Appendix BSA-2

Aquatic Environment Baseline Study

PROJECT NUJIO’QONIK
Environmental Impact Statement

PROJECT NUJIO'QONIK
Aquatic Environment Baseline Study

August 2023

Prepared for:

Prepared by:

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141 Kelsey Drive
St. John's, NL   A1B 0L2

File: 121417575

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Abbreviations

AC	Assimilative Capacity
AC CDC	Atlantic Canada Conservation Data Center
ASB	aeration stabilization basin
CCME	Canadian Council of Ministers of the Environment
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPAWS	Canadian Parks and Wilderness Society
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
EA	environmental assessment
EBSAs	Ecologically and Biologically Significant Areas
ECCC	Environment and Climate Change Canada
EDOs	Environmental Discharge Objectives
EIS	Environmental Impact Statement
EPA	*Environmental Protection Act*
EQOs	Environmental Quality Objectives
ERA	Ecological Risk Assessment
ESA	*Endangered Species Act*
FAL	Freshwater Aquatics Life
GCDWQ	Guidelines for Canadian Drinking Water Quality
HADD	harmful alteration, disruption or destruction
kV	kilovolt
LAA	Local Assessment Area
m	metre
mbgs	metres below ground surface
MMF	mean monthly flow
Mt	megatonnes
MW	megawatt

NL	Newfoundland and Labrador
NLDMA	Newfoundland and Labrador Department of Municipal Affairs
PPWSA	Protected Public Water Supply Areas
psu	practical salinity unit
RAA	Regional Assessment Area
RoW	Right of Way
SAR	species at risk
SARA	*Species at Risk Act*
SiBAs	Significant Benthic Areas
SMAs	Special Marine Areas
SOCC	species of conservation concern
SSAC	Species Status Advisory Committee
SWMP	Surface Water Monitoring Plan
t	Metric tonnes
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TSS	total suspended sediment
UXOs	unexploded ordnances
VEC	valued environmental component
VOC	volatile organic compounds
WEGH2	World Energy GH2
WHPA	wellhead protection area
WQMA	Water Quality Monitoring Agreement
WSC	Water Survey of Canada
WUL	water use license

1.0 Introduction

World Energy GH2 (WEGH2) is proposing Project Nujio’qonik (the Project). The Project involves the development, construction, operation and maintenance, and eventual decommissioning and rehabilitation of one of the first Canadian, commercial-scale, “green hydrogen”[1] and ammonia production plants powered by renewable wind energy. Located on the western coast of the island of Newfoundland, Newfoundland and Labrador (NL), the Project will have a maximum production of up to approximately 206,000 t of green hydrogen (equivalent to approximately 1.17 megatonnes (Mt) of ammonia) per year. The hydrogen produced by the Project will be converted into ammonia and exported to international markets by ship. The hydrogen / ammonia plant and associated storage and export facilities will be located at the Port of Stephenville (in the Town of Stephenville, NL) on a privately-owned brownfield site and at an adjacent existing marine terminal, both of which are zoned for industrial purposes.

Renewable energy from two approximately 1,000 megawatt (MW) / 1 gigawatt (GW) onshore wind farms on the western coast of Newfoundland will be used to power the hydrogen and ammonia production processes. These wind farms (referred to herein as the “Port au Port area wind farm” and the “Codroy area wind farm”) will include up to 328 turbines and collectively produce approximately 2,000 MW / 2 GW of renewable electricity. The Port au Port wind farm layout under consideration consists of 171 turbine locations on the Port au Port Peninsula, NL and adjacently on the Newfoundland “mainland” (i.e., northeast of the isthmus at Port au Port, on Table Mountain). The final layout of the Port au Port wind farm will ultimately consist of up to 164 turbines when constructed. The Codroy wind farm layout under consideration consists of 143 turbine locations. The final layout of the Codroy wind farm will also consist of up to 164 wind turbines located on Crown land in the Anguille Mountains of the Codroy Valley, NL. The final total nameplate capacity for each wind farm is expected to be approximately 1,000 MW / 1 GW. The modelling and assessment work is based on preliminary layouts for both wind farm sites (i.e., 171 potential turbine locations at the Port au Port wind farm and 143 potential turbine locations at Codroy wind farm). Final wind farm layouts will be dependent on results of the wind campaign and more detailed field investigations. Once the layout and number of turbines are finalized, the results of models will be reviewed and updated as required. If additional turbine locations are added to the Codroy wind farm in the future, it will be done in consideration of the mitigation measures, compliance with regulations, and such that the conclusions of the effects assessment do not change.

