associated with neighbouring water wells, mitigation will include advising neighbours that temporary compensation of water will be supplied and follow up assessment of groundwater quality will be provided in order to ensure that water quality returns to previous levels, levels that are in compliance with provincial acts (i.e., the Ontario *Clean Water Act*) and federal guidelines (Canadian Drinking Water Quality Guidelines).

The study area includes two surface water features (i.e., Black River tributaries) and border areas within the regulation limits of LSRCA. While the LSRCA has indicated that it is not a regulatory authority for this project, it will continue to be consulted regarding recommendations for development proposed within its limits. The Contractor and ultimate owner will also be required to review the LSRCA's "Guidance for the protection and restoration of significant groundwater recharge areas (SGRAs) in the Lake Simcoe watershed" (LSRCA, 2014) to confirm that the appropriate recommendations for the protection of SGRAs are implemented.

As well, the South Georgian bay Lake Simcoe Source Protection Region Source Protection Plan's policies will be reviewed to confirm that relevant activities (e.g., relating to the handling, storage, and application of road salt, storage of snow, handling and storage of fuel and DNAPL, and water taking) will be adhered to during construction and operation.

20.4 Stormwater / Drainage

20.4.1 Changes to the Environment

There is a potential for impacts to stormwater quality as a result of oil, grit, and other contaminants, such as salt or other de-icing agents, contacting surface water on the road,

causeway, bridge or other surfaces. It is understood that the environmental impact of the Fixed Link on Lake Simcoe is a concern to many stakeholders and must be well understood. This includes a need to consider the effects of climate change on the Project (e.g., potential for need to manage higher intensity rainfall scenarios) and during the design phase.

The drainage design for the Fixed Link includes three separate stormwater treatment processes.

Firstly, the portion of the causeway located on the mainland and the south half of the bridge will be drained through ditches where possible and storm sewers west to the mainland. The drainage network on the bridge will be installed under the superstructure to collect and convey runoff. Stormwater shall be treated via a 'treatment train', which shall include a hydrodynamic separator upstream of a bioswale (or other bioretention Low Impact Development [LID]) located within the West Property and then released into the lake. The hydrodynamic separator removes heavier particulates and oils while the bioretention system provides filtration, polishing, and partial infiltration of stormwater runoff prior to discharge.

Separately, stormwater on the north half of the bridge and the causeway would drain through storm sewers prior to being treated with a hydrodynamic separator and filter treatment unit and then releasing it into the lake through an outlet located between the Sand Islands and Georgina Island.

Lastly, stormwater on the approach to the island itself would drain through storm sewers prior to being treated with a hydrodynamic separator and bioswale and then released into the lake through an outlet located on Georgina Island.

With these three treatment processes, the amount of oil, grit, and other contaminated runoff outletting to Lake Simcoe will be reduced to or below the acceptable minimum.

From discussions with the GIFN community members and from prior investigations, it is understood that scour, the impact of ice, shoreline stability, and erosion and sedimentation are also concerns in proximity to the lake. The outlet from the bridge into Lake Simcoe will be coordinated with drainage, environmental and geotechnical considerations in mind to ensure that the final design has considered and addressed these elements of concern.

Consultation with the MECP and stormwater management staff at LSRCA will collaboratively assist in informing the design on best management practices to support the high degree of water quality sought on this Project.

20.4.1.1 Climate Change Considerations

The following considerations will be implemented during the design phase to assess the capabilities of the system during higher intensity rainfall scenarios.

Rainfall Intensity-Duration-Frequency (IDF) curves serve as an important tool in the design of stormwater management (SWM) infrastructure. In Canada, development of IDF curves relies on historical rainfall records from ECCC's weather station network with the key underlying assumption that the locally observed (historical) rainfall characteristics do not change over time; this assumption is termed stationarity. This implies that the current hydrologic processes represent future patterns in rainfall; however, there is strong evidence supporting the non-stationary hypothesis inferring that stormwater infrastructure designed for today may experience

non-satisfactory operational conditions in the future. In recognizing climate change, it becomes imperative to consider and account for climate change to better design for the future.

Climate models, also known as General Circulation Models (GCMs), are important tools for improving our understanding of climate change under a range of future emissions scenarios. These emissions scenarios are known as Representative Concentration Pathways (RCPs) and provide a way to incorporate future climate projections into IDF curve generation. Climate change projections are founded on four scenarios of future GHG concentrations known as RCPs. The RCPs provide a range of possible trajectories of how global land-use and emissions of GHGs and air pollutants may change throughout the 21st Century (IPCC, 2013). The climate scenarios considered in this assessment are:

- RCP 4.5: represents an intermediate, stabilized GHG trajectory; and
- RCP 8.5: represents the most carbon intensive pathway ("business-as-usual").

To assess the sensitivity of stormwater system design under a range of potential future climate scenarios, modified IDF curves that incorporate climate change projections will be used. This sensitivity analysis will be in addition to the approaches required by the Town of Georgina and the LSRCA.

The sensitivity analysis was based on the following:

- Local/Municipal IDF Curves: Obtain municipal IDF curves to determine design objectives.
- Asset Service-Life: Based on data from Statistics Canada (2018), determine the expected service-life of the stormwater system assets.
- ECCC Data: Obtain the annual maximum series (AMS) for the ECCC station nearest to the Project site location.
- Future Period Climate Projections: Obtain climate projections for a 30-year future time-period that aligns with the expected service-life (Step 2) of the stormwater system. Two potential future time-periods are as follows:
    - 2050's: period between 2041 and 2070 to represent the "near future".
    - 2080's: period between 2071 and 2100 to represent the "distant future".
- Obtain climate projections under RCP4.5 and 8.5 climate scenarios.
- Updated IDF Curves: Using a scaling methodology, update IDF curves for the ECCC station (Step 3) for the future time-period and climate scenarios (Step 4).

20.4.2 Mitigation Measures

20.4.2.1 Stormwater Management

At this time, it is anticipated that underground servicing will be necessary to provide any storm system required to augment the drainage of the rural road and open ditches, and not include watermains or sanitary sewers. Stormwater management considerations may be necessary to address runoff from the road and open ditches, potentially including small roadside pond(s) and pre-treatment to protect downstream waters such as Lake Simcoe.

Safe management and treatment of stormwater runoff is an essential part of providing protection of Lake Simcoe and the surrounding natural environment. The Stormwater Management (SWM)

strategy for the Project will therefore intend, at a minimum, to meet the requirements highlighted in the provincial and municipal design guidelines. As such, the following design guidelines will be met, as a minimum, as part of the Project:

- Development Design Criteria and guidelines of the Town of Georgina as well as the criteria set out in the Georgina Comprehensive Stormwater Management Master Plan.
- Criteria outlined in the LSRCA 2016 Technical Guidelines for Stormwater Management Submissions.
- 2009 Lake Simcoe Protection Plan (LSRCA).
- The MECP 2003 Stormwater Management Practices – Planning and Design Manual, (formerly Ministry of Environment).

As well, the South Georgian bay Lake Simcoe Source Protection Region Source Protection Plan's policies will be reviewed to confirm that relevant activities (e.g., relating to the handling, storage, and application of road salt, storage of snow, handling and storage of fuel and DNAPL, and water taking) will be adhered to during construction and operation.

20.4.2.2 Quantity Control

As the lake is an extremely large body of water and not sensitive to volume changes and given there is no municipal storm infrastructure used in discharge, no quantity control requirements have been identified for this Project provided all other related criteria (scour, erosion) have been satisfied.

20.4.2.3 Quality Control

As required by local and provincial guidelines, an "Enhanced" (level 1) water quality control (equivalent to a minimum 80% TSS (Total Suspended Solids) removal standard) and a removal of 80% of the annual Total Phosphorus (TP) load from all impervious areas will be achieved by the Project.

To achieve such performance, it is anticipated that a treatment train composed of either (1) an Oil-Grit-Separator (OGS) with extended oil storage system (see **Figure F-1** below) in conjunction with a filter treatment unit (see **Figure F-2** below) or (2) an OGS with extended oil storage system in conjunction with a bioswale be used on the Project.

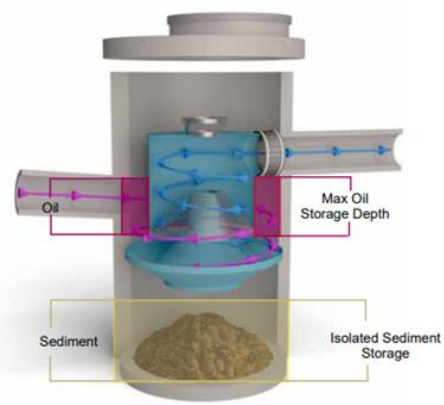


Figure F-1 Oil-Grit-Separator

Figure F-2 Filter Treatment Station

20.4.2.4 De-Icing Methodology and Salt Management

De-icing material will be used on the top surface of the bridge and causeway to reduce the potential of deterioration due to salt application. A very commonly used de-icing material is sodium chloride (commonly known as road salt). The sensible and conservative use of sodium chloride is recommended by the MECP, as well as other de-icing compounds. The following operational guidelines are recommended for the maintenance of the future infrastructure:

- Reduce de-icing chemical application rates to the minimum amount necessary to successfully perform the job;
- Employ rate-controlled distribution equipment which applies the de-icing chemical at the proper rate, regardless of the vehicle's speed; and

- Where salt/sand mixtures are applied, incorporate into the admixture only enough salt to achieve the desired results.

In certain municipalities, other elements are added to de-icing material to achieve a certain goal; however, sodium chloride and certain rock salt additives may be environmentally hazardous. Rust inhibitors (e.g., hexavalent chromium) can impair water quality and should not be used. Ferric ferrocyanide, commonly added as an anti-caking agent, has not been proven hazardous in the small quantities found in road salt. Alternatives to using sodium chloride exist however the choice of de-icing material should be carefully considered. A summary of the impacts of two alternatives, calcium magnesium acetate and calcium chloride, are explored below. Although this summary explores the standalone material, it may be more effective to use a blend of the compounds during treatment.

Other chemical substances such as nitrates and phosphates (for example, urea) and organic substances such as methanol, alcohol, or ethylene glycol present hazards to the aquatic environment and should not be used. These materials are not explored further in this report.

Other maintenance methods may be used in addition to de-icing the roadway to increase the effectiveness of snow removal:

- Snow plowing or other method of removal;
- Using a 'brine' mixture to treat roadways instead of solids to accelerate material melting into the snow;
- Anti-icing prior to snowfall to reduce the amount of snow sticking to the pavement and to help with snow clearing operations; and
- Using de-icing material strategically (i.e., on bends in the roadway) and only when required.

In general, it is recommended to only use de-icing chemicals if required to ensure public safety during adverse winter road conditions. The Regional Office of the MECP will be consulted prior to application of alternative deicers by municipalities or commercial users.

Table F-1 De-Icing Strategies

Material	Sodium Chloride	Sand	Calcium Magnesium Acetate	Calcium Chloride
How it works	Lowers freezing point of water	Increases traction on roadway Needs to be applied after snowfall	Useful as a pre-treatment to reduce the amount of snow sticking to pavement	Lowers freezing point of water Exothermic which may increase rate of snow melt
Working Temperature	-7 ºC and up	-12 ºC and below	-7 ºC and up	-25 ºC and up
Maintenance	May be used in a brine form	Higher rate of application required	May be used in a brine form	May be used in a brine form

Material	Sodium Chloride	Sand	Calcium Magnesium Acetate	Calcium Chloride
		Requires sweeping in the spring		
Corrosivity	High	Low	Low	High

20.4.2.5 Spills Management and Response Plan

A comprehensive Accidents and Malfunctions Plan will be completed during the Detail Design phase. This will plan will include a Spills Management and Response Plan. While the focus will be on prevention, if an accident does occur during any phase of the Project (including accidental releases), measures to control, contain, recover and clean up the release are to be implemented in a timely manner to minimize the potential for adverse environmental and human health effects. This will consider potential for both construction and operational accidents and malfunctions.

The following framework for the Spills Management and Response Plan provides examples of standard protection measures that will be considered for all phases of the Project to be included in the final Spills Management and Response Plan:

- Never clean equipment in the watercourse or where the wash-water can enter the watercourse.
- Locate materials storage sites and equipment parking at a minimum distance of 30 m from any waterbody, watercourse or wetland.
- Wash, refuel and service machinery and store fuel and other materials for the machinery at least 30 m away from a waterway to prevent any deleterious substance from entering the water.
- Maintain appropriate containment and recovery equipment and materials (e.g., spill kits) on site.
- Communicate instructions regarding applicable notifications and appropriate response actions to be taken in the event of an accident to on-site staff in Project orientations.
- If an accident occurs:
    - Assess the safety hazards of the situation.
    - Ensure the details of the accident or malfunction are appropriately documented in an internal management system and reported to an appropriate company representative.
    - When notified of a release of any type:
        - determine if the release is reportable per applicable provincial and/or federal regulations;
        - refer to an emergency contacts list for the appropriate reporting information; and
        - notify the appropriate responsible regulatory agency if the release incident is reportable as soon as practical and within 24 hours of detection.

    - Cleanup the release and containment areas for any accidental spills.
        - Consultation with a qualified remediation specialist may be required.
    - Dispose of any containment materials, and contaminated soil and vegetation at an approved facility.
- Where applicable, a reclamation plan, follow-up monitoring or reporting may be required.
- Repair or replacement of any malfunction in the equipment will be the responsibility of the construction manager.

The final Spills Management and Response Plan, which will include the standard measures at a minimum and will be tailored to reflect the Project's key activities and components, will be generated prior to construction by the approved construction manager or contractor. This requirement will be indicated in the construction tender documents and included in the scope of work.

Engagement on the plan will consist of review and acceptance by representatives of the GIFN, and other regulators that require the plan as a part of their review and approval process.

20.4.2.6 Pollution Control Plan

As discussed in previous sections, stormwater will be treated by both an OGS and either filtration units or bioswales. The combination of these two treatments systems will allow the removal of both the larger solids (such as oil, grit, or floating detritus) as well as smaller solids (such as silt, sand, phosphorus, etc.) prior to discharging into the lake and therefore preserving its integrity.

Each drainage point on the Fixed Link will be contained and directed to an OGS prior to discharging into the lake. An OGS with extended oil storage system will be used to capture a large volume of oil which could come from a potential spill. This oil would then be stored inside the OGS until it can be safely removed.

20.4.2.7 Low Impact Development Options

The term LID refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater to protect water quality and associated aquatic habitat. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions.

As a stormwater filtration and infiltration practice, bioswales temporarily stores, treats and infiltrates runoff. The primary component of the practice is the bioswales soil media. This component is comprised of a specific ratio of sand, fines and organic material. Another important element of bioretention practices is vegetation, which can be grass or an elaborate planting arrangement like an ornamental garden. Bioretention can be integrated into a diverse range of landscapes including as roadside practices, open space, and as part of parking lots and landscaped areas a perimeter control.

Figure F-3 Typical Bioswale Design

Furthermore, whenever possible within the land, vegetated filter strips (buffer strips and grassed filter strips) will be used on the Project. These vegetated filter strips are gently sloping, densely vegetated areas that treat runoff as sheet flow from adjacent impervious areas. They function by slowing runoff velocity and filtering out suspended sediment and associated pollutants, and by providing some infiltration into underlying soils (refer to Figure F-4 below).

Figure F-4 Vegetated Filter Strips

20.4.2.8 Climate Change Resiliency

A Climate Resiliency Plan was prepared by CIPS (2023) that details the approach to assess the Project's resiliency to climate change (refer to **Appendix P**). As part of this Plan, a Climate Change Resiliency Assessment will be completed at a later stage of the Project to identify future climate change related risks that the Project may be exposed to during its expected service life

(construction, operation, and maintenance). The intent is to support better decision-making during the Project's planning and design stages to identify, evaluate, and manage potential risks.

The Climate Change Resiliency Assessment will follow the principles of the ISO 31000 Risk Management Standard and utilizes the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Engineering Protocol. The PIEVC Protocol consists of 5 steps. These steps are:

- Step 1 – Project Definition
- Step 2 – Data Gathering and Sufficiency
- Step 3 – Risk Assessment
- Step 4 – Engineering Analysis
- Step 5 – Recommendations and Conclusion

Overall, the Climate Change Resiliency Assessment will help to identify any potential vulnerabilities related to climate change over the lifetime of the Project. Measures to mitigate any vulnerabilities will be identified, including recommendations to conduct further Engineering Analyses as required, to ensure the Project will operate safely and efficiently over the course of its lifetime.

20.5 Atmospheric Environment

20.5.1 Changes to the Environment

Construction activities related to the Project are expected to result in temporary changes to air quality. Dust and diesel combustion emissions are expected from activities related to earthworks, material transportation, construction machinery, and paving.

During operation, changes to air quality, specifically dust, transportation-related air pollutants and GHGs, are expected as a result of more vehicles using the new roadway and Fixed Link; however, reduced emissions to water are expected as a result of no ferry service.

An Air Quality Impact Assessment Report was completed for the preferred alternative to assess changes to air quality during construction and operation.

20.5.2 Mitigation Measures

During the Detail Design phase, an Air Quality Management Plan for dust and other emissions will be developed to minimize construction-related air emissions. The plan is expected to include the following:

- Identification of the sources of fugitive dust emissions.
- Review the composition and size range of the fugitive dust.
- Identify fugitive dust control measures for each identified source.
- Prepare a schedule by which the plan will be implemented.
- Provide a description of how the plan will be implemented, including training of facility personnel.

- Description of inspection and maintenance procedures.
- Description of methods of monitoring and recordkeeping to verify compliance with the plan.
- If mobile mitigation equipment is required, obtain an ECA from the MECP (if required), or engage equipment with a mobile ECA.

Mitigation during construction will include:

- Avoid excavating during high wind events.
- Apply regular watering during excavation/material piles.
- Move material off-site to avoid long-term storage piles, minimize pile heights.
- Excavate soils in accordance with the Air Quality Management Plan to limit air emission impact off site.
- Reduce materials being handled (per hour and per day); minimize the number of trips made optimizing construction schedule.
- Minimize the barge trip number and distance.
- Limit the number of pieces of mobile equipment operating at any time.
- Avoid summer months when sensitive receptors in the area may have open windows, thus reducing the likelihood of receiving air complaints.
- Select road surfacing material to minimize GHG emissions.
- Limit the length of construction time on site, and the quantity of materials brought to the Project site.