The Project is subject to provincial environmental assessment (EA) requirements under the NL *Environmental Protection Act* and associated *Environmental Assessment Regulations* (EA Regulations). This document is the Aquatic Baseline Study, prepared in support of an Environmental Impact Statement (EIS) and required under section 4.3.2 of the EIS Guidelines.

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[1] “Green hydrogen” is produced via electrolysis using renewable electricity to split water into hydrogen and oxygen. This type of hydrogen, which is referred to by the European Commission (n.d.) as “renewable fuel of non-biological origin”, is often called “green hydrogen” in industry.

1.1 Project Overview and Location

The Project includes the construction, operation and maintenance, and decommissioning of the Port au Port wind farm, Codroy wind farm, and a hydrogen / ammonia plant in Stephenville, as well as upgrades to the existing port at Stephenville (Figure 1.1).

The Project Area shown on Figure 1.1 is a conservative representation of the spatial extent of potential Project-related direct physical disturbance (i.e., the Project footprint). In addition to encompassing the immediate area in which Project components and activities will occur, the Project Area also includes up to a 175 metre (m) buffer (350 m right-of-way [RoW]) around key Project components. This buffer allows some flexibility for the micro-siting of certain Project components (e.g., wind turbines) during detailed design, based on technical considerations as well as the avoidance of environmentally sensitive areas, where practicable.