To minimize dust impacts related to operations, regular bridge maintenance (e.g., street cleaning) should be completed to minimize dust.

20.6 Acoustic Environment

20.6.1 Changes to the Environment

To date, a predictive analysis of noise from the construction and operation phases of the Project has been completed using computer modelling to determine the Project's impact on nearby noise sensitive land-uses and human receptors. Noise impacts from construction and operation phases were compared to applicable guidelines from Health Canada (HC) and Joint MTO-MECP guidelines (Health Canada, 2017; MTO & MECP, 1986):

- Results for construction indicated with the recommendation that the construction workday be limited to 10 hours compliance for both HC and MTO-MECP Joint Protocol guidelines.
- Results for operation indicated compliance without requirements for control for both HC and MTO-MECP Joint Protocol guidelines.

In addition, it was determined that the Prohibited Construction Vibration originating from general construction does not extend beyond 20 m from the construction boundaries. There were no receptors noted within this zone of influence. Therefore, a detailed vibration assessment was not completed.

To better understand potential impacts from the Project on humans, fish and fish habitat and migratory birds, and the corresponding mitigation measures, the Project Team also referred to the findings of the Terrestrial Existing Conditions Report and Aquatic Existing Condition Report. The Underwater Acoustics Assessment Report will be completed following the 66% design completion. This study will discuss underwater acoustics and its effects to aquatic species.

Once the design is complete (i.e., >30%), the Project Team will undertake a more detailed analysis of the acoustic impacts of the Project on aquatic species and wildlife. This includes providing details about how these changes could impact fish and wildlife species, their habitat, and sensitive life stages (e.g., waterfowl nesting periods and fish spawning seasons) along the preferred alignment. The Project Team will identify additional mitigation measures where needed.

20.6.2 Mitigation Measures

Appendix V presents an assessment of potential noise impacts from the construction and operation of the Project on residential, wildlife and aquatic receptors within the Project Area. Although environmental noise in this report is represented by A-weighted decibels (dBA), a difference between two A-weighted sound levels is reported in decibels (dB); in other words, a change (i.e., increase or decrease) in sound level is always reported in decibels (dB). This study was completed in accordance with the Health Canada Publication, “Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise”, dated January 2017 (HC guideline) (Health Canada, 2017). As the Project proceeds through the Detail Design phase, noise mitigation measures will be further refined and validated to demonstrate compliance with HC Guidelines.

Engagement on the study will consist of review and acceptance by representatives of the GIFN, and any regulators that require the plan as part of their review and approval process (e.g., the municipality if there are exemption requirements per its noise by-law).

Specifically, the mitigation, offsetting and/or overall benefit measures for impacts to aquatic species will be determined in engagement with relevant regulatory agencies, such as ECCC and DFO, and through future permitting processes where required. As part of these processes, information will be posted on an online registry and a notice about the Project will be published, inviting public comments that will be considered during DFO’s public resolution process. Preliminary mitigation relating to aquatic impacts includes avoidance of pile driving in the spawning months (generally late spring to summer months), along with general implementation of timing windows to avoid noise and vibration impacts during sensitive life stages.

Standard mitigation measures for construction are expected to include, but not be limited to:

- Follow applicable municipal noise bylaws and conduct construction during permitted hours.
- Use equipment with noise muffling devices and keep all equipment in good repair.
- Prior to work commencing, determine where power generating equipment should be placed to reduce exposure and minimize the disruption to adjacent occupants; shield loud power equipment.
- Provide suitable personal hearing protection as well as proper instruction to construction workers for their health and safety.

- Advise nearby residents of construction schedules, specifically for work that could potentially generate excess noise or disruption. Erect a noise barrier if required.
- If construction noise will last for more than one year (i.e., long term) at receptors for operational noise, and existing noise levels will be in the range of 45–75 dB, evaluate health impact endpoints on the change in the percentage of the population (at a specific receptor location) who become highly annoyed.
- Prepare and implement a Construction Noise and Vibration Management Plan (NVMP) that includes the following items:
    - Instrumentation
    - Monitoring locations
    - Applicable noise and vibration limits at the nearby noise and vibration sensitive receptors
    - Monitoring procedures
    - Reporting requirements
    - Response plans for noise and vibration levels exceeding the limits
    - Complaint investigation procedures

20.7 Coastal Environment

20.7.1 Changes to the Environment

The Project construction activities are not expected to have direct adverse impacts on the coastal environment other than the use of barges to transfer materials and equipment. During operation, the existence of the new infrastructure, such as the causeways, foundations and piers, will cause permanent changes to the existing coastal environment. Based on the Lake Simcoe water table and depth, the proposed causeway segments could prohibit water movement and circulation at certain locations.

To better understand the potential impacts, a Lake Simcoe numerical model was developed to simulate the water level, currents, wave and sediment transport conditions for existing and post-construction conditions using the Delft3D Flexible Mesh (FM) package (Deltares, 2015). The Lake Simcoe numerical model consists of hydrodynamic model component, wave model component and sediment transport model component. The numerical model incorporated a range of forcings, including:

- Water levels;
- Lake Simcoe tributaries inflow and outflow; and
- Wind speeds and directions.

Ten simulations (**Table F-2**) were carried out to assess the impacts due to construction of the Fixed Link.

Table F-2 Modeling Scenarios

Simulation	Conditions	Simulation Time Frame	Water Level	Wind Condition	MORFAC[1]
1	Pre-Construction	April 1 – Nov 30	Year 2017 (High)	Year 2010	1
2	Pre-Construction	April 1 – Nov 30	Year 2015 (Low)	Year 2010	1
3	Post-Construction	April 1 – Nov 30	Year 2017 (High)	Year 2010	1
4	Post-Construction	April 1 – Nov 30	Year 2015 (Low)	Year 2010	1
5	Pre-Construction	April 1 – Nov 30	Year 2010	Year 2010	25
6	Post-Construction	April 1 – Nov 30	Year 2010	Year 2010	25
7	Pre-Construction	4-hour duration	0.20 m CD	100-yr Storm [East]	N/A
8	Pre-Construction	4-hour duration	0.20 m CD	100-yr Storm [West Northwest]	N/A
9	Post-Construction	4-hour duration	0.20 m CD	100-yr Storm [East]	N/A
10	Post-Construction	4-hour duration	0.20 m CD	100-yr Storm [West Northwest]	N/A

[1]*Morphological Acceleration Factor*

The modeling results and predicted effects due to the construction of the Fixed Link are presented in the following sections. More details of numerical modeling including approach, data used, model calibration, results, discussion and conclusion are provided in the Coastal Engineering Study (WSP, 2024).

The numerical model was simulated during the open-water season (April to November) considering the model simulation time. Since the Lake Simcoe is completed covered by Lake Ice during the winter, the wind-generated currents are absent, and the tributary flow-generated currents are negligible in the Project site.

The results presented here focus on the effects of the bridge and causeway construction on the hydrodynamics, waves, and sediment transport processes in the Project area.

20.7.1.1 Lake Hydrodynamics

Flow velocity results from the model are shown in **Figure F-5** and **Figure F-6**, for the existing conditions and post-construction conditions. **Figure F-5** is demonstrating a 100-year high flow event with winds coming from the west-northwest. Under current conditions, peak depth-averaged current speeds reach 1.0 m/s during a 100-year west-northwesterly storm. Under post-construction conditions, velocities reduce to 0-0.1 m/s in the shadow zone (east of the

causeway) and increase by a maximum of 0.30 m/s at the causeway opening and in between bridge piers #17 to #27.

Figure F-6 is demonstrating a 100-year high flow event with winds coming from the east. Under current conditions, peak depth-averaged current speeds reach 0.8 m/s during a 100-year easterly storm. Under post-construction conditions, velocities reduce to 0-0.1 m/s in the shadow zone (west of the causeway) and increase by a maximum of 0.20 m/s at the causeway opening and between bridge piers #17 to #27.

In extreme conditions for both easterly and westerly storms, the peak current velocities occur in the shallower regions, near the Sand Islands, shoals, and in-between the mainland and Georgina Island. Post-construction, maximum current velocities increase by 0.10-0.30 m/s between the south end of the causeway and bridge pier #17. Current velocities diminish in shadow zones such as the downdrift side of the causeway. Post-construction, average current velocities are expected to increase by 0.01 m/s between the south end of the causeway and bridge pier #17. Therefore, minimal changes in velocities are expected along the shorelines along the mainland and Georgina Island and near the Sand Islands and shoals, post-construction.

Figure F-7 shows the observation point where the largest change in flow speed occurs post-construction, located between Pier #17 and the south end of the causeway. **Table F-3** shows a comparison of the magnitude of current velocity between different construction conditions at this observation location, such as the mean and maximum values for pre- and post-construction, and the differences between them. During the windiest month (April) and calmest month (August), the mean current velocity increases by 0.01 m/s and the maximum current velocity increases by 0.10 m/s, post-construction.

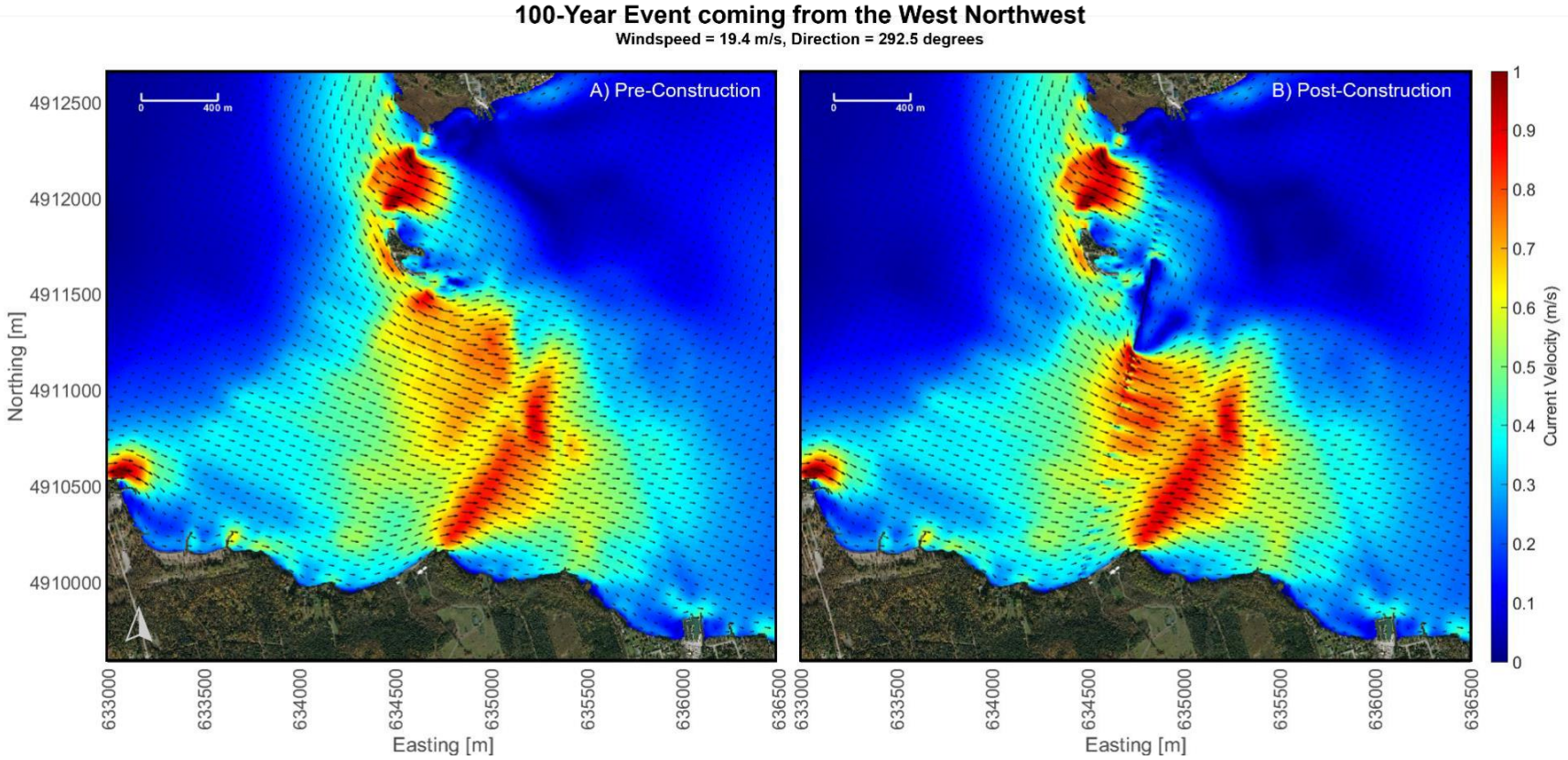


Figure F-5 Current Velocity due to 100-Year High Flow Event of West-Northwesterly Wind at Different Construction Conditions

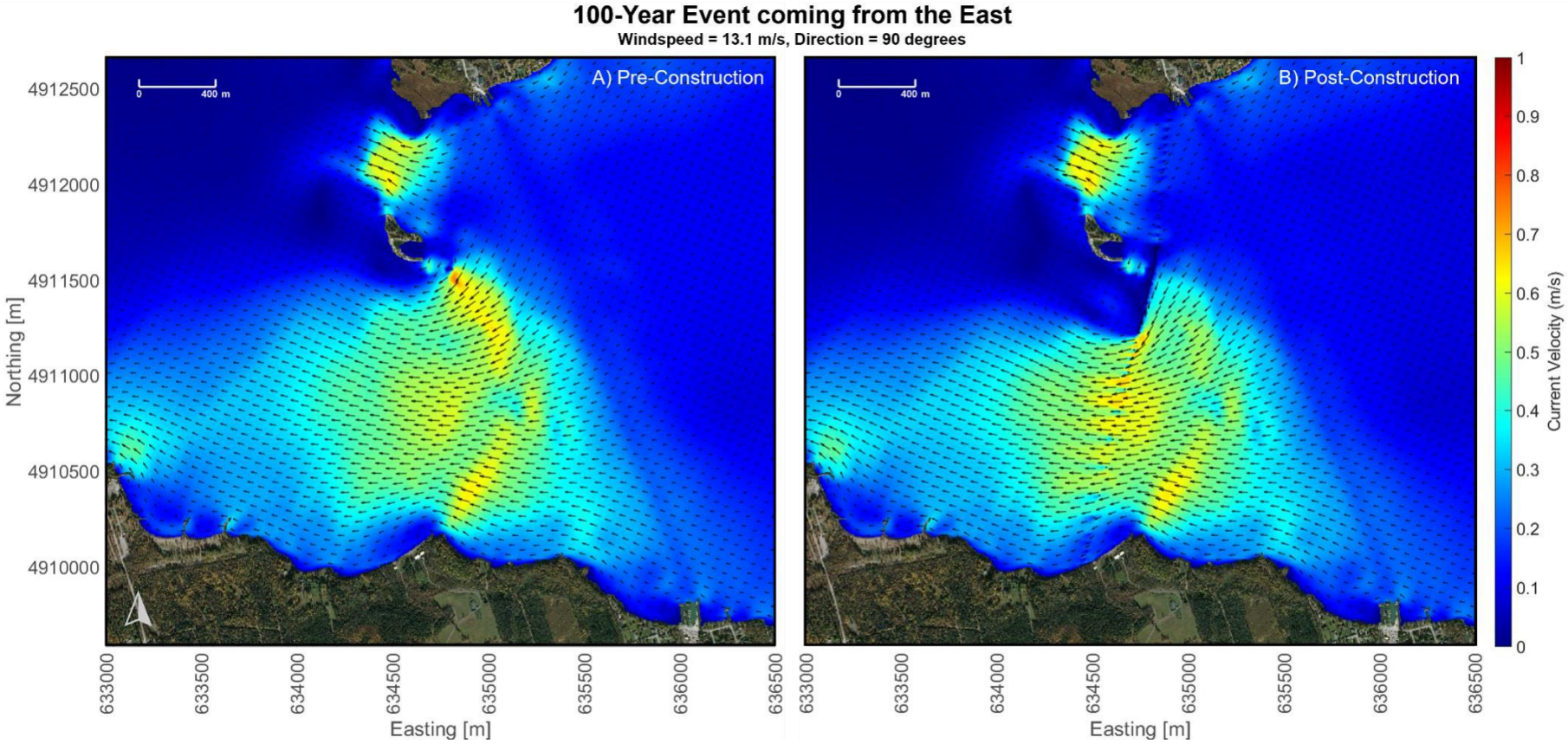


Figure F-6 Current Velocity due to 100-Year High Flow Event of Easterly Winds at Different Construction Conditions

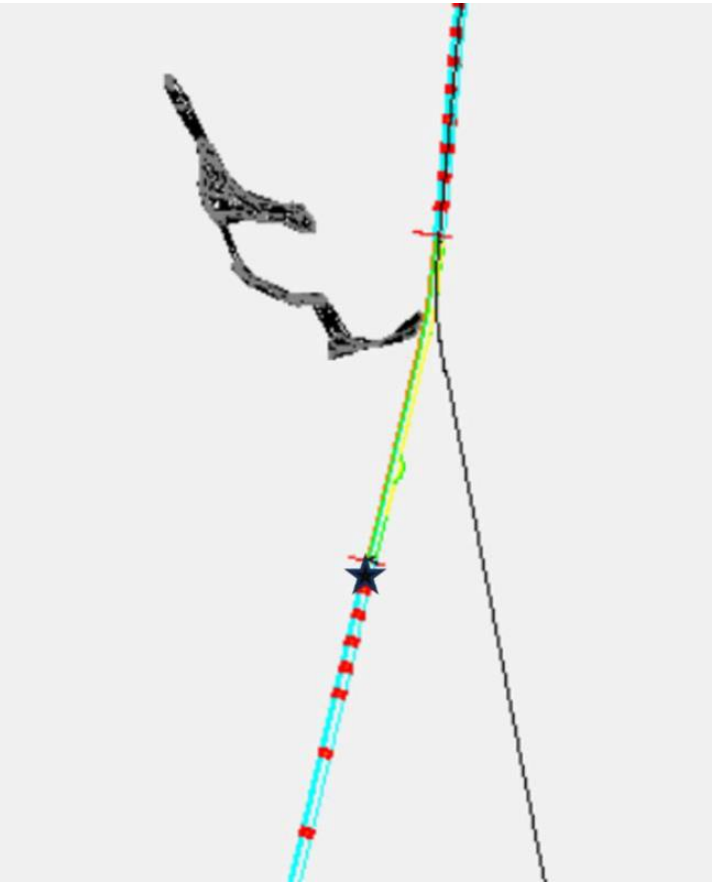


Figure F-7 Observation Point Where the Largest Change in Current Velocity is Observed

Table F-3 Current Velocities During the Windiest and Calmest Months at Different Construction Conditions

	Current Velocities (m/s)					
	Windiest Month (April)			Calmest Month (August)		
	Pre-Construction	Post-Construction	Difference	Pre-Construction	Post-Construction	Difference
Mean	0.07	0.08	0.01	0.06	0.07	0.01
Max	0.25	0.35	0.10	0.27	0.38	0.11
Note: Although the mean current velocities in August are lower than those in April, one significant event in August resulted in a maximum velocity that surpassed the highest recorded in April.						

20.7.1.2 Wave Height

A maximum significant wave height of approximately 0.6 m was predicted at the Project site for the easterly storm during both pre- and post-construction conditions (**Figure F-8**). Similarly, a maximum significant wave height of approximately 1.2 m was predicted at the Project site for the west-northwesterly storm during both pre- and post-construction conditions (**Figure F-9**).

In the proposed bridge-causeway design, the causeway acts as a breakwater and reduces wave heights in its lee. It is expected that the bridge-causeway design will generate minimal to no increases in wave heights around piers, the Sand Islands, shoals, or the along the shorelines of the mainland and Georgina Island, post-construction.

Figure F-10 and **Figure F-11** show the wave height difference between the pre-construction and post-construction scenarios for the 100-year extreme easterly and west-north-westerly wind conditions, respectively. The difference plots demonstrate how the proposed design will alter the wave dynamics. In these figures, the blue areas indicate a reduction in significant wave height for the post-construction scenario, while yellow areas indicate an increase in significant wave height for the post-construction scenario. Since no significant change in wave heights is observed post-construction, there will be no increase in wave run-up or water level, and therefore, the risk of flooding due to wave action remains unchanged.

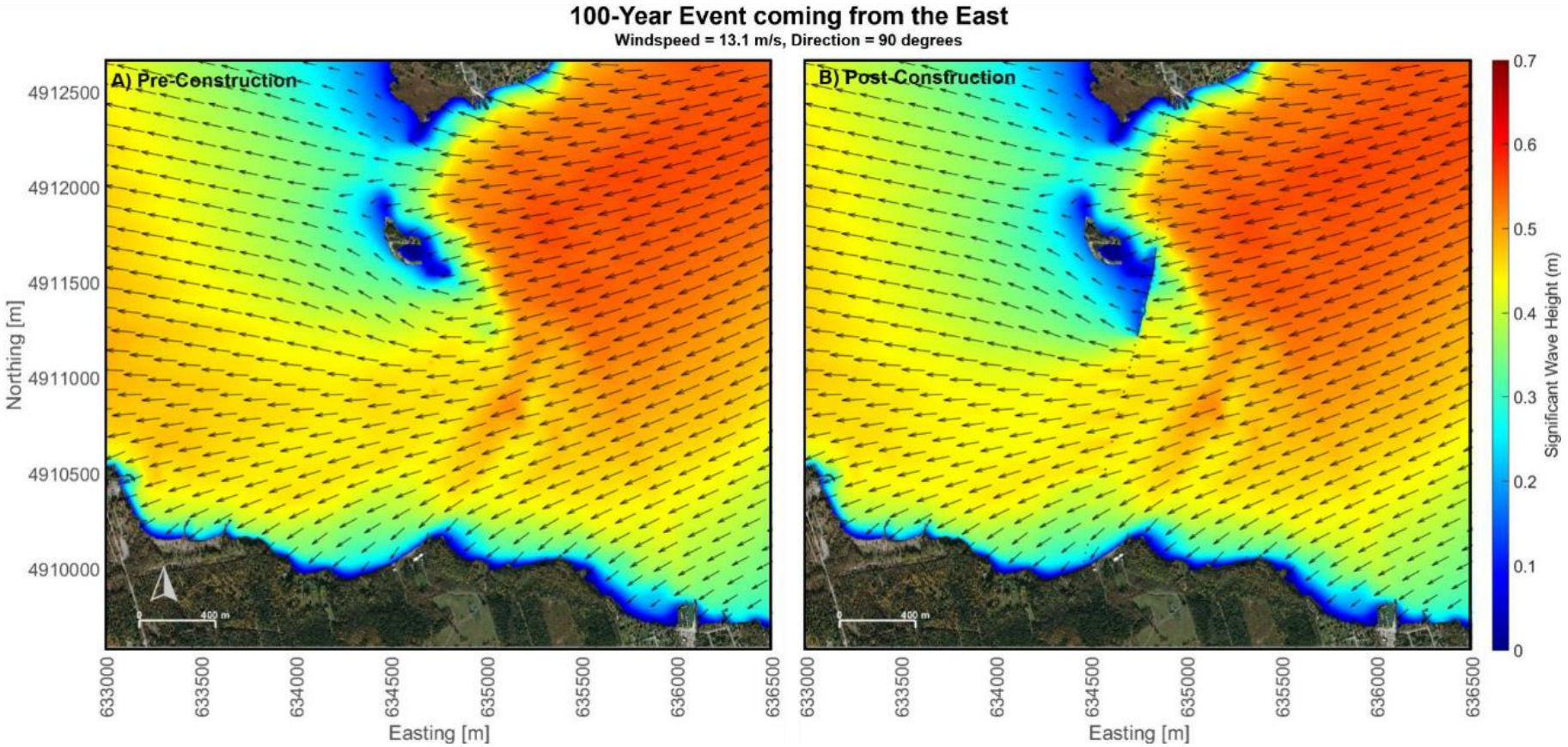


Figure F-8 Significant Wave Height and Wave Direction due to 100-Year High Flow Event of Easterly Wind at Different Construction Conditions

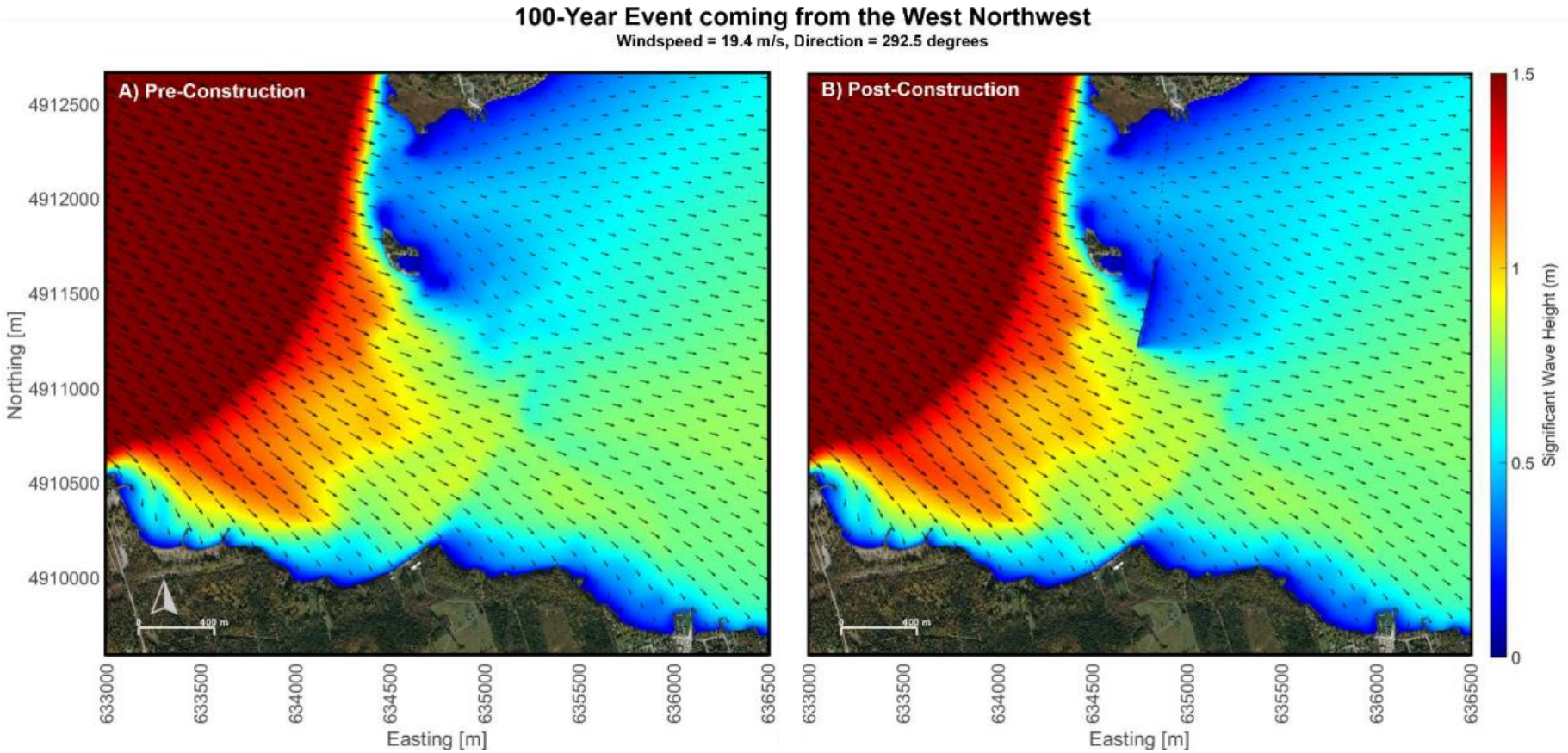


Figure F-9 Significant Wave Height and Wave Direction due to 100-Year High Flow Event West-Northwesterly wind at Different Construction Conditions

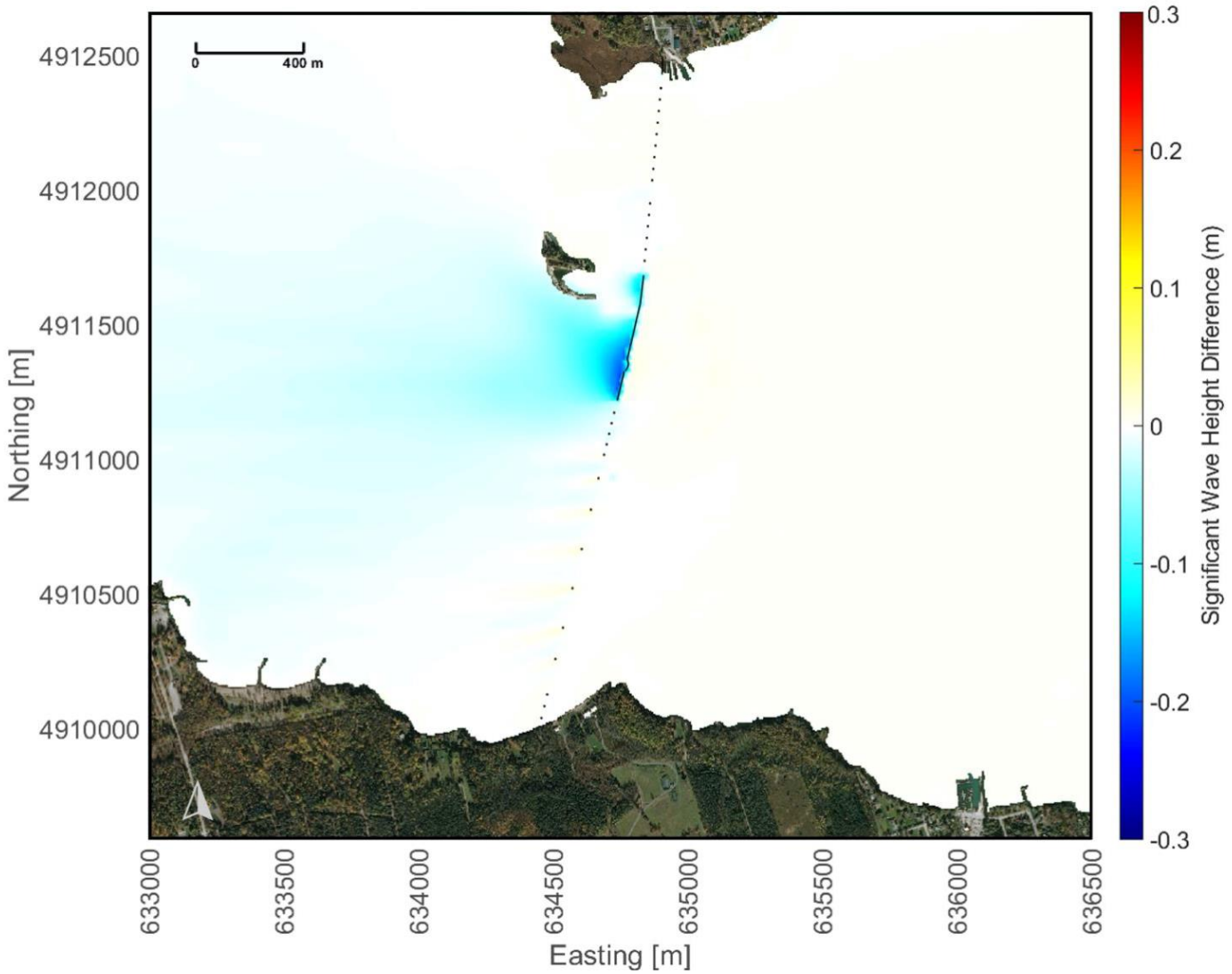


Figure F-10 Significant Wave Height Difference between Pre- and Post-Construction due to 100-year Easterly Wind

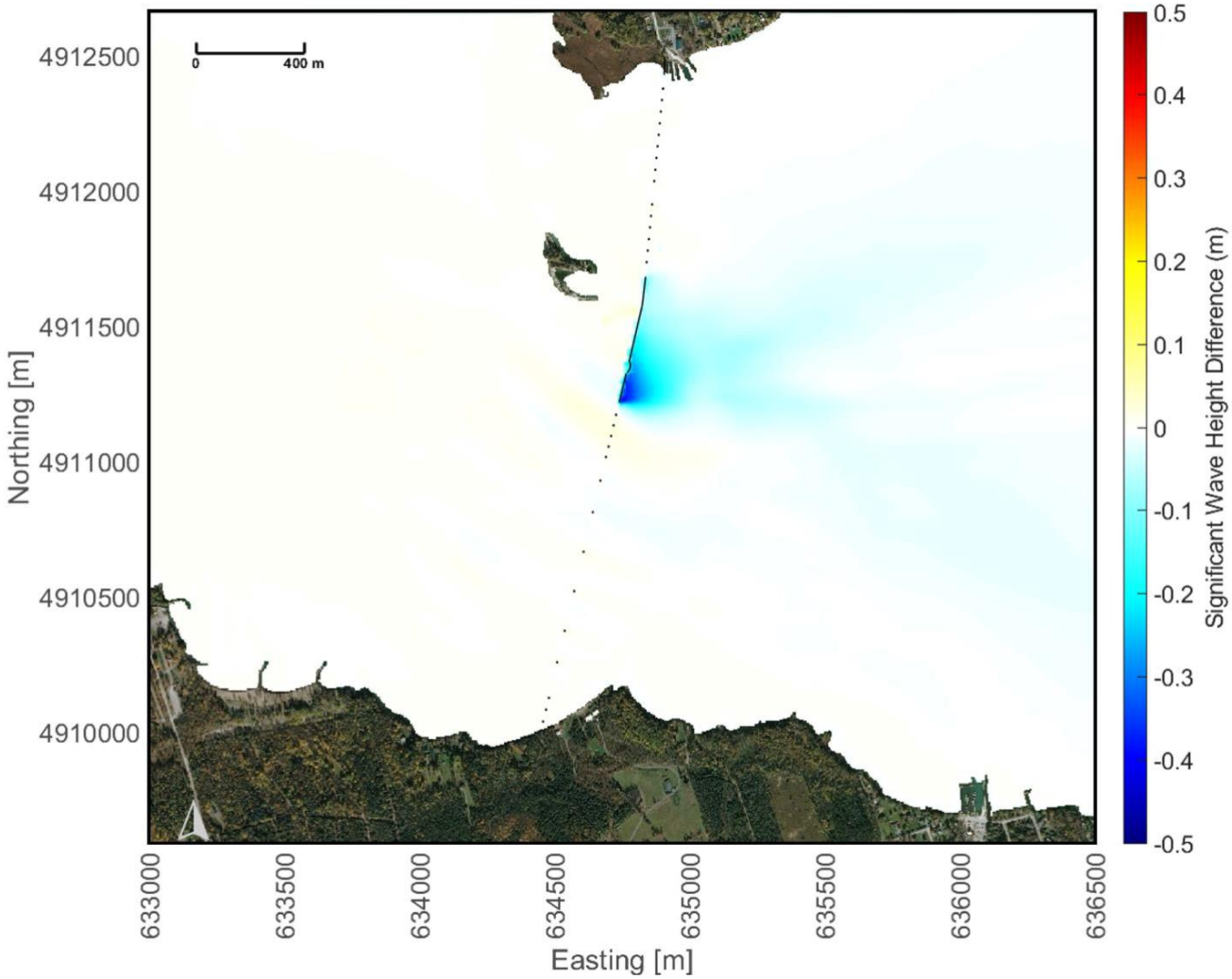


Figure F-11 Significant Wave Height Difference between Pre- and Post-Construction due to 100-Year West-Northwesterly Wind

20.7.1.3 Lake Morphology

The changes in waves and hydrodynamics between the pre-construction and post-construction scenarios, which drive sediment transport processes, are directly related to the overall morphological changes in the post-construction design. Most of these changes are observed near the causeway structure. The bridge piers allow currents and waves to pass, while the causeway acts as a barrier.

After 1-year the causeway results to a maximum of 0.15 m of sedimentation. Minimal changes are expected near the Sand Islands, shoals, shoreline, and bridge piers (**Figure F-12**). After 25 years, the movement of sediment is interrupted by the causeway, halting accumulation in previous sedimentation areas. This is demonstrated by stable bed levels east and west of the structure, with erosion reducing by up to 0.60 m (**Figure F-13**). In these figures, the blue areas indicate deposition, and the yellow areas indicate erosion.

Overall, the construction of the causeway and bridge has a limited impact on the hydrodynamics, wave patterns, and sediment transport. However, it does bring about some changes such as narrowing the flow area, increasing velocities, altering wave heights, and leading to localized erosion and sedimentation.