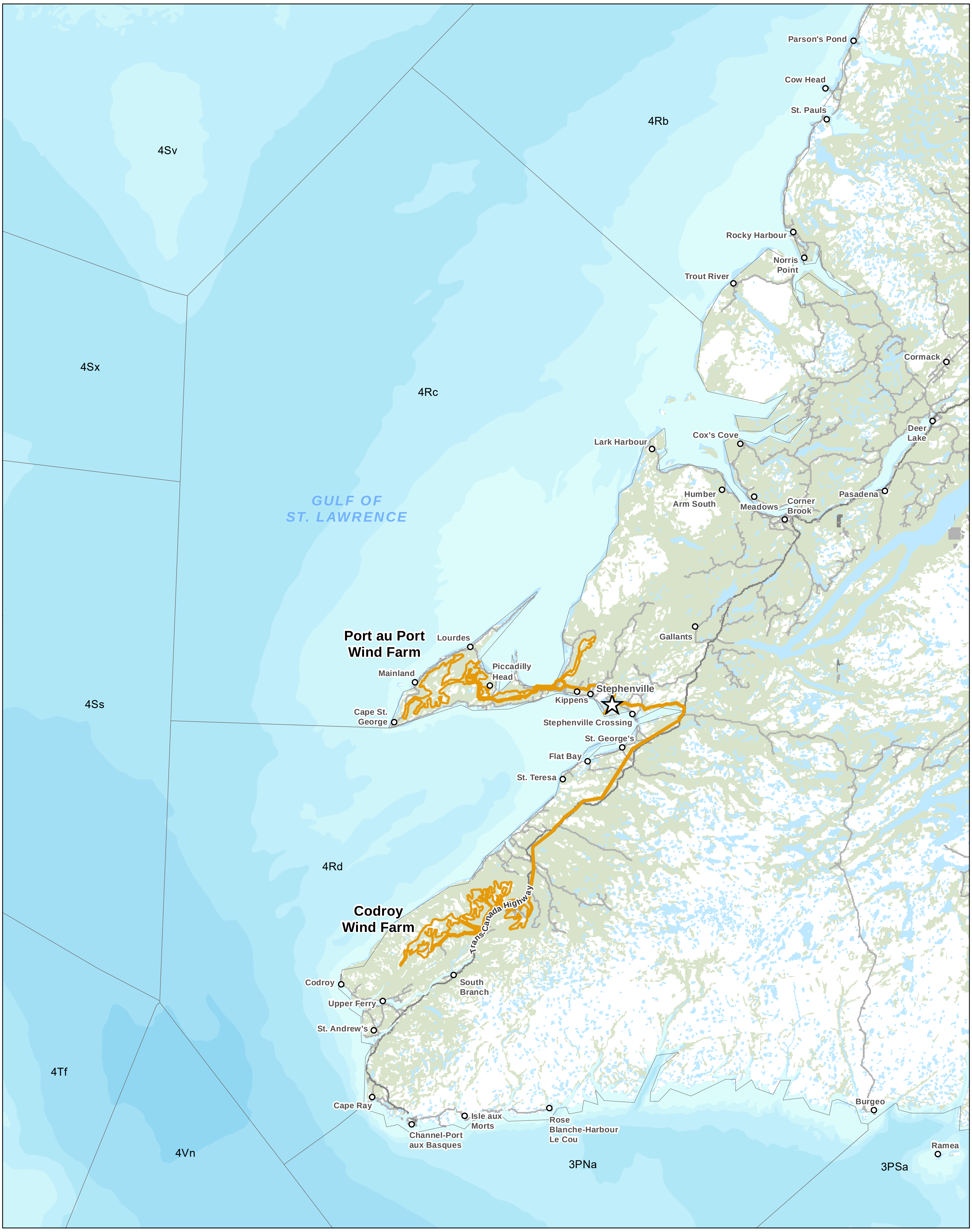
The proposed hydrogen / ammonia plant and export facilities at the Port of Stephenville are located approximately 5 kilometres (km) west of the Town of Stephenville, Newfoundland and Labrador (NL). The Port au Port wind farm (comprised of Port au Port West and Port au Port East) is located west and north of Stephenville and the Codroy wind farm is located 75 km south of Stephenville; both are connected to the hydrogen / ammonia plant by a collector system / transmission lines.

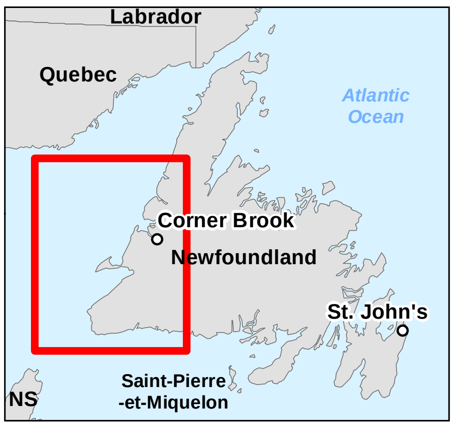
1.2 Scope of the Study

The Aquatic Environment Baseline Study has been developed in consideration of the section 4.3.2 of the final EIS Guidelines. The study is focused on the following components:

- Water Resources and Use
  - Groundwater Resources
  - Surface Water Resources
- Wastewater Discharge
- Freshwater Fish and Fish Habitat
- Freshwater Fisheries
- Marine Environment

As detailed below, the approach to the baseline studies has been developed based on both field data and publicly available desktop information. Information on spatial boundaries, study scope, methods and the results are provided for each component.