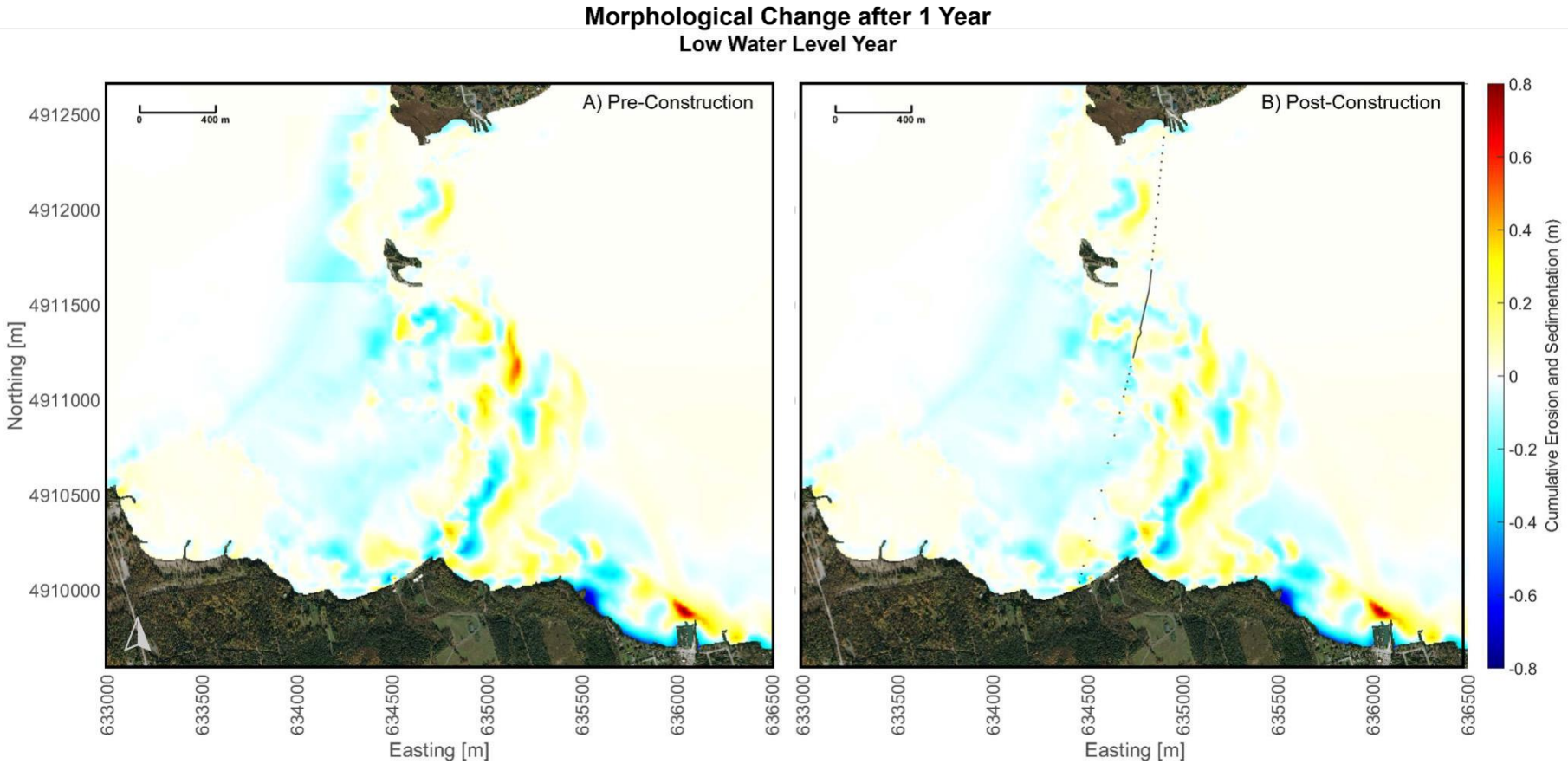


Figure F-12 Cumulative Erosion and Sedimentation for Different Construction Conditions after 1-Year Low Level Water

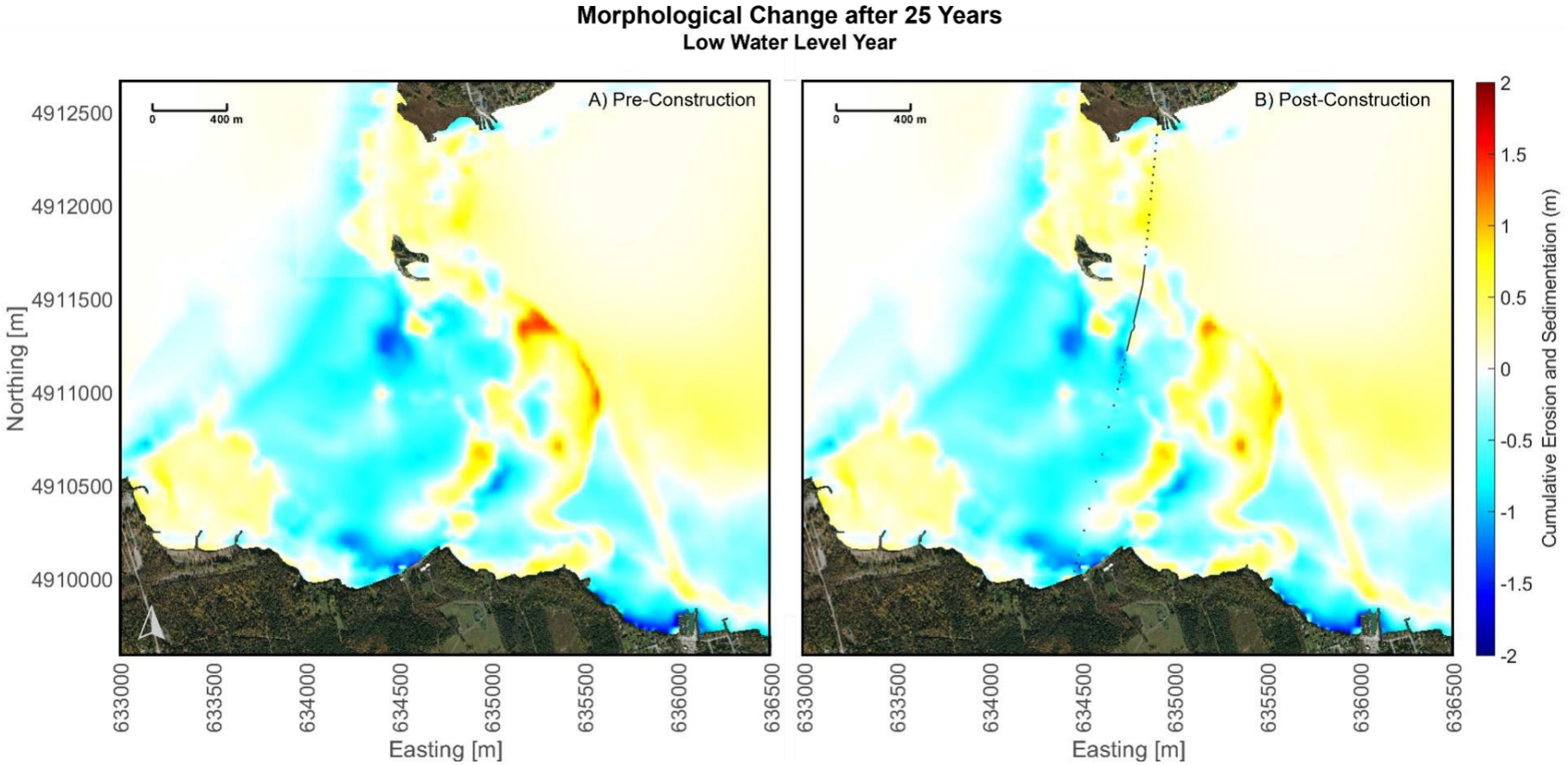


Figure F-13 Cumulative Erosion and Sedimentation for Different Construction Conditions after 25-Year Low Level Water

20.7.1.4 Ice Environment

Climate change will likely impact the lake ice characteristics and behaviour. It is anticipated that the ice season will be shortened, maximum ice thickness will be reduced, and mid-winter ice movement will be more frequent. These changes will be considered in the design of the new structure.

During the operation phase, no active maintenance activities are expected to be required. For instance, the ice at this location on the lake will not require mechanical breaking, such as ice breakers, as on other moving water bodies (e.g., rivers). In addition, it is assumed that the ferry will be decommissioned and use of ice breakers to maintain the ferry line during winter months will no longer be needed. Ice will be managed in a passive manner by the bridge structure itself. Bridge piers will be designed to break the ice flows and causeway slopes will be designed to minimize the ice pileup.

20.7.2 Mitigation Measures

These changes to the environment are being taken into account in the design of the new structure. Design solutions to minimize the impacts identified will be explored during the Detail Design phase of the Project. In addition to the mitigation measures previously identified to prevent erosion and sedimentation and to protect fish and fish habitat, the following measures will also be implemented.

20.7.2.1 In-stream Control Practices

In-stream control practices include measures that will be implemented during construction to ensure that habitat disturbance is kept to a minimum and that construction activities are isolated from the rest of the Lake. In-stream control practices may include temporary sediment curtains, which will be installed in the lake prior to construction to stop silt, dirt, or debris from continuing past the construction limits.

20.7.2.2 In-Water Works

In-water works are defined as any work that will occur in Lake Simcoe or a water feature.

Proper planning, scheduling, and maintenance will be required in advance of any in-water work, particularly to ensure effective ESC measures during construction. Sediment control methodologies that will be in place during construction will include:

- Temporary sediment curtains installed in the lake prior to construction.
- Equipment, methods and procedures selected to minimize turbidity during dredging or filling operations.
- Once started, the Project will be completed as soon as possible.
- Any shore areas that have been disturbed will be stabilized and revegetated as soon as possible upon completion.
- Causeway material will be adequately deposited at pre-approved sites or put to proper reuse. Placement of causeway material will be above the high-water mark (i.e., so that the material will not regain access to the water) and will be stabilized as soon as possible to prevent erosion.
- All debris will be contained in the immediate work area and adequately disposed of on land.

- Gravel and sand to be placed in a lake will be clean and free from fine materials and organic matter.
- All disturbed surfaces, bed, banks and overbank areas, will be appropriately rehabilitated as soon as practical.

In addition, mitigation measures in **Section 19.1.2**. will be implemented to avoid negative impacts to fish and fish habitat.

During operations, unsafe ice conditions could develop near the bridge piers. Safe passage for snowmobiles should be maintained and flagged.

20.8 Transportation and Traffic

20.8.1 Changes to the Environment

During construction, vehicles and equipment, possibly transporting large Project components, will need to access the Project site. This will require planning based on the size of the vehicles and equipment needed, and may cause temporary nuisance effects to other traffic and local stakeholders.

Operation phase impacts consider the future transportation and traffic context, including the anticipated traffic volumes, intersection improvements, and future intersection capacity, as described below.

20.8.1.1 Future Traffic Volumes

Future traffic volumes were derived as follows:

- Corridor growth rates of the study roadway on the mainland (Black River Road and Park Road) were derived using the Region's multimodal equilibrium (EMME) model (a transportation forecasting system).
- Traffic was derived for a proposed development at 78 Hadden Road.
- To estimate traffic on the Fixed Link, the number of houses and cottages on Georgina Island, as well as the school enrolment of the island community, was considered.
- Due to the absence of a Development Master Plan for Georgina Island, potential commercial development such as a hotel or golf courses that would generate traffic on the Fixed Link, were not included.

By the year 2051, the island-generated trips are estimated to constitute 27% to 32% of the total traffic growth at Black River Road at Park Road intersection. The details of the future traffic forecasts are provided in the TIS in **Appendix N**.

20.8.1.2 Signal Warrant

WSP completed a signal warrant analysis at the Black River Road and Park Road intersections using Ontario Traffic Manual (OTM) Book 12 Justification 7. The results of the analysis indicate that traffic signals will be warranted at this intersection under 2051 background traffic conditions regardless of the addition of the Fixed Link based on predicted summer weekend peak hour traffic volumes. Therefore, the traffic signal roadway improvement would be recommended regardless of the Project and should not be tied to it.

The details of the signal warrant analysis and detailed calculations of the island-generated trips assigned to the intersection vs. background growth and background development trips are provided in the TIS in **Appendix N**.

20.8.1.3 All-Way Stop Control Warrant

WSP completed an all-way stop control warrant analysis for the intersection of Chief Joseph Snake Road and Bear Road using procedures from OTM Book 5 – Regulatory Signs. The results show that an all-way stop control is warranted for the Fixed Link alignment Proposed Route Alignment 1 (i.e., the Fixed Link will tie into the west leg of the Chief Joseph Snake Road and Bear Road intersection).

The details of the all-way stop control warrant analysis are provided in the TIS in **Appendix N**.

20.8.1.4 Turning Lane Warrant

WSP assessed the need for exclusive left and right-turn lanes at the proposed future intersection of the Fixed Link and Black River Road. The left and right-turn lane warrant analyses are based on the MTO Geometric Design Standards for Ontario Highways. The analysis shows that a westbound left-turn lane and an eastbound right-turn lane will be warranted at the intersection.

The details of the turning lanes warrant analysis are provided in the TIS in **Appendix N**.

20.8.1.5 Recommended Lane Configurations

The recommended lane configurations at the study intersections are shown in **Figure F-14**. The recommended length of storage lanes for exclusive turning lanes at the Fixed Link and Black River Road intersection are:

- Westbound right turn lane – 15 m
- Eastbound left turn lane – 15 m
- Southbound left turn lane – 15 m

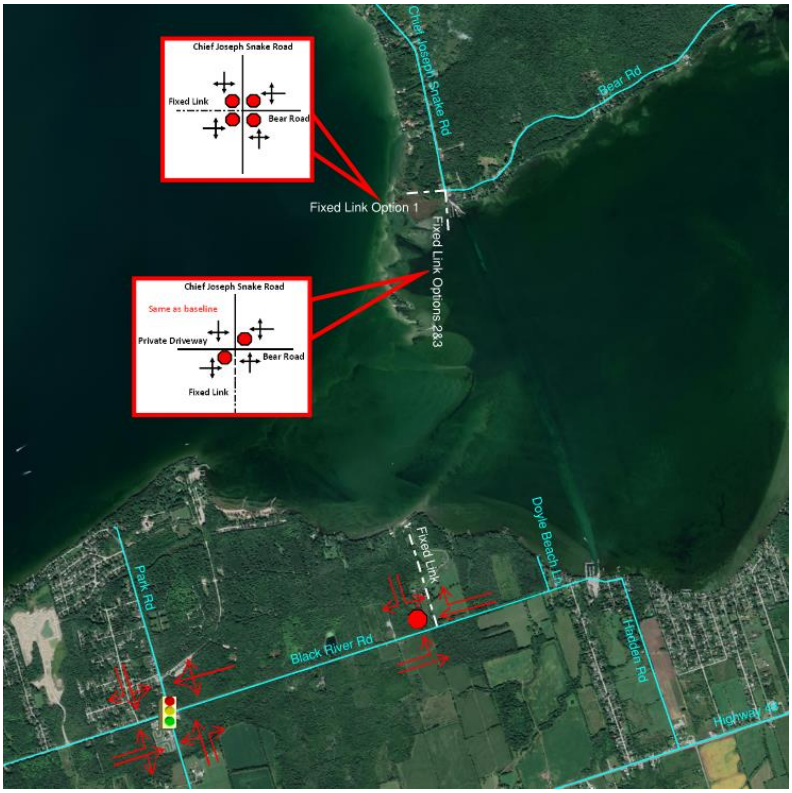


Figure F-14 Recommended Lane Configuration

20.8.1.6 2051 Total Intersection Capacity Analysis

The operations of study intersections were analyzed using the Synchro 11 traffic analysis software. The details of the methodology, Synchro input parameters and Synchro result sheets are provided in the TIS, provided in **Appendix N**.

Intersection capacity analysis provides an indication of traffic operations based on calculations of volume-to-capacity ratio (v/c) and delays for individual movements at an intersection. LOS denoted by the letters ‘A’ through ‘D’, represent satisfactory traffic operations. LOS denoted by the letters ‘E’ and ‘F’ represent congested traffic conditions.

The operation of the intersections under 2051 total conditions is schematically shown in Figure F-15

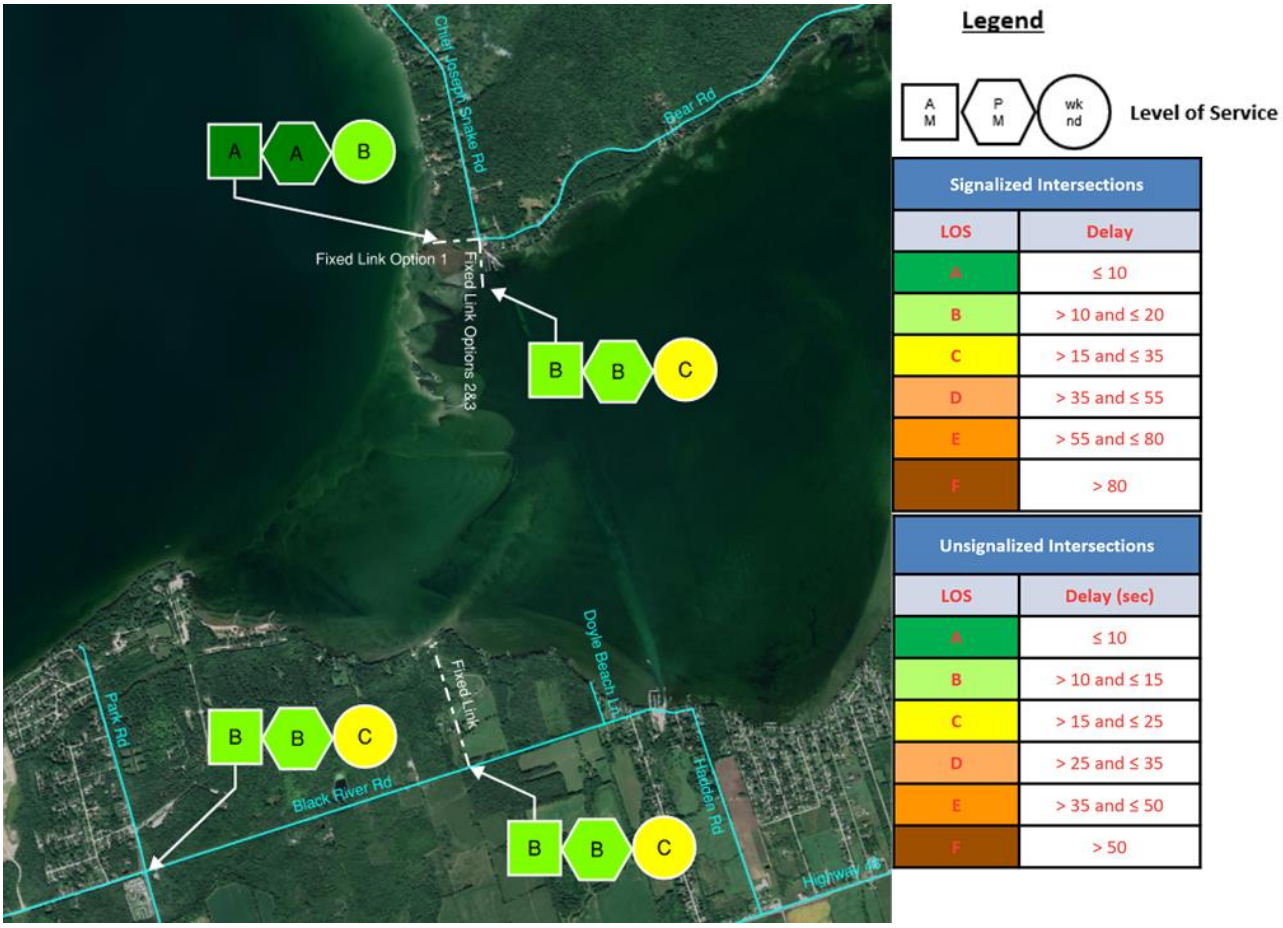


Figure F-15 2051 Total LOS

The results show that the study intersections are projected to operate at acceptable LOS 'C' or better during the study peak hours under the 2051 future total conditions. There will be no traffic operation issues with the proposed intersection and roadway improvements in place.