☆ Hydrogen / Ammonia Plant Location

🟧 Project Area

☐ NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
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Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Client, Province of Newfoundland and Labrador, ACCDC, Stantec
3. Background: Natural Resources Canada CanVec

Stantec

Project Location
Stephenville
NL

Prepared by NW on 2023/08/01
QR by AW on 2023/XX/XX

Client/Project
121417233_035

World Energy GH2
Project Nujio'qonik

Figure No.
1.1

Title
Project Area

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2.0 Water Resources and Use

This baseline report describes the relevant components of the water resources within the Regional Assessment Area (RAA) associated with the hydrogen / ammonia plant, wind farm locations, and transmission lines including:

1. Hydrological features such as watershed areas and the location of rivers and river inputs
2. Surface and ground water resources
3. Surface-water flow, groundwater movement, base flow and aquifer recharge zones
4. Water quality
5. Hydrologic/Hydrogeologic assessment of the water supply, including testing results for quantity and quality, including metals
6. Survey of existing public drinking water source areas that may be affected, including watershed or recharge areas and characteristics, land cover assessment, and a water quality assessment

This baseline study will inform the assessment of the effects that the Project may have on the aquatic environment.

2.1 Scope And Objectives of the Water Resources and Use Study

The objectives of this water resources and use baseline study are to summarize existing conditions so the effects of the Project on groundwater and surface water resources can be predicted in future studies. The scope of the baseline study includes:

- Description of the existing groundwater conditions in the RAA including groundwater levels and background water quality.
- Description of the existing surface water quality and surface water quantity in the RAA
- Identification of existing users of both groundwater and surface water

2.2 Methods

This section includes the review of existing desktop information and the development of baseline datasets to support the assessment of the assimilative capacity of the receiving environment throughout the development of the project. Field work is anticipated in Summer 2023 to support the development of the EIS and future permitting.

2.2.1 Groundwater Resources

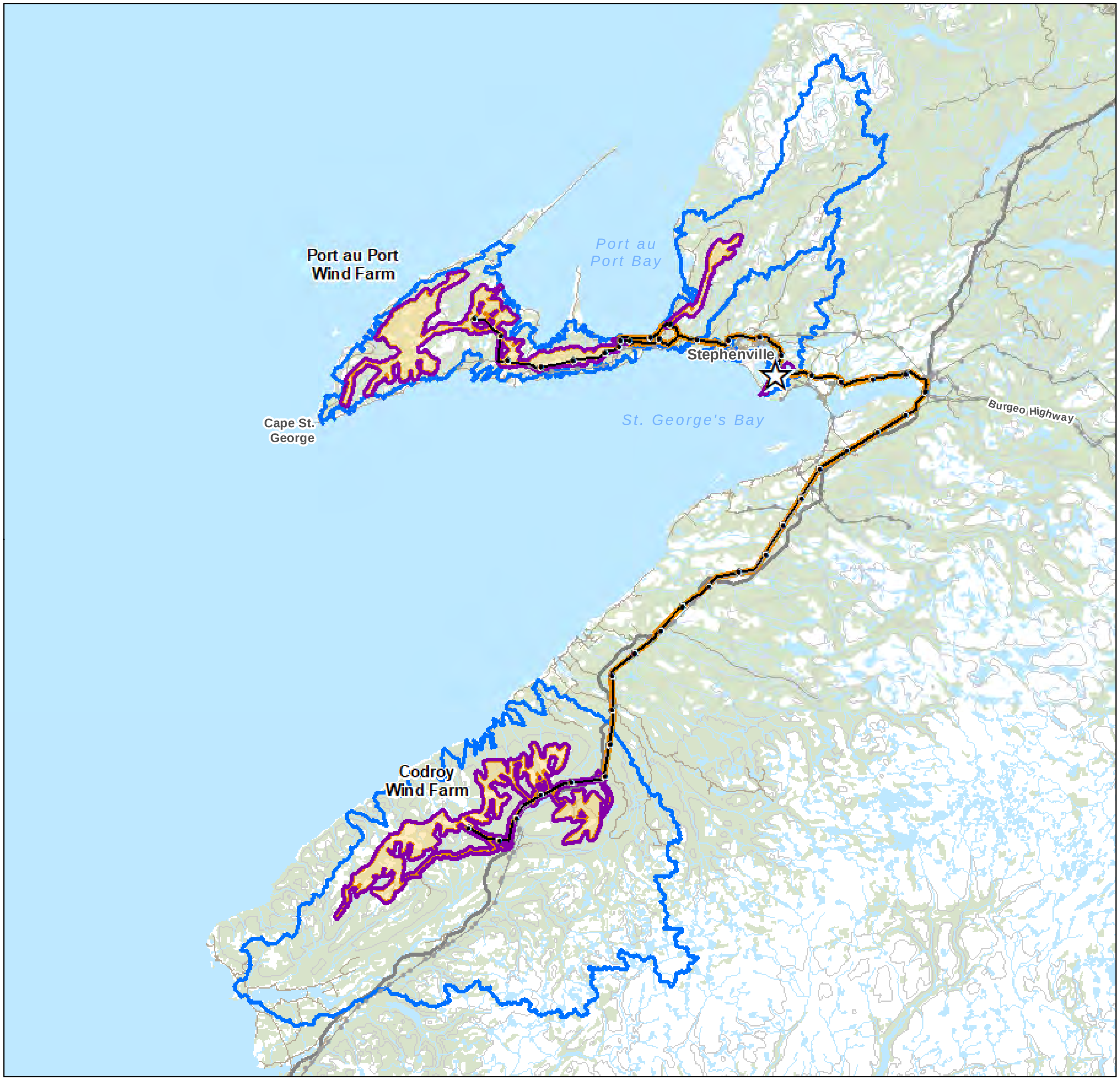
2.2.1.1 Spatial Boundaries

The Project Area is the direct footprint of the Project and is consistent across Valued Environmental Components (VECs). The Project Area encompasses the immediate area in which Project activities and components will occur and is comprised of the following distinct areas: the Port au Port wind farm, the Codroy wind farm, the hydrogen / ammonia plant, port facilities, and the 230 kilovolt (kV) transmission lines, as well as associated infrastructure including roads, substations, and water supply(ies). The Project Area is the potential area of direct physical disturbance associated with the construction, operation, and decommissioning, rehabilitation and closure of the Project. The Project Area includes a buffer (up to 175 m) around planned infrastructure to allow for micro siting during detailed design and mitigation to avoid ecological and culturally sensitive habitats

The Local Assessment Area (LAA) is the area adjacent to the Project Area where there is the potential for direct Project-related effects on groundwater. The potential effects related to water table drawdown during construction activities were used as a basis for delineating the LAA. To estimate the potential area of influence of a dewatering well, a fixed-radius approach consistent with that used to generate wellhead protection areas (WHPAs) for small municipal supply wells in the province was used. A WHPA generated using a fixed-radius approach usually encompasses the area within 100 to 300 metres of the wellhead (NLDMAE 2017). Given that water taking(s) associated with the above activities are of shorter duration and expected to be at a lower rate than a municipal taking, a 100-m buffer was added to the Project Area to define the LAA, excluding portions which are exclusively related to transmission lines as no Project-related dewatering is expected in these areas. The LAA is divided into the Port au Port LAA, the Codroy LAA, and the Stephenville LAA and may change slightly based on the Codroy camp water supply locations/water demand.

The RAA is the area adjacent to the LAA where there is the potential for indirect and/or cumulative Project-related effects on groundwater. As the environmental effects of the Project on groundwater resources are not expected to extend to the boundaries of the RAA, the RAA for groundwater resources was chosen to match the RAA for surface water resources and is based on the watershed boundaries contributing to the Project Area. The RAA is divided into the Port au Port RAA, the Codroy RAA, and the Stephenville RAA.

The Project Area, LAA, and RAA are presented in Figure 2.1.