It is noted that the alignment of Fixed Link would not make a difference in study intersection operations, except for the Chief Joseph Snake Road, Bear Road and Fixed Link intersection. The alignment of Fixed Link will alter the potential traffic patterns at this intersection and therefore warrant different intersection controls (i.e., all-way stop control vs. two-way stop control). That said, regardless of which alignment options are implemented, there would be no fundamental impact on traffic operations.

20.8.1.7 Other Future Considerations

As documented in **Section 3.4.14** York Region circulated the TOR to YRT and STSYR and their responses associated with the potential for future public transit and school bus service on the Fixed Link and island. As a result of this correspondence, the following is recommended:

- The potential for future public transit service and school bus service on the island and the Fixed Link cannot be determined at this time and further consultation with YRT and STSYR will be needed closer to completion of the Project. YRT and STSYR would consult with the residents and GIFN at that time.

20.8.2 Mitigation Measures

A Traffic Management Plan for construction will be prepared to ensure that construction equipment can safely arrive and depart from the site and to minimize disruption to other road users.

Once the recommendations described above (e.g., the signal, all-way stop, and turn lane recommendations) are accepted by reviewing agencies – Town of Georgina and York Region, the functional and Detail Design will need to be completed for the intersection improvements, as well as the traffic management plan.

The measures are expected to include, but not be limited to, the following:

- Define accessible areas by the installation of construction strips or temporary fencing.
- Restrict vehicle and equipment traffic to designated work areas and access points and use vehicles suitable for the load bearing capacity of the road or driving surface.
- Ensure the Project area is accessible to people living in nearby communities, including the socio-economically vulnerable, for example, they will:
    - Ensure sufficient lighting and signage.
    - Ensure pathway connections.
    - Remove barriers to accessibility (fences).

20.9 Navigation

20.9.1 Changes to the Environment

The installation of a Fixed Link that includes approximately 110 m of causeway for the approach to the bridge, 740 m of low-level bridge, 500 m of causeway, and 1,250 m of high-level bridge, will have impacts to how people navigate vessels between the south shore of the island and the mainland.

The following subsections are based on the results of the Navigation Impact Assessment conducted as part of the Coastal Engineering Report conducted by WSP last 2023 (**Appendix Y**).

20.9.1.1 Bridge Clearances

The horizontal and vertical clearances between each set of piers will be based on the final bridge design and influenced by the minimum and maximum water depth within each span between piers. The spans are proposed to increase vertically such that at least one span within the peak of the high-level bridge will provide 10 m clearance from maximum water level for vessels. The proposed horizontal clearance between the waterway and the bridge at the widest point is approximately 150 m.

The low-level bridge is proposed to provide adequate clearance for small vessels such as canoes and kayaks.

The Navigation Impact Assessment quantifies navigational risk related to channel width/horizontal bridge clearance and channel depth, considering the recommended channel width and depth for motorized boats (Oregon State Marine Board, 2011). A cross-section view of a typical recreational boat channel is shown in **Figure F-16**.

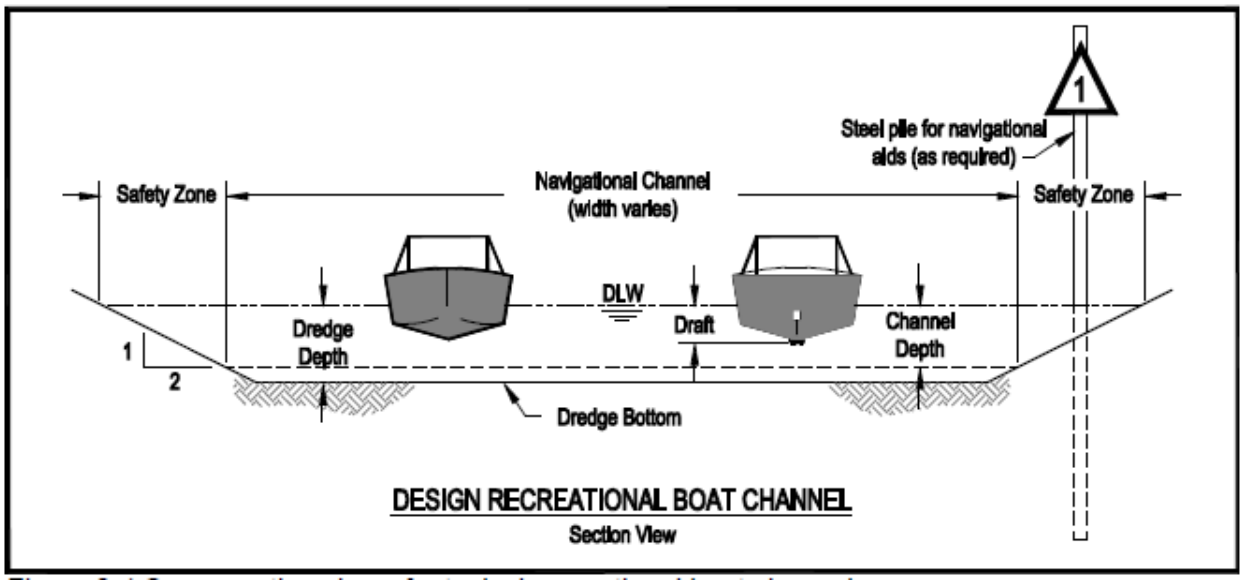


Figure F-16 Cross Section View of a Typical Recreational Boat Channel (Oregon State Marine Board, 2011)

Navigation risk related to the vertical clearance between the vessel and the lowest portion of the bridge is also being considered. The air draught clearance (ADC) is the vertical distance between above the top of the ship and overhead structures, such as bridges, power lines, cables, etc. There is no guideline available for pleasure boats in terms of ADC; thus, the discussion below is related to the ADC of ships and vessels. However, the ADC guidelines for the ships and vessels were used as a guide for this assessment.

Figure F-17 illustrates the two basic definitions for air draughts: (a) Hkt is the height of the ship from keel to top mast and (b) Hst is air draught or height from the sea or water surface to top mast (Takahashi, 2007). The water surface is equivalent to the highest navigable water level in this application. The air draught, Hst varies greatly depending on the value of ship draught T. For safety reasons, there should always be a positive ADC between the top of the ship and the bottom of any overhead structure, attached equipment and other suspended facilities.

The ADC recommended by (PIANC, 2014) is provided below.

- ADC = 0.05 Hst for inner channel (protected water), all vessel speeds and all wave conditions
- ADC = 0.05 Hst + 0.4 T for outer channel (open water), all vessel speeds and all wave conditions

(DFO, 2001) recommended the following related to the ADC:

- A water level that is exceeded only two percent or less of the time during the life of the Project is a reasonable design criterion for determining the near maximum surface for a heavily used channel.

- The distance between the top of the vessel and lowest member of the bridge is dependent upon the vessels' motion characteristics and should be at least 3 m.

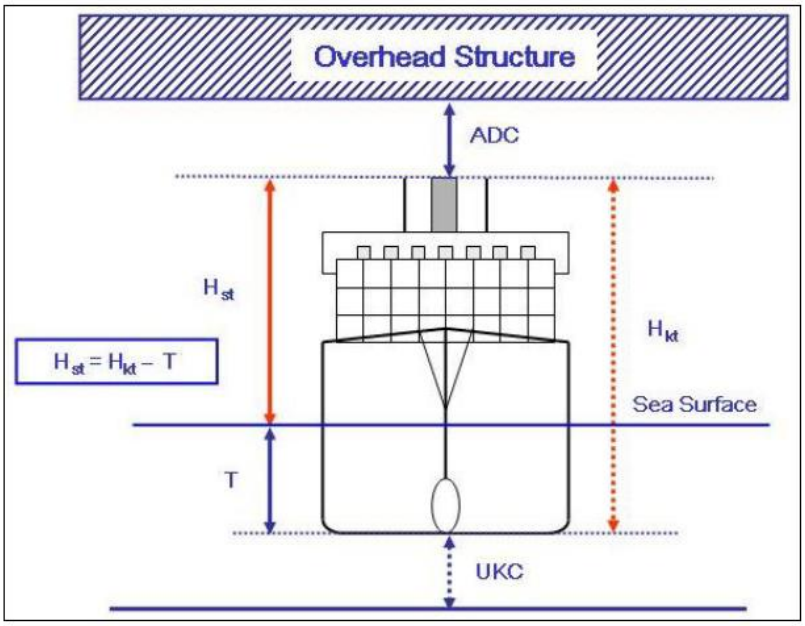


Figure F-17 Air Draught Relation Ship (Takahashi, 2007)

The water depth in the waterway ranges from 2.0 to 3.0 m during the boating season from May to October. All the boat categories meet the channel width and depth criteria, except large sail, which can only use the water way during the maximum water level conditions (219.5 m CVGD28).

The required vertical clearance is 9.0 m based on the following:

- Draft = 1.8 m
- Air Draught = 6 m

The proposed vertical clearance of 10 m is less than the required vertical clearance of 9.0 m. It should be noted that the conservative values for draft and air draught was assumed in this assessment.

Based on an analysis of vessel traffic on Lake Simcoe and their associated air draught, channel width and depth requirements, it is unlikely that there will be an impact on navigation for the boats that currently use the waterway during the boating season.

20.9.2 Mitigation Measures

Lake Simcoe is listed as a Scheduled waterway under the *Canadian Navigable Waters Act* (CNWA) subsection 5(1) - Work in Scheduled Waterway, and the Project meets the definition of a Major Work (fixed span bridges with one or more piers below the ordinary high-water mark); therefore, an application for approval is required.

Prior to construction, the Project Team will consult with TC's Navigation Protection Program (NPP) to discuss the requirements for the application under the CNWA. As part of that process, information will be posted on an online registry and a notice about the Project will be published,

inviting public comments. A 30-day public comment period is a part of the application process and will be available to the public to express any navigated-related concerns with the Project for Transport Canada NPP to review.

It is expected that consultation with the NPP will identify the requirements to be in compliance with the *Navigable Waters Bridges Regulations* and that the Minister may attach conditions to an approval that will be identified as commitments to mitigate impacts.

In general, mitigation measures may include:

- Ensuring that the perimeter of the work site is visible from sunset to sunrise and during periods of restricted visibility by the placement of navigational aids (e.g., flashing lights and visible cautionary buoys).
- Dredging of the channel between piers if required to maintain navigability for boats.
- Installation of navigational aids for safe navigation during operation.
- Installation of lights or markings to be exhibited on the bridge or any span through or under which any passage to navigation is approved.

In addition, it is recommended that a safe passage for snowmobiles be maintained and flagged during the winter season.

Conditions set out for approval may vary and more specific conditions may be recommended by the NPP to mitigate safety concerns and ensure navigation is minimally impacted during and after construction. Once an application for approval under the CNWA is submitted and assessed by the NPP, appropriate site-specific conditions may be assigned. If navigation concerns are raised during a 30-day public comment period, the NPP may require addition conditions of approval based on these comments.

21. CHANGES TO INDIGENOUS PHYSICAL AND CULTURAL HERITAGE, TRADITIONAL LAND USE, OR ARCHAEOLOGY

With respect to Indigenous peoples of Canada, the description of any impact – that, as a result of carrying out the project, may occur in Canada and result from any change to the environment – on:

- physical and cultural heritage;
- the current use of lands and resources for traditional purposes; and,
- any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

based on information that is available to the public or derived from any engagement undertaken with Indigenous Peoples of Canada.

Overall, GIFN views the benefits of the Project as benefits to physical and cultural heritage and the current use of lands and resources for traditional purposes.

21.1 Cultural Heritage Resources

21.1.1 Marine Archaeological Resources

21.1.1.1 Changes to the Environment

The potential for underwater archaeological resources is detailed in Section 3.6 of the Marine Desktop Archaeological Assessment report (**Appendix Q1**). There are no registered archaeological sites within the preferred alignment, and the features identified during the site inspection (timber rock filled docks) will be avoided by the project alignment and will not be directly impacted. However, the Marine Desktop Archaeological Assessment Report indicated that identified nearshore areas have retained archaeological potential.

In addition, the Marine Archeological Impact Assessment (2025) **(Appendix Q2**) has determined that 5 boreholes along the proposed bridge alignment revealed a stratigraphic sequence that can be correlated with an undisturbed paleosol. Further marine archaeological assessments and surveys are recommended prior to any disturbance of the lakebed within areas identified as having potential for marine archaeological resources (**Figure F-18**).

To determine the potential effects of the Project on marine archaeological resources that have not yet been identified, further assessment is recommended to determine whether there are any buried archaeological resources within the areas of archaeological potential identified in the desktop assessment, and whether they may be impacted by the Project (**Figure F-18**). Given the nature of the waters within the study area, a snorkel survey was recommended, with test pitting to occur in areas above the waterline. Further fieldworks and surveys should be conducted under appropriate weather and lighting conditions as per the MCM's *2011 Standards and Guidelines for Consultant Archaeologists*.

To better inform the assessment and ensure that Indigenous interests are integrated into the study, the marine archaeologist(s) will engage with the GIFN and other interested Indigenous communities (i.e., the Williams Treaties First Nations) to inquire as to how they would like to

participate. It is anticipated that the level of involvement from each community may vary. The Project Team will work with the GIFN to coordinate the participation of interested Indigenous communities. All engaged Indigenous communities will be notified of the results of the Marine Archaeological Impact Assessment survey, including details of archaeological sites identified. Input from Indigenous communities will be requested when assessing the CHVI of sites and when making recommendations for further assessment, if required. A draft copy of the Marine Archaeological Assessment report will be provided to Indigenous communities for review and comment to ensure their interests are considered.

21.1.1.2 Mitigation Measures

Following further marine archaeological assessments and surveys, archaeological sites may be identified that may require a Marine Archaeological Mitigation. Any Marine Archaeological Mitigation required for sites should be completed prior to construction. The Marine Archaeological Mitigation would assist in defining the extent of the site, further assess its CHVI, and inform on the need to mitigate the site from project impacts (i.e., Complete Marine Archaeological Mitigation). The preferred method for mitigating impacts to archaeological sites is through avoidance and long-term protection. The archaeological resources identified during the field investigation will be communicated to the GIFN and the Project Team, which will determine if the site(s) can be avoided and whether additional First Nation engagement is appropriate. If the resources cannot be avoided, then mitigation through documentation and/or excavation may be required prior to any project impacts in the location of the site(s).

Should the preferred alignment change, recommendations for further inspection and documentation of these features are listed below and included in **Appendix Q1.**

The marine desktop archaeological assessment has also provided the following recommendations (**Figure F-18**):

- Should any project activities that may disturb the environment be required within the locations of the two timber and rock infill docks and associated buffers, these activities should be preceded by an inspection and/or documentation of the wooden features by a qualified marine archaeologist to determine the size, context and historical significance of the feature(s). The inspection should consist of a snorkel survey to visually identify the spatial limits of the feature(s) and assess the temporal context, with the documentation consisting of photography and a topographic survey to map the feature(s) in relation to the surrounding landscape.
- If unrecorded archaeological resources (i.e., features and/or artifact concentrations) are encountered during construction activities, any potential disturbance activities should cease in the immediate area and a qualified marine archaeologist should be contacted to assess the context and significance of the resource and determine the requirements to mitigate the chance find. The Project team should also ensure that all observed saturated or waterlogged cultural materials are kept submerged and/or wet until they can be archaeologically assessed.

In addition, the Marine Archaeological Impact Assessment (2025) (**Appendix Q2**) report has provided the following recommendations

- It is recommended that further archaeological investigation be undertaken prior to any impacts to the lakebed. Specifically, further investigation should comprise:
    - Additional investigation of the extent of the buried landscape. This could comprise further geotechnical investigation or the excavation of 1 m bby 1 m test units.
    - Once the extent of the buried landscape is characterized, systematic test unit excavation should be undertaken at 5-metre intervals along the proposed alignment. Test units should extend north and south of each borehole containing a paleosol until the extent of the buried landscape has been reached. All sediments recovered from the excavation units should be screened through 6 mm wire mesh for the recovery of archaeological material.
- The archaeological Inadvertent Discoveries Plan (IDP) should be implemented during project activities that could potentially disturb the lakebed within the study area. The IDP provides information on the types of Indigenous and Euro-Canadian archaeological resources that may be located within the project area and recommends appropriate procedures to address unexpected discoveries.

It should also be noted that the Marine Archaeological Impact Assessment (2025) report does not fully satisfy the recommendations in the Marine Desktop Archaeological Assessment (2022) report; instead, these recommendations should be considered as additions. The recommendations for both reports should be considered prior to any further impact to the lakebed.

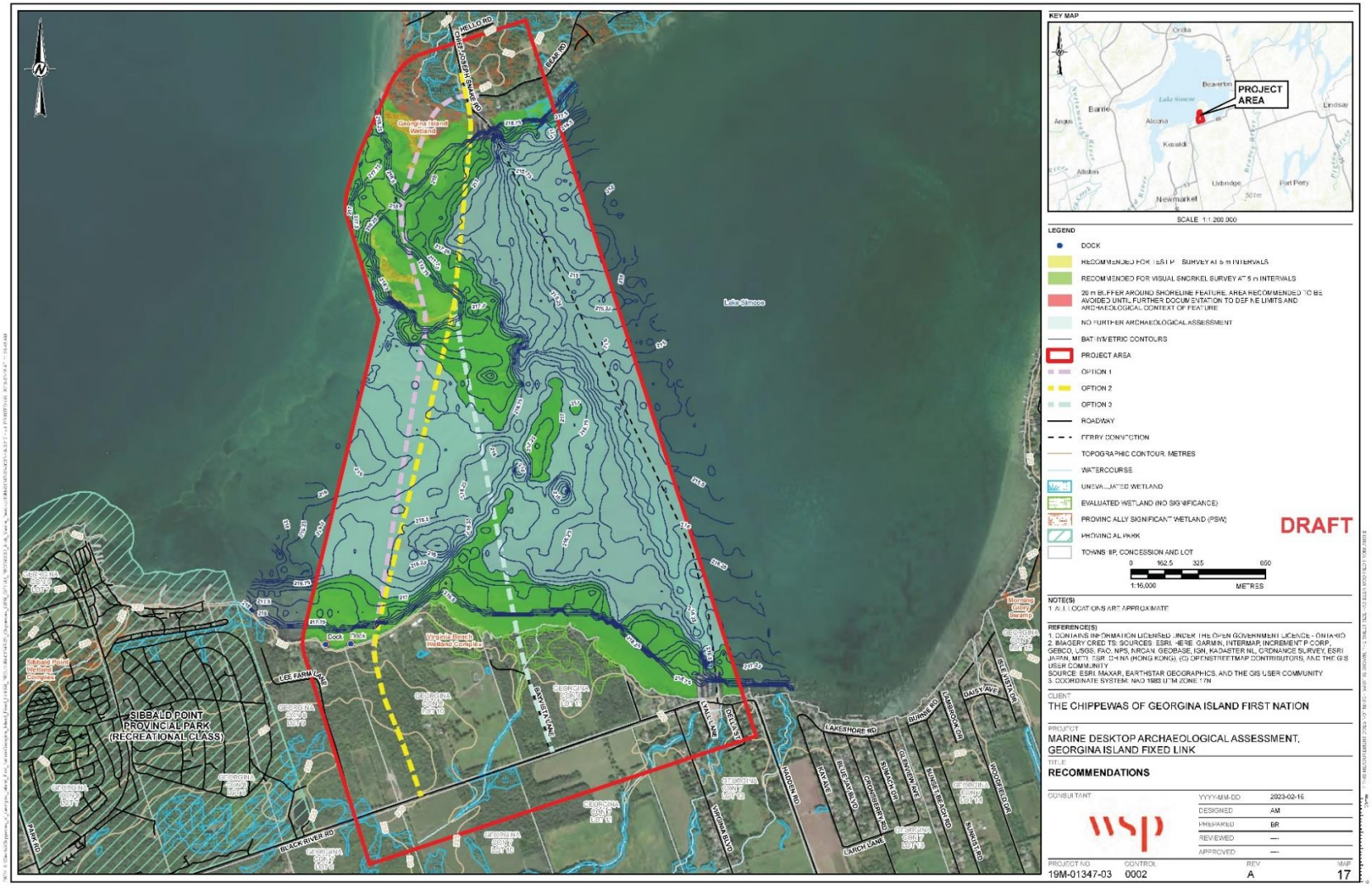


Figure F-18 Recommendations for Further Marine Archeological Assessment

21.1.2 Terrestrial Archaeological Resources

21.1.2.1 Changes to the Environment

No known terrestrial archaeological sites are currently within the preferred alignment. However, since the study (**Appendix R**) identified areas of archaeological potential, a Stage 2 archaeological assessment is recommended to identify the location of previously undocumented terrestrial archaeological resources that may be impacted by the Project. Information from the Stage 2 archaeological assessment will be used to identify the Project's potential effects and appropriate mitigation measures.

The Stage 1 archaeological assessment has provided the following recommendations:

1. No further archaeological assessment is recommended for land portions of the study area that are not identified in the assessment as possessing archaeological potential ().
2. Land portions of the Project area identified as possessing archaeological potential and that may be impacted by the Project should be subjected to a Stage 2 archaeological assessment in compliance with the MCM Standards and Guidelines for Consultant Archaeologists (2011).
    a. Land that can be ploughed should be assessed by pedestrian survey at 5 m intervals.
    b. Land that cannot be ploughed should be assessed by test pit survey at 5 m intervals.
3. Wetland areas identified as possessing archaeological potential that may be impacted by the Project should be visually inspected during a Stage 2 field assessment and test pits hand excavated at 5 m intervals were possible, with areas of saturated soils delineated accordingly.

The discovery of any archaeological resources during the Stage 2 archaeological assessment will be communicated to the GIFN, who will determine the appropriate responses and engagement of additional First Nations Communities, as describe below.

21.1.2.2 Mitigation Measures

For any archaeological sites identified during the Stage 2 terrestrial archaeological assessment, the preferred recommendation is avoidance of the archaeological site(s). If the site(s) cannot be avoided, then the site(s) will require mitigation through excavation, or a combination of avoidance and excavation. Should the site(s) be avoided, no direct impacts will occur. If the site(s) cannot be avoided by the Project, then the direct impact will be archaeological excavation to mitigate the site(s).

Prior to Stage 2 terrestrial archaeological assessment fieldwork, it is expected that some Indigenous communities may request to have a representative(s) on site to observe and/or participate as a means to be involved first-hand, provide meaningful input, and ensure their interests are considered. The Project Team will work to coordinate the participation of interested Indigenous communities.

All engaged Indigenous communities will be notified of the results of the Stage 2 terrestrial archaeological assessment, including details of archaeological sites identified. Input from Indigenous communities will be requested when assessing the CHVI of sites and when making

recommendations for further assessment, if required. A draft copy of the Stage 2 terrestrial archaeological report will be also provided to Indigenous communities for review and comment to ensure their interests are considered.

Further assessment, such as a Stage 3 Archaeological Assessment and a Stage 4 Archaeological Mitigation, may be required to mitigate impacts if archaeological site(s) are present in the Stage 2 survey. Mitigation measures will be developed in consultation with Chippewas of Georgian Island First Nation.

Although not a project requirement, an Inadvertent Discoveries Plan can also be developed to identify the appropriate protocol should any previously unidentified archaeological resources or burial sites be identified during the Project. This would include protocols to stop work and information regarding who to contact.

21.1.3 Cultural Heritage

21.1.3.1 Changes to the Environment

Changes to infrastructure have the potential to adversely affect BHRs and CHLs by displacement and/or disruption during and after construction. These heritage resources may experience displacement (i.e., removal) if they are located within the footprint of the Project. There may also be potential for disruption or indirect impacts to BHRs and CHLs by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and/or setting.

To establish potential impacts, identified BHRs and CHLs were considered against a range of possible impacts as outlined in the MCM's *InfoSheet #5: Heritage Impact Assessment and Conservation Plans* (MCM 2006). Refer to **Appendix O1** for more details. The Cultural Heritage Report (**Appendix O1**) determined that the Project would have potential direct impacts on the Lake Simcoe and a CHER was recommended.

In addition, in January 2024, MCM provided comments on the 2022 Cultural Heritage Report and requested revisions to reflect the latest Project details. As such, WSP prepared a Cultural Heritage Report Addendum to address MCM's requested updates (Appendix O1). The updated preliminary impact assessment presented in the addendum determined that the Proposed Project works will result in no impacts to 7577 Black River Road, and direct adverse impacts to Lake Simcoe. As a result of this addendum, a CHER was recommended for Lake Simcoe (CHL-1).

The CHER was completed by WSP in June 2024, and updated in September 2025 to reflect MCM's comments (**Appendix O2**).

Table F-4 presents the potential impacts of the project on known or potential BHRs and CHLs as identified in the Cultural Heritage Report, Cultural Heritage Addendum, and CHER.

Table F-4 Impacts and Preliminary Mitigation Strategies for BHRs and CHLs

BHR or CHL #	Location	Heritage Recognition	Type and Description of Potential/Anticipated Impact(s)	Mitigation Measures
BHR-1	7577 Black River Road	Identified as potential BHR in Cultural Heritage Report: Identified during the field review and background research.	Impact: None. The Project works, including the proposed widening of Black River Road and associated property taking, will not occur within not adjacent to the property containing the potential BHR.	No mitigation measures required as no impacts are anticipated.
CHL-1	Lake Simcoe, including marsh and associated shoreline	Identified as potential CHL in the Cultural Heritage Report: Identified during the field review and background research. Based on the CHER, confirmed as a CHL.	Impact: Direct adverse impact The Project works will directly impact the CHL. This will result in direct adverse impacts (land disturbance, alterations, introduction of new elements) resulting from the following: • Construction of a new bridge and causeway • Construction of a new road between Lee Farm Lane and Bayvista Lane	Direct adverse impacts are anticipated to the CHL due to the Project works associated with the construction of a new bridge, causeway, and roadway. Based on the CHER (**Appendix O2**), the preparation of a Heritage Impact Assessment (HIA) is required to assess the impacts of the proposed work, identify conservation strategies, and recommend mitigation measures.

It is anticipated that the Project will directly impact a section of Lake Simcoe within the study area. Based on the CHER (**Appendix O2**), the HIA should be informed by the MCM Standards and Guidelines for Provincial Heritage Properties (MCM, 2014). The HIA must be prepared at the outset of the detained design phase of the Project and in consultation with GIFN to gather insight on conservation and mitigation strategies.

21.1.3.2 Mitigation Measures

The Cultural Heritage Report provided the following recommendations:

- Staging and construction activities should be appropriately located and/or planned to mitigate impacts to the identified CHL.
- Construction activities should seek to avoid direct impacts to Lake Simcoe including the shoreline as well as direct impacts the identified CHL. Where avoidance is not possible, mitigation measures should be developed in consultation with the GIFN.
- Should future work require expansion of the study area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on known or potential BHRs and CHLs.

In addition, appropriate mitigation measures will be developed as part of the HIA. Where avoidance of an impact to a BHR or CHL is not possible, mitigation measures provided in the HIA should be developed in consultation with the GIFN.

Methods of minimizing or avoiding a negative impact on a BHR or CHL include, but are not limited to:

- Alternative development approaches;
- Isolating development and site alteration from significant built and natural features and vistas;
- Design guidelines that harmonize mass, setback, setting and materials;
- Limiting height and density;
- Allowing only compatible infill and additions;
- Reversible alterations;
- Buffer zones, site plan control and other planning mechanisms;
- Recommendations for additional studies, including CHERs, HIAs, and Strategic Conservation Plans; and,
- Alterations to project design during construction planning and project controls (i.e., vibration reduction, dust suppression or other measures).

Table F-4 presents the potential impacts of the improvements project on known or potential BHRs and CHLs as identified in the Cultural Heritage Report. The study area for the Project were reviewed to assess impacts to identified heritage resources.

Furthermore, mitigation measures will be refined in the HIA, which will identify the conservation strategies and recommend mitigation measures based on the anticipated Project activities.

21.1.4 Indigenous Culture and Heritage

21.1.4.1 Changes to the Environment

In addition to the topics mentioned elsewhere in this DPD, the GIFN have received letters of support from all Williams Treaties First Nations for this Project and at a meeting of the Chiefs, the primary interest was how the federal government would be treating one of their allies as a proponent. This Project will bring to light some Treaty-based responsibilities of the Crown and the Williams Treaties communities wanted to support and be informed when those discussions took place. It was believed that any impacts identified by the GIFN community members would be more significant and direct than to the other Williams Treaties communities. For that reason, the GIFN was to keep the Williams Treaties First Nations informed and up to date on the progress and the relationship with the Crown as the Project proceeds.

In discussions with the MNO, their general response was that there is an economic opportunity for their population. Entrepreneurs, training opportunities and potential large-scale partnerships may all be realized through the inclusion of the Métis Nation during the study and constructions phases. The primary issues of concern for the Métis Nation were based on archaeology practices and general environmental issues with large infrastructure projects.

Initial discussions with the Huron Wendat community were very similar to those with the Métis Nation. The significant economic impact of the Project could benefit their community member businesses and workforce. The Huron Wendat indicated a trust of the Chippewa community assessments and process when evaluating the environment and would have little input in that area over and above any concerns that the GIFN community would have. The Huron Wendat community also expresses a desire to be aware of artifacts or archaeology matters as they progress. They notified the GIFN community of their joint venture in archaeology and indicated that using them would assist in transparency with the work to all Indigenous communities.

21.1.4.2 Mitigation Measures

Following engagements with the Williams Treaties Frist Nations, Métis Nation and the Huron Wendat, the GIFN intends to include Indigenous groups in the archaeology investigations at all stages. Although the process hasn't been fully identified, it is projected that any significant archaeological work would include the Huron Wendat Joint Venture to ensure an Indigenous lens is maintained. See **Table F-5** for more details on proposed mitigation measures.

In addition, the GIFL Secretariat has been asked, and has agreed to provide project updates to all parties within the William Treaty First Nations.

Table F-5: Changes to Indigenous Physical and Cultural Heritage, Traditional Land Use and Archaeology

Factor	Potential Effects to Identified Activities	Proposed Protection/Mitigation Measures
Indigenous Culture and Heritage	Loss of or disruption to current traditional land and resource uses such as hunting, gathering, fishing, trapping from possible direct project impacts to wildlife and fish habitats, plants, and water navigation.	Application of appropriate habitat protection and mitigation measures.
	Easier access to outside of community could put pressure or losses on traditional language, traditions, and culture; and/or decrease interest and participation in traditional land use activities (e.g., trapping, hunting, fishing, gathering, etc.).	Effort to reinforce language and culture through changes to educational curriculum that provide additional cultural enrichment opportunities.
	Possible for outsiders to access and affect cultural/spiritual/ sacred sites.	Controlled road access/security
	Potential to impact archaeological sites	Include Indigenous groups in the archaeology investigations at all stages.

21.2 Traditional Land Use

21.2.1 Changes to the Environment

While the Fixed Link is not expected to directly affect traditional land use on Georgina Island, it may unintentionally facilitate growth or the introduction of other stressors as a consequence of easier access to the island. As growth occurs, stresses on the current, limited lands of Georgina Island may result. The effects of a Fixed Link on the overall lands for the community will be noticed and will be a net negative to the community.

Impacts to traditional land use in Lake Simcoe are expected to be temporary during construction when avoidance to areas under construction will be required, and should be unimpeded or facilitated during operation of the Fixed Link.

On the mainland, the direct effects from the Project will be to the recently acquired GIFN-owned lands that are currently undeveloped; however, impacts to traditional land uses have not been specifically identified as a result of the Project in this area.

Potential adverse impacts of the Fixed Link could include:

- Loss of or disruption to current traditional land and resource uses such as hunting, gathering, fishing, trapping from possible direct project impacts to wildlife and fish habitats, plants, and water navigation.
- Easier access to outside of community could put pressure or losses on traditional language, traditions, and culture; and/or decrease interest and participation in traditional land use activities (e.g., trapping, hunting, fishing, gathering, etc.).

- Possible for outsiders to access and affect cultural/spiritual/ sacred sites.

21.2.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- Application of appropriate habitat protection and mitigation measures.
- Effort to reinforce language and culture through changes to educational curriculum that provide additional cultural enrichment opportunities.
- Controlled road access/security
- Develop Land Use Management system to control new development.
- Develop Conservation plans, By-laws and Land Use Plan.
- Develop communication plans to regulate lands in a meaningful, proactive manner.

21.2.3 Country Foods

21.2.3.1 Changes to the Environment

A preliminary list of country foods and medicinal sources for GIFN is provided in **Table D-18, Section 14.2.4**. This list includes species of fish, mammals, birds, reptiles and plants.

As these culturally significant species are fish, plants and wildlife species, the previous sections that outline impacts to fish and fish habitat, vegetation and wildlife (i.e., **Sections 19.1.1, 20.2.2.1** and **20.2.3.1)** also apply generally to the associated groups of country foods, although not all of the species listed in **Table D-18** are found within the Project area. Specifically, there may be direct impacts and displacement of some country food species and the habitats in which they are found. An assessment has not been completed to determine the extent to which displacement of individual of these species would impact consumption of potential impacts to country foods and whether has not been completed. This may be further evaluated during Detailed Design.

Information regarding country foods may be enhanced with results from further engagement with other Indigenous communities to verify whether they identify country foods within the study area, and whether they are concerned about impacts to those country foods as a result of the Project.

21.2.3.2 Mitigation Measures

Mitigation measures outlined in **Sections 19.1.2**, **20.2.2.1**, and **20.2.3.2** also apply generally to the associated groups of country foods and their habitats. Additional mitigation measures may be warranted, as determined in consultation with GIFN and other Indigenous communities during detailed design. Measures may include timing windows for certain activities during construction to protect specific areas during harvesting seasons or targeting specific areas for harvest prior to construction (e.g., for plant species that will be directly impacted / removed by construction activities).

22. CHANGES TO INDIGENOUS HEALTH, SOCIAL OR ECONOMIC CONDITIONS

A description of any change that, as a result of carrying out the project, may occur in Canada to the health, social or economic conditions of Indigenous peoples of Canada, based on information that is available to the public or derived from any engagement undertaken with Indigenous peoples of Canada.

There are multiple impacts that the Fixed Link would have on the GIFN community. At an engagement session of First Nation management, many effects were viewed from either a positive or negative lens. All of these are significant areas of impact for the community that will require development and/or mitigation plans. The demands this will place on First Nation administration are considered significant and will directly impact community-based service levels from human resource capability standpoint. Moreover, there will be significant financial costs association with opportunity development and negative effects mitigation. The following effects have been identified.