Stantec

🟧 Project Area

🟪 Local Assessment Area

🟦 Regional Assessment Area

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

●— Transmission Line 230 kV

Other Features

●— Transmission Line, Existing

— Trans-Canada Highway

— Road

— Contour (100 m)

— Watercourse

▨ Waterbody

▨ Forested Area

N

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Kilometres
(At original document size of 8.5x11)
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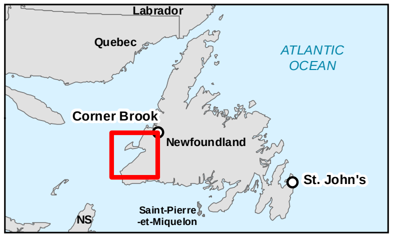
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-07-14
QR by AW on 2023-08-03

Client/Project
World Energy GH2
Project Nujio'qonik

121417233_042d

Figure No.
2.1

Spatial Boundaries

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2.2.1.2 Baseline Data Review

The baseline data review includes publicly available data and hydrogeological studies specific to the Project. The following publicly available data sources were used to support the baseline study of groundwater resources:

- Bedrock and surficial geology mapping (GeoScience OnLine Atlas; NLDIET 2023)
- Real Time Water Quality Monitoring Station Data (NLDECC 2023a)
- Protected groundwater area mapping (Water Resources Portal; NLDECC 2023b)
- Drilled Water Database (NLDECC 2023c)
- Hydrogeology of Western Newfoundland (AMEC 2008)
- Water Resources Atlas of Newfoundland (NLDEL 1992)

This report references the following supporting design and planning studies prepared for the Project:

- Fracflow (2022), Assessment of the Potential to Obtain an Industrial Water Supply, Stephenville, NL.
- Fracflow (2023a), Industrial Water Supply Infrastructure, Stephenville, NL.
- Fracflow (2023b), Geotechnical Factual Report. Former Abitibi Mill Site. Stephenville, NL.
- Fracflow (2023c), Preliminary Geotechnical Interpretive Report. Former Abitibi Mill Site. Stephenville, NL.
- Stantec (2022), Preliminary Findings of the Environmental Due Diligence Review, Port Harmon and Former Abitibi Site, Stephenville, NL.

2.2.2 Surface Water Resources

2.2.2.1 Spatial Boundaries

The Project Area is the direct footprint of the Project and is consistent across VECs. The Project Area encompasses the immediate area in which Project activities and components will occur and is comprised of following distinct areas: the Port au Port wind farm, the Codroy wind farm, the hydrogen / ammonia plant, port facilities, and the 230 kV transmission lines, as well as associated infrastructure including roads, substations, and water supply. The Project Area is the potential area of direct physical disturbance associated with the construction, operation and decommissioning and rehabilitation of the Project. The Project Area also includes a up to a 175 m buffer (350 m RoW) around key Project components to allow for micro-siting during detailed design and mitigation to avoid ecological and culturally sensitive habitats.