22.1 Health Conditions

22.1.1 Physical and Mental Health

Whether it is worrying that someone is safe coming home to the stresses of the ice road being safe, to the significant community grieving that occurs when an accident does take place, overall community health would improve with a Fixed Link.

22.1.1.1 Changes to the Environment

The following positive effects are anticipated:

- Consistent and regular access to health care services.
- Reduced travel time and transportation costs will lower costs of food and necessities, improving mental health.
- The reduction of loss of life due to ice road related accidents will improve the community's mortality rate and overall community mental health.
- More services can be offered from health professionals.
- Safe access to medical appointments scheduled during winter months.
- Improved food security and access to nutrient foods.
- Less physical and mental stress for everyday activities; buying groceries or running other household errands.
- Potential for members remain on Georgina Island and receive medical care and long-term care access 24/7.
- Health services requiring confidentiality or discretion can be sought on the mainland since there is a perceived sense of lack of privacy or confidentiality from health services currently offered in the community.
- Lower costs for food and other everyday necessities as transit are improves thus reducing stresses on residents and improving overall mental health.

- Increased ability of and convenience for elderly residents, to access health care services (e.g., emergency services) on the mainland.

The following are potential negative effects:

- Loss of local services and on territory jobs in the health services as many will be perceived as duplication once the federal government designation of remote location is lost.
- Current health services professional may be lost as the First Nation cannot compete with mainland pay and benefits.

22.1.1.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- Controlled road access/security through toll booths.
- Develop a plan for retaining/recruiting island health services staff

22.1.2 Emergency Services

It is believed by GIFN administrative staff that emergency services will require significant changes to the way the First Nation operates if the Fixed Link is constructed. Currently, the GIFN community has significant emergency services for a community of its size – being served by local, First Nation members.

22.1.2.1 Changes to the Environment

The following positive effects are anticipated:

- Ambulance Services will be quicker and more reliable especially in winter months since emergency vehicles cannot travel on ice and stretchers cannot fit in airboats.
- Overall cost of services will be reduced due to better access to the island.
- There would be cost savings for purchasing and maintaining emergency equipment.
- The current Georgina Island emergency responders could have new agreements put in place where services are contracted out to Township/Region for Airboat Rescue, Fire and other emergency services.
- Access to services 24/7 services resulting in a safer and more secure community.
- There may be a reduction in homeowner insurance rates with the increased access to services.
- The Fixed Link would cut response times between 25 minutes and multiple hours depending on the time of day. This could be the difference between life and death.

The following are potential negative effects:

- The existing emergency services on the island may be eliminated with the construction of the Fixed Link, which may result in:
    - Eliminating existing culturally appropriate and sensitivities that are beloved by the community and fear that island services may no longer be needed.
    - Loss of community specific jobs would be lost.

- Current First Nation staff may be lost as the community cannot compete with compensation packages of the mainland emergency services.
- Increased traffic and economic activity may all result in increased crime potential placing a higher demand on emergency services.

22.1.2.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- Controlled road access/security through toll booths.
- Develop a plan for retaining/recruiting island emergency staff.

22.1.3 Safety and Security

22.1.3.1 Changes to the Environment

The following positive effects are anticipated:

- The construction of the Fixed Link also allows for individuals in the community experiencing violence a method for leaving the island at any hour, any day of the year and provides access to support services on the mainland, for individuals experiencing violence, that would not be readily available with the current ferry system in place.
- The Fixed Link will also reduce response times for services like external police services when necessary.

The following are potential negative effects:

- Lack of health and safety services.
- It is understood that with the construction of the Fixed Link to the community can create potential instances where community members are at risk to violence such as when travelling to and from the island using transportation methods such as public transit, taxi services, Uber, etc.
- The Fixed Link may increase crime and make access to drugs and other narcotics easier from the mainland.
- The introduction of the Fixed Link may increase incidents of sexual assault and gender-based violence as a result of increased access to the island from the mainland. A recent study published in 2020 has also shown that women and 2SLGBTQQIA+ people were more likely to be sexually assaulted than men and non-2SLGBTQQIA+ people and found a higher prevalence of violent victimization among Indigenous 2SLGBTQQIA+ people than those who were not Indigenous (Canadian Femicide Observatory for Justice and Accountability , 2020).

22.1.3.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- The community is currently drafting a Residency By-Law and a Land Use plan to protect the community from unique criminal elements in the community.
- The construction of the Fixed Link creates the opportunity to implement controlled access in the form of gates, security cameras and security personal carrying out checkpoints.

- Mechanisms of controlled access can help identify and intervene on potentially dangerous situations for community members

22.2 Social Conditions

22.2.1 Island Culture

Although the Project is considered to provide overwhelmingly positive benefits to Indigenous communities and populations, the traditional and historical community identity of being an Island Nation protected by Lake Simcoe will be compromised. The notion that GIFN is a community that is isolated from the non-Indigenous world, protected by the waters of Lake Simcoe, is one that will be forever altered. In community engagement activities, the First Nation community expressed considerable fear of outsiders, drugs, crime, and unwanted non-community members. This fear extended to a desired mitigation of a 'gated' or 'toll' on the Fixed Link to maintain some level of control of access to Georgina Island is maintained.

The following are potential negative effects:

- Hard to enforce action on undesirable activities pertaining to community lands and land policy
- Members want different laws than cottagers/visitors to the island

22.2.2 Indigenous Culture

When considering connecting the GIFN community to the mainland, the element of cultural impacts, which are dominantly negative, cannot be underestimated. Immediate or tangible effects may be obvious, like the risk of culturally significant areas facing potential exposure or pressure due to increased visitors to the community. Some other effects may be not as immediate or visible, like the potential loss of Island identity due to community members choosing alternative employment on the mainland or re-locating completely to the mainland.

22.2.2.1 Changes to the Environment

The following positive effects are anticipated:

- GIFN off-reserve members or public having an increased desire to seek out Georgina Island cultural activities, with access being regularized due to the Fixed Link versus ferry.

The following are potential negative effects:

- Exposure and potential destruction of GIFN Culturally Significant Areas.
- Traditional food and medicine areas on the island facing increased exposure due to increase in visitors.
- Loss of Island identity due to students re-locating to mainland schools, community members seeking better employment on the mainland and assumed increase developments within the community.

22.2.2.2 Mitigation Measures

These effects will be revisited and monitored as the construction of the Fixed Link nears completion to prevent and mitigate potential loss of spiritually or culturally significant areas or plants and wildlife, that are critical to the quality of life for the community, through the application of appropriate habitat protection and mitigation measures.

22.2.3 Education

It is believed that there will be a net positive impact to the education within the community. Although many concerns pertaining to the social 'island' fabric of the community being somewhat lost by the Fixed Link, it is believed that education will become better in the long run.

22.2.3.1 Changes to the Environment

The following positive effects are anticipated:

- One of the most significant benefits will be that children and youths are able to stay at home throughout the whole school year without billeting during freeze up and thaw season.
- Students will be able to travel, uninterrupted, by bus or personal vehicle to school or extracurricular activities rather than bus/airboat/bus in the winter months or bus by ferry during warmer months. This will reduce travel time to and from school or extracurricular activities, will negate tardiness or absenteeism due to unexpected ferry issues.
- Increased time for extracurricular offerings.
- Students will be able to have more opportunity for youth employment.
- There will be the opportunity to attract and hire qualified teachers at a at a more competitive salary, rather than those having to cross on ferry boat.
- Parents residing off territory will be able to send their children to Community School to retain their "island identity' and teachings.

The following are potential negative effects:

- Student Safety – if the Fixed Link is not monitored, there will be many more people coming and going through the community
- There may be a need for a Residency By-law to support education, taxation if population begins to grow.
- More children and youths staying to attend school or off reserve sending them to Community School creating a bigger demand on the current education system.
- Fear that school needs to be closed due to parents pulling children and youths out and sending them to mainland schools causing numbers to decline.

22.2.3.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- Effort to reinforce language and culture through changes to educational curriculum that provide additional cultural enrichment opportunities.
- Controlled road access/security.
- Develop plans for student retainment and enrollment.
- Managing the Fixed Link through an entry point (toll station) allowing for better security and controlling access of visitors.

22.2.4 Recreation

The construction of a fixed link will be a net positive when social and recreation effects are considered.

22.2.4.1 Changes to the Environment

The following positive effects are anticipated:

- More opportunity for physical activities/ extracurricular activities.
- Increased social activities and reduction in absence and cancellations due to transportation issues.
- GIFN members will have the ability to schedule social plans without worrying about the ferry schedule and weather-related delays or having to stay the night on the mainland.
- Community members can stay home in the winter months without having to worry about access to jobs or health services.
- Increase of recreation opportunities as ferry schedule may not fit recreation offerings off territories.
- Increased access to municipal programs and services, especially in mitigating social isolation of the elderly who live on Georgina Island.

The following are potential negative effects:

- There may be an increase in crime and access to drugs and other narcotics.
- Community members may be exposed to negative comments or racial stereotyping by participating in mainland base recreation and social improvement programs.
- There is strong fear that the community may lose Island identity and a significant piece of what it means to be a Georgina Islander.

22.2.4.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- Further enhancement or reinforcement of essential services; such as health, social and police services.
- Controlled access (gates) of Fixed Link and security (cameras, staff).
- Enhancement of cultural activity offerings both within community, and nearby schools.
- Continued consultation with the community during all stages of construction.
- Implementing clear signage for pedestrians and vehicle operators to ensure smooth transition once the Fixed Link is operational.
- Developing a governance structure that steers and facilitates system-based community development.
- Development of a Health and Safety (H&S) Plan.

The H&S Plan will be prepared by the contractor prior to construction and will outline practical measures to eliminate or control risks to the health, safety and welfare of workers, contractors and the public in accordance with relevant legislation and applicable Codes of Practice. The Plan will include requirements for:

- Implementation of safe work practices, safe work systems and functional equipment;
- Provision of instruction and/ or training in work processes as required;

- Hazard/ risk identification and assessment;
- Regular monitoring and updating of the H&S Plan; and
- Appropriate signage posting of notices.

Furthermore, the GIFN recognizes the sensitivity and concern related to workers brought in temporarily to the area to support construction. The project will require the contactor to have a strong health and safety management system and a commitment to implementing the following best practices as part of its H&S Plan:

- Maintain a Substance Abuse program, which will forbid the consumption of drugs and alcohol during work hours as term and condition of employment for its employees;
- Impaired individuals will not be tolerated on worksites;
- Individuals suspected to be under the influence of alcohol and/or drugs will be escorted out of the work area immediately and be dealt with according to the contractor's Substance Abuse Program, which should include reasonable grounds testing and post-incident testing; and
- Any incidents that violate the contractor policies or rules and require immediate attention or action, will be appropriately addressed by Project leadership, and may include termination.

The contractor must also establish policies that are specific to protecting the safety and security of the community and the public, and specifically Indigenous women, girls, and gender diverse people. These will include:

- creating safety protocols applicable to the Project area;
- supporting community safety programs;
- implementing mandatory training for all employees on gender-based and sexual violence, anti-racism, cultural safety, diversity and inclusion, and the effects of colonization on Indigenous peoples;
- developing and implementing systems for tracking and reporting incidents of harassment and violence; and
- exploring options to increase the representation of Indigenous women and gender diverse individuals in the workforce.

With regard to engagement, the H&S Plan will be reviewed and approved by representative of the GIFN prior to implementation to ensure that all commitments are incorporated. A community advisory committee will be formed by GIFN to engage on the development and implementation of the H&S Plan.

22.3 Economic Conditions

Overall, it is strongly believed that the Fixed Link will have a net positive impact on the community. The fact that the access to commercial markets becomes simple via a trustworthy transportation route is the key reason for the positive feelings towards the Fixed Link and the economy.

22.3.1 Economic Development

22.3.1.1 Changes to the Environment

The following positive effects are anticipated:

- Increased Employment opportunities
- Airboat Rescue Agreements possible with Town and surrounding areas
- Partnerships with small business between Band and others
- Opportunities for Band Members to start or expand small businesses
- More access to markets in the GTA
- The overall size of GI's economy is expected to grow
- Lower costs for food and other everyday necessities as travel time and ferry costs are eliminated and potential for businesses supplying necessities within community.
- Reduced time and costs of construction projects as materials can be delivered on demand rather than being based on ferry boat

The following are potential negative effects:

- There are limited by-laws/by law enforcement for development to take place in a positive way – this will need to be developed, supported and enforced.
- There may be negative effects to things like fishing access points or other points of interest in the community – there is nothing formal in place to manage possible development of sites of significance in the community. Negative effects are not anticipated for Indigenous fishing areas as none were identified within proximity of the alignment (see **Section 15.3.3.1**)
- The small amount of community expenditures will flow outside of the community more easily. What used to be a 1.5-hour trip to get items of convenience can be reduced to 10 to 15 minutes. The local market will reduce as a result of a Fixed Link.

22.3.1.2 Mitigation Measures

Mitigation measures may include but are not limited to:

- During construction, the GIFN community will develop communication and complaint resolution plans to realize procurement benefits.
- CIPS will maintain regular monthly meetings with WTFN during construction to ensure that the complaints process for First Nation communities is adequately supported.

22.3.2 Employment

22.3.2.1 Changes to the Environment

The following positive effects are anticipated:

- Opportunity for a more qualified work force in the lands department and other departments.
- Can get experts and services needed at market rates without paying the 'Island premium'.

- Greater access to employment, including youth employment, for residents of Georgina Island, as well as benefits to the labour pool for local businesses.
- Greater opportunity for more training.
- Opportunity for a more qualified work force to be developed with access to employment related services off territory.
- Reduced commute time to off territory employment.
- Hiring of By-law Officers possible as new sector developed as a part of the community's growth.
- More qualified/educated GIFN members coming home to work.
- More opportunities for GIFN members to be employed.
- Succession planning made possible.
- New employment opportunities through staffing potential controlled access stations to the Fixed Link, as well as increased requirement of road maintenance.

The following are potential negative effects:

- Loss of highly qualified individuals to mainland opportunities.
- The community will have a hard time competing with mainland for pay scale.
- There may be less opportunity for less qualified members trying to remain on territory as the market of job seekers increases to include filling positions on the Island.

22.3.2.2 Mitigation Measures

In an effort to mitigate potential negative effects on employment described above, the GIFL Secretariat developed the Procurement Principles guidance document (**Appendix S**) and the GIFL Workplace Recruitment Strategy, which are described in the following sections.

22.3.2.3 Procurement Principles

The Procurement Principles document is intended to guide the procurement process for the duration of the implementation of the Project. Refer to **Appendix S** for more details.

The following principles guide the GIFL procurement process:

- **Principle of Work Quality:** Quality of Work will always be the primary consideration for supplier selection for the Project. Quality of work will be assessed through the experience of personnel, experience of company performing the work & references for past works completed.
- **Principle of Human Inclusion:** The Principle of human inclusion requires a concerted effort by suppliers to ensure all humans are provided equal opportunity to participate in this project. 2SLGBTQQIA+ people experience disproportionate rates of unemployment and underemployment. 2SLGBTQQIA+ people may experience discrimination and bias based on their identities at every stage of the employment process and the barriers that they

experience in hiring processes limit their employment possibilities before they even begin to enter the workplace. Inclusion will require qualified suppliers to support 2SLGBTQQIA+inclusion whenever possible for the Project.

- **Principle of Indigenous Inclusion:** Inclusion will require qualified suppliers to support Indigenous inclusion whenever possible for the Project. The First Nation would like to prioritize indigenous inclusion in the following priority order:
    a. Economic or capacity development benefits to be received by Members (or familial relations to Members) of the Chippewas of Georgina Island First Nation.
    b. Economic or capacity development benefits to be received by Members of the community's Williams Treaties allies.
    c. Economic or capacity development benefits to the Indigenous population of Ontario. More specifically, this would include members of other First Nations, members of the Metis community and members of the Inuit community.
- **Principle of Sustainability and Environmental Protection:** All suppliers will provide GIFN with the workplan that has the least impact to Mother Earth in the near, mid and long term. This may require suppliers and bidders to offer solutions beyond what is requested in bid documents based on professional knowledge and experience.
- **Principle of Community:** All suppliers will be required to follow the GIFL Environmental Principles which requires all team members to take community specific training prior to undertaking any land related works. This is to be done at the cost of suppliers and is intended to ensure the community directive to protect the community, the lands and Lake Simcoe are fully understood prior to work commencing.

22.3.2.4 Workforce Recruitment Strategy

The GIFN will, as the Project progresses, provide the following unique employment opportunities.

SUMMER AND YOUTH OPPORTUNITIES

BEAHR (Building Environmental Aboriginal Human Resource) Indigenous training programs (Eco Canada) offer locally customized learning that provide accessible and meaningful career development to First Nation, Métis, and Inuit members to overcome barriers to employment and develop competencies needed to actively contribute to Canada's growing environmental sector.

The courses provide introductory training to those who want to work in the environmental sector in Canada. Graduates will have all the necessary technical, cultural, safety and soft skills required to secure meaningful environmental employment. There are two streams, Workforce Training and Technician Training. The latter gives participants further recognition if they already have environmental experience or training.

GIFN will provide BEAHR certified or unique opportunities for youth that includes on-the-job support and a job shadowing opportunity for all high school and post-secondary aged youth. Managed by the GIFL Secretariat, the community assign youth workers to shadow field professionals as they undertake study work. With core training in field-based health and safety

and the GIFL Environment Principles, youth are encouraged to shadow study team members as they complete the multitude of activities required for the Project's planning.

The intent of this program is to inspire youth and to build a legacy of knowledge of what work was completed and what results of the studies mean. This integration with western science allows for community-based understanding of processes. It also enhances work experiences to become more employable in the future.

CASUAL EMPLOYMENT OPPORTUNITIES

There are several Georgina Island members that will realize project-based employment opportunities over the course of the next three years:

- Many members are currently certified harbour pilots and meet the necessary insurance requirements to transport study teams on the ice.
- Caterers will be provided opportunities to support team meals and field teams.
- There will be the need for traditional based services for meeting openings, closings, and areas where traditional knowledge is being shared.
- Those with boats, ATV's/UTV's and vans may be required to transport field teams around the island.

These types of positions will be offered through a 'community roster'. The roster will identify skill sets and abilities to be offered to contractors on the island. These opportunities will provide a more robust resume and experiences following their service. The GIFL Secretariat will continue to monitor and project the number of casual employment opportunities as the Project continues, and demand is better understood.