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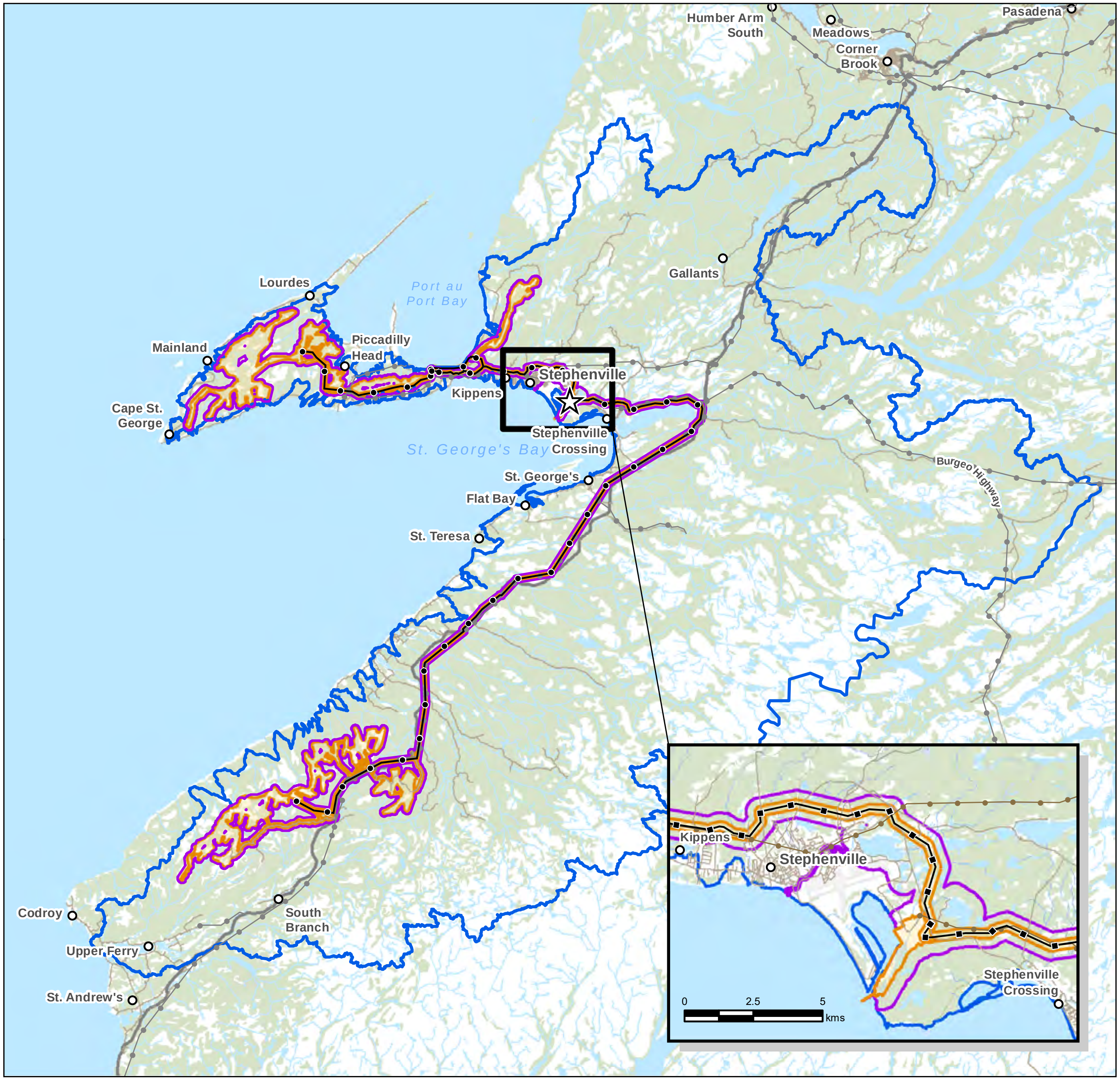

Stantec

- 🟧 Project Area
- 🟪 Local Assessment Area
- 🟦 Regional Assessment Area

Proposed Project Features

- ☆ Hydrogen / Ammonia Plant Location
- Transmission Line 230 kV

Other Features

- Existing Transmission Line
- Trans-Canada Highway
- Road
- Watercourse
- Waterbody
- Forested Area

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Kilometres
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Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NL Fisheries, Forestry, and Agriculture; NRCan CanVec
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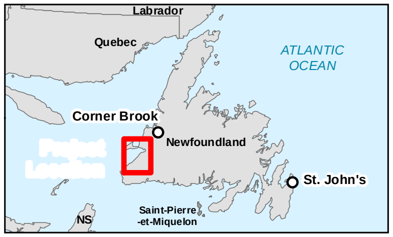


Project Location
Stephenville
NL

Prepared by NW on 2023-06-02
QR by AW on 2023-07-17

Client/Project
World Energy GH2
Project Nujio'qonik

121417233_070

Figure No.
2.2

Spatial Boundaries for Surface Water

The LAA is the area adjacent to the Project Area where there is the potential for direct Project-related effects on surface water. The potential effects related to surface water quantity and surface water quality during construction activities were used as a basis for delineating the LAA. The LAA for this VEC encompasses the topographic catchment area of site watercourses and waterbodies located downstream of project infrastructure.