FIRST NATION EMPLOYEE DEVELOPMENT

There are several skill development opportunities that will be offered because of the Project. GIFN employees will be able to learn through direct relationships with suppliers about their job, the analysis and interpretation of data and the recommendations that result from this work. The overall internal skill development for current employees will result in:

- A better understanding of the local environment
- A better understanding of western science-based methods of data collection on lands
- A better understanding of how to integrate community based ecological and traditional knowledge into western based scientific studies
- A better understanding of project management, deliverable assessment and financial modeling for projects being undertaken on community lands.
- A better understanding of the IA process to respond to other proponent's projects more effectively.

EMPLOYMENT THROUGH PROCUREMENT INITIATIVES

There will be $2M worth of studies occurring the support the Project planning. These studies will require many team members from many different contractors. The GIFN procurement process is intended to award ‘points’ to those projects that incorporate employment opportunities for:

a) Members of the GIFN
b) Members of Williams Treaties ally communities
c) Members of the Indigenous community at large including Métis and Huron Wendat community members

The GIFL Secretariat will continue to monitor and project the number of employments through procurement opportunities available, as the Project continues and project deliverables, scopes of work are identified.

Additional investigations will be required to confirm any potential impact to physical and cultural heritage features of GIFN and Williams Treaties First Nations. GIFN acknowledges that this Project will have an overall net gain in social and economic conditions for the community and will conduct investigations against their own traditional land use, knowledge, and cultural areas.

23. GREENHOUSE GAS EMISSIONS

An estimate of any greenhouse gas emissions associated with the project.

This section discusses the GHG emissions from the Project construction phase and the operation phase. A qualitative GHG comparison was not provided for the construction phase given the construction methodologies and details (such as equipment to be used) are not yet finalized. Detailed GHG calculations were conducted for the operation phase, and comparisons between the initial proposed Fixed Link design alternatives and the current Aazhaawe Ferry are presented below. The GHG assessment was updated during the reference concept design stage, following selection of the preferred alignment.

23.1 Construction

The Aazhaawe Ferry is the single largest energy user within the GIFN. From 2014 to 2017, the ferry consumed approximately 244,600 litres (L) of diesel annually, accounting for 66% of energy consumption in the Band-owned sector and about 12% of all the energy used within the community as a whole. In addition, using the annual fuel usage, it is estimated that the Aazhaawe Ferry is responsible for the production of an estimated 676 tonnes of carbon dioxide equivalent (CO_2eq) annually, which is about 17% of the total GHG emissions produced by GIFN per year when compared to GHG data provided in GIFN CEP Update (Cambium Aboriginal Inc., 2019c).

By building a Fixed Link, and eliminating the need for the ferry, there is a potential for annual GHG production (and fossil fuel combustion) to be reduced. A qualitative GHG comparison was not provided for the construction phase given the construction methodologies and details (such as equipment to be used) are not yet finalized. The following factors will be taken into consideration when assessing the construction GHG production:

- **Type of fixed link** – GHG emissions are associated with construction projects, including the operation of equipment, material manufacturing and material transportation. There are multiple fixed link types available (i.e., causeway, span bridge, etc.) each with a unique GHG emission rate.
- **Fixed Link Length** – GHG emissions for any infrastructure project will be dependent upon the amount of work required to complete the Project. In the case of roads and bridges, this is most easily expressed by the length of the Project. There are several proposed routes available for the Fixed Link, the shortest being about 3.3 km and the longest being about 3.6 km.
- **Increased Vehicle Traffic** – When the Fixed Link is built, it is anticipated that vehicle travel by GIFN residents will increase. The rate of increase is difficult to determine, but for the purposes of this analysis, it is assumed that a range of increases will be between 5% and 25% of current use. Only vehicle traffic from year-round residents has been considered and it has been assumed that there will be no increase in efficiency of vehicles. Impacts due to growth within the residential sector, increase in electric vehicle use, or increase in alternatives modes of transportation such as cycling are not included in this analysis.

Due to the unknowns that exist in relation to construction of the Fixed Link, potential GHG savings for the Project have been calculated, using the variables shown in **Table F-6,** below.

Table F-6 Values Used in GHG Savings Estimation for the Project

Variable	Preferred Alignment
Fixed Link Length (m)	3,335
GHG in Fixed Link Construction (tonnes CO_2eq/m)	15
Increase in Traffic (%)	25%

In addition to any assumptions listed above, the calculation also assumes: 1) The typical life of a ferry is 30 years. The current Aazhaawe Ferry will require replacement in approximately four years. Replacement of a ferry results in approximately 1,000 tonnes CO2eq due to manufacturing. 2) Potential increase in the efficiency of any subsequent ferry is neglected, as well as any need to increase the size of the ferry.

Actual GHG savings achieved over the life of the Fixed Link (estimated to be 100 years) varies greatly depending on the factors listed above. The best-case scenario includes choosing the shortest possible route for the Fixed Link, choosing a low producing GHG emission construction (i.e., a causeway, which is assumed to have shorter construction time, resulting in lower GHG emissions), and driving does not significantly increase (i.e., less than 25% increase). Realistically, the construction of a fixed link would likely be close to CO_2eq neutral in relation to GHG emissions over its lifetime, emitting about as much GHG emissions during construction as would be saved due to the elimination of the Aazhaawe Ferry.

23.1.1 Potential Mitigation Measures

That said, there are several considerations that should be made during the planning stages of the Fixed Link in order to increase the potential for a reduction in GHG emissions in comparison to the Aazhaawe Ferry. These considerations include:

- Choosing the shortest route for the Fixed Link;
- Decreasing overall construction time by selecting the shortest length fixed link, or employing construction efficiencies to shorten construction timelines;
- Choosing a construction method that limits GHG emission production (although this should be weighed in relation to potential physical impacts to the local environment); and
- Should a fixed link be built, actively attempting to reduce GHG emissions associated with residential transportation (encouraging carpooling and increasing personal vehicle efficiency).

23.2 Operation

The Aazhaawe Ferry currently operates all year, with varying levels of service, Monday to Friday from 7:00 am to 7:30 pm for 13 trips per weekday, and on the Saturday to Sunday from 9:00 am to 7:30 pm for 11 trips per day. The Aazhaawe Ferry can accommodate 18 vehicles each trip. The vehicles ferried were assumed to be one-third as cars, one-third as sport utility vehicle (SUV) and the remainder one-third as trucks. It was also conservatively assumed that 1% of the vehicles would be heavier duty transport trucks delivering goods to and from Georgina Island. For these calculations the scope of the assessment was limited to 250 m within the Ferry/Fixed Link. GHG emissions associated with on-ward journeys were not included

in the emission estimates due to the lack of information available to estimate the average trip each vehicle would make beyond this.

When assessing GHG emissions associated with the Project, this assessment follows the instructions under the SACC, published in October 2020, section 4.1.1, and Equation 1 to quantify project emissions. The acquired energy GHG emissions, CO_2 captured and stored, and offset credits were considered negligible for this assessment when compared to the direct GHG emissions, which already account for the avoided domestic GHG emissions in the comparison of alternatives. The assessment focused on the quantified net GHG emissions as the direct GHG emissions in Equation 1.

Net GHG emissions (SACC Equation 1) = Direct GHG Emissions + Acquired energy GHG emissions – CO_2 captured and stored – Avoided domestic GHG emissions – Offset credits

= Direct GHG Emissions

Note: the acquired energy GHG emissions, CO_2 captured and stored, avoided domestic GHG emissions, and offset credits are considered negligible comparing to the direct GHG emissions in this project.

GHG emissions from the Aazhaawe Ferry include the emissions from its operation, and the vehicle activities, such as vehicle idling, embarking and disembarking the ferry. To quantify the GHG emissions from the operation of the ferry, an annual diesel fuel consumption rate of 244,600 L was estimated based on current operations, and emission factors were obtained from “Canada's Official GHG Inventory – Emission Factor" Table A6.1-14 Emission Factors for Energy Mobile Combustion Sources, Marine, Diesel. GHG emissions from vehicle activities were calculated from the estimated vehicle-kilometer travelled (VKT) and vehicle emission factors for the 2021 year were generated using the latest Motor Vehicle Emission Simulator (MOVES3) emission model. GHG emissions from the proposed route alignments include the emissions from vehicles traveling on the Fixed Link, which were quantified using the vehicles emission factors and the VKT calculated from the length of Fixed Link in each alternative.

Based on this assessment, it was estimated that the Aazhaawe Ferry generates approximately 696tonnes of CO_2eq annually. The preferred alignment (3,335 m in length) is anticipated to generate approximately 518 tonnes of CO_2eq annually, which would provide approximately 25% reduction in GHG emissions compared to the ferry.

See below **Table F-7** for a breakdown by alternatives of the annual and daily GHG emissions.

Table F-7 GHG Emission Calculations – Comparative Values

Alternative	Emission Sources	GHG	CAS #	Annual Emission Rate (tonnes/yr)	Daily Emission Rate (tonnes/day)
Current Aazhaawe Ferry	**Ferry**	Carbon Dioxide	124-38-9	656	2
		Methane	74-82-8	0.06	0.0002
		Nitrous Oxide	10024-97-2	0.02	0.00005
			CO_2eq	662	tonnes/year
	Ferry Vehicle Activity	Carbon Dioxide	124-38-9	34	0.09
		Methane	74-82-8	0.0008	0.000002
		Nitrous Oxide	10024-97-2	0.0003	0.0000008
			CO_2eq	34	tonnes/year
			Total CO_2eq	696	tonnes/year
Refined Alternative Alignment #2 (3,335 m)	**Bridge/Causeway Vehicle Activity (3,070 m)**	Carbon Dioxide	124-38-9	517	1.4
		Methane	74-82-8	0.009	0.00002
		Nitrous Oxide	10024-97-2	0.003	0.000008
			CO_2eq	518	tonnes/year

See below as sample calculations for GHG emissions associated with the preferred alignment:

Carbon dioxide emission rate passenger cars (g/s) = *CO_2 Idling emissions per car (g/V-h) x # of cars (V/day) x Conversion x Red Light Fraction] x Idling Factor + [CO2 Travel emissions per car (g/vehicle miles travelled) x Vehicle Miles Travelled (VMT/day) x Conversion x Travel Factor]*

= *[1,390 (g/V-h) x 789 (V/day) x 1 day/86,400 sec x 0.44] x 0.1 + [281 (g/vehicle miles travelled) x 1520 (VMT/day) x 1 day/86,400 sec x 0.9]*

= *432 g/s*

Carbon dioxide annual emission rate (tonnes/yr)= *[CO_2 emissions passenger cars (g/s) + CO_2 emissions per truck (g/s) + CO_2 emissions per transport truck (g/s)] x Conversion (tonnes/g) x Conversion (3600 sec/1 hour) x Conversion (24 hour/1 day) x Conversion (365 days/1 year)*

= *[4.32 g/s + 11.3 g/s + 0.77 g/s] x (3600 sec/1 hour) x (24 hour/1 day) x (365 day/1 year) x (1 tonnes/1,000,000 g)*

= *517*

Option 2 GHG Emission Rate (tonnes/yr)= *CO_2 annual emission rate (tonnes/yr) x Global Warming Potential (GWP) (CO_2) + CH_4 annual emission rate (tonnes/yr) x GWP (CH_4) + N_2O annual emission rate (tonnes/yr) x GWP (N_2O)*

= *(517 tonnes/yr) x 1 + (0.009 tonnes/yr) x 25 + (0.003 tonnes/yr) x 265*

= *518*

23.2.1 Canada's Climate Action Plan/Strategic Assessment of Climate Change

Under Canada's Climate Action Plan, Canada is committed to achieving net-zero emissions by the year 2050. As such, reductions in GHG emissions overall are required to meet this target. Under the SACC (ECCC, 2020) to support the Climate Action Plan, any project undergoing a federal IA will be required to provide an estimate of the Project's GHG emissions.

The proposed Fixed Link GHG emissions have been estimated to result in a reduction of 26% less than the estimated GHG emissions from the Aazhaawe Ferry operations (**Appendix U**); thus, supporting the goals of Canada's Climate Action Plan.

23.2.2 Reducing Transportation Energy

Energy use related to transportation accounts for about 65% of the total energy used within the GIFN community. Although a significant portion of this energy (about 12%) can be attributed to the Aazhaawe Ferry, personal vehicle use in both the year-round residential and seasonal residential sectors make up a significant portion of the remainder.

Identifying ways to reduce energy consumption associated with transportation in the residential sectors should be a priority of the GIFN CEP moving forward. Potential initiatives include:

- Encouraging use of the pedestrian walkway that will be included as part of the Fixed Link and will be wide enough to accommodate both pedestrians and bicycles.
- Encouraging methods of reducing transportation, such as carpooling and cycling;
- Educating the community on the impact of energy use related to transportation (i.e., fossil fuel combustion);
- Encouraging residents to purchase efficient vehicles, including hybrid and electric models; and
- Developing infrastructure within the community to support the use of electric vehicles, including electric vehicle charging stations.

In addition, efficient vehicles (including hybrid and electric models) should be considered when replacement of administrative vehicles is required (and where hybrid/electric models are suitable). Carpooling is organic to the island and already occurs on a regular basis. Given the controlled traffic and customs of carpooling, any carpooling will be encouraged to any extent for users of the Fixed Link.

24. TYPES OF WASTE AND EMISSIONS

A description of any waste and emissions that are likely to be generated – in the air, in or on water, and in or on land - during any phase of the project and a description of the plan to manage them.

Although construction will have many impacts to the environment, it is believed many of the impacts will be mitigated similar to bridge construction projects of a similar scale. Streamlined construction mitigation measures in addition to increased security and safety of the proposed alternative and elimination of environmental disasters as a result of ferry accidents are viewed as net positive impacts on the environment. See **Section 23** for a discussion on GHG emissions. See **Table F-8** and **Table F-9** for a summary of waste and emissions that are likely to be generated by the Project during each of phase of the Project.

for a summary of waste and emissions that are likely to be generated by the Project during each of phase of the Project.

Table F-8 Summary of Waste Sources

Type of waste/ emission	Source	Management/Re-uses	Project phase
Excess Soil - To be identified in Phase II ESA - typically metals, PHCs, PAHs, Electrical conductivity (EC)/ sodium adsorption ratio (SAR)	Excavated soil, topsoil, and sediment (Excess Soil)	To be re-used on-Site wherever possible or at a beneficial re-use site per Ontario Regulation 406/19. Liquid soils or sediment which does not pass slump test must be dewatered prior to testing for re-use, all in accordance with a Soil and Ground Water Management Plan prepared and approved for the Project.	Construction Post-operation (end-of-life)
Demolition materials - asphalt Metals, PHCs [F3, F4, F4G] and PAHs are typical	Existing asphalt removal	Asphalt removal, if necessary, will be specified to be re-used on-Site as a compacted gravel base in gravel areas to prevent erosion, or may be included as re-cycled asphalt in asphalt design mixes on- or off-Site, or as a recycled asphalt product surface treatment on- or off-site.	Construction

Type of waste/ emission	Source	Management/Re-uses	Project phase
Demolition materials Steel and other metals/alloys, concrete, asphalt, aggregate	Bridge and causeway structures/superstructure (steel, concrete, asphalt, aggregate)	Steel and other metals/alloys, concrete, asphalt, aggregate demolition materials to be segregated and assessed for re-use or recycling.	Post-operation (demolition)
Geological Spill Metals, petroleum hydrocarbons (PHCs), EC/SAR, cyanide are typical	Spill/Erosion	Comprehensive ESC Plan. Spills Management and Response Plan	Construction Operation (in the event of a spill; accumulation in storm water management pond/sediment basin/OGS) Post-operation (demolition)
Soil and Sediment To be determined through Phase II ESA/soil and sediment characterisation sampling; metals, PHCs, EC/SAR, cyanide are typical.	Pre-existing Contaminated soil/sediment Post-demolition soil/sediment	Contaminated soil or sediment passing slump test will be assessed for beneficial re-use wherever possible and for disposal when necessary, per *Ontario Regulations 153/04, 406/19, and 347*. Special requirements apply for the re-use of contaminated materials. Additional characterization (sampling and analysis) will be required for re-use/disposal purposes.	Construction Post-operation (demolition)
Hydrogeological/ Hydrological To be determined through Phase II ESA/environmental characterisation; metals, PHCs are typical	Ground Water/ Surface Water	Ground water or surface water that is pumped for dewatering will comply with a PTTW and discharged in accordance with an ECA per section 53 of the Ontario *Water Resources Act*. Sampling and monitoring maybe required for discharges.	Construction Post-operation (demolition)
Air Emissions Nitrogen dioxide, sulphur dioxide, particulate matter	Fossil fuel combustion, dust-generating activities	• Develop a BMPP) for Dust.	Construction (construction equipment, fugitive sources)

Type of waste/ emission	Source	Management/Re-uses	Project phase
(total suspended particles, PM_{10}, $PM_{2.5}$), carbon monoxide, ozone, VOCs, PAHs, metals, diesel, particulate matter (DPM), carbon dioxide, methane, nitrous oxide		• Manage construction timing and duration appropriately • Construction equipment selection and maintenance	Operation (vehicle activity)
Water discharge to lake, ground water Chloride, sodium, metals, PAHs, cyanide	Storm water runoff	Stormwater management plan to capture and treat runoff	Operation
Geological	Bedrock	• Bedrock may be re-used as granular or dimensional stone assuming no evidence of contamination is observed. • Crushing/screening may be required for re-use as granular if the re-use will be subject to Ontario Provincial Standard Specification (OPSS). • Fine materials maybe considered soils for management purposes.	Construction
Fuel spill PHCs F1-F4, metals	Construction vehicles Traffic on causeway/bridge	Clean up/remediate per comprehensive Spills Management and Response Plan.	Construction Operation Post-operation (demolition)

Note: Necessary assessments will be done in future phases of the Project.

Table F-9 Summary of Emissions Sources

DIRECT EMISSIONS		
Option	**Source**	**Details**
Ferry	Ferry	The Aazhaawe Ferry operations emissions
	Vehicle idling	Vehicle fleets that travel via the Aazhaawe Ferry (Cars, SUVs, trucks, transport trucks)
	Vehicle embarking and disembarking the ferry	Vehicle fleets that travel via the Aazhaawe Ferry (Cars, SUVs, trucks, transport trucks)
Fixed Link	Vehicle emissions	Vehicle fleets that travel on the Fixed Link (Cars, SUVs, trucks, transport trucks)

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