The RAA is the area adjacent to the LAA where there is the potential for indirect and/or cumulative Project-related effects on surface water. As the environmental effects of the Project on surface water resources are not expected to extend to the boundaries of the RAA, the RAA for this VEC is based on the delineated watershed area contributing surface flow to defined watercourses and waterbodies, from headwater to defined outlet point, in which project infrastructure is contained.

2.2.2.2 Baseline Data Review

The baseline data review includes publicly available data and supporting design and planning studies specific to the Project. The following publicly available data sources were used to support the baseline study of surface water resources:

- Publicly available GIS data including hydro network and topographic contours (CANVEC 2023)
- Regional regression for the Province of Newfoundland (AMEC 2014)
- Surface water quantity data (Water Survey of Canada (WSC) hydrometric network)
- Regional surface water quality data (Water Quality Monitoring Agreement (WQMA) Sites)
- Surface source water supply mapping (Water Resources Portal)

This report references the following supporting design and planning studies prepared for the Project:

- Fracflow (2023a), Industrial Water Supply Infrastructure, Stephenville, NL
- Fracflow (2022), Active Storage and Water Quality in Water Supply Ponds, Stephenville, NL

2.2.2.3 Data Analysis

Surface Water Quantity

Surface water quantity is estimated using regional regression relationship developed for the Province of Newfoundland and Labrador. The Project is located within Subregion D, a hydrologic zone which encompasses the southwestern region of the island of Newfoundland (AMEC 2014). The regression relationships are developed using hydrometric station data from the Water Survey of Canada (WSC) gauged watercourses located in Subregion D (Table 2.1).

Table 2.1 Water Survey of Canada Stations used in Regional Regression Analysis

Station ID	Station Name	Drainage Area (km^2)	Years of Record	Range of Years
02YJ001	Harrys River Below Highway Bridge	640	53	1968-2021
02YJ003	Pinchgut Brook at Outlet of Pinchgut Lake	119	12	1986-1997
02YK002	Lewaseechjeech Brook at Little Grand Lake	470	66	1952-2021
02YN002	Lloyds River Below King George IV Lake	469	41	1981-2021
02ZB001	Isle Aux Morts River Below Highway Bridge	205	58	1962-2019
02ZC002	Grandy Brook Below Top Pond Brook	230	39	1982-2020
02ZD002	Grey River Near Grey River	1,340	48	1969-2019
02ZE001	Salmon River at Long Pond	2,640	22	1944-1965
02ZE004	Conne River at Outlet of Conne River Pond	99.5	33	1989-2021
02ZF001	Bay Du Nord River at Big Falls	1,170	72	1950-2021
02ZK004	Little Salmonier River near North Harbour	104	39	1983-2021
02ZA002	Little Barachois Brook near St. George's	343	20	1978-1997
02ZA002	Highlands River at Trans Canada Highway	72	39	1981-2020
02ZA003	Little Codroy River near Doyles	139	16	1982-1997
02ZK003	Little Barachois River Near Placentia	37	37	1983-2019

Estimates of mean monthly flow (MMF) and mean annual flow (MAF) are determined for each studied watershed using the Subregion D regional regression relationships. MMF is compared to a threshold value of 30% MAF per the 2013 Department of Fisheries and Oceans (DFO) Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. Per the framework, changes to a flow regime that result in flows <30% of MAF represent a heightened risk of effects on fisheries.

Surface Water Quality

Analysis of available surface water quality data includes the comparison of available data to applicable guideline values, specifically the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life in marine and freshwater. Where surface water is used as a source of potable water supply, raw water quality is also screened using the Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) as a metric to assess the potability of the water supply source.

2.2.2.4 Surface Water Quality Monitoring Field Program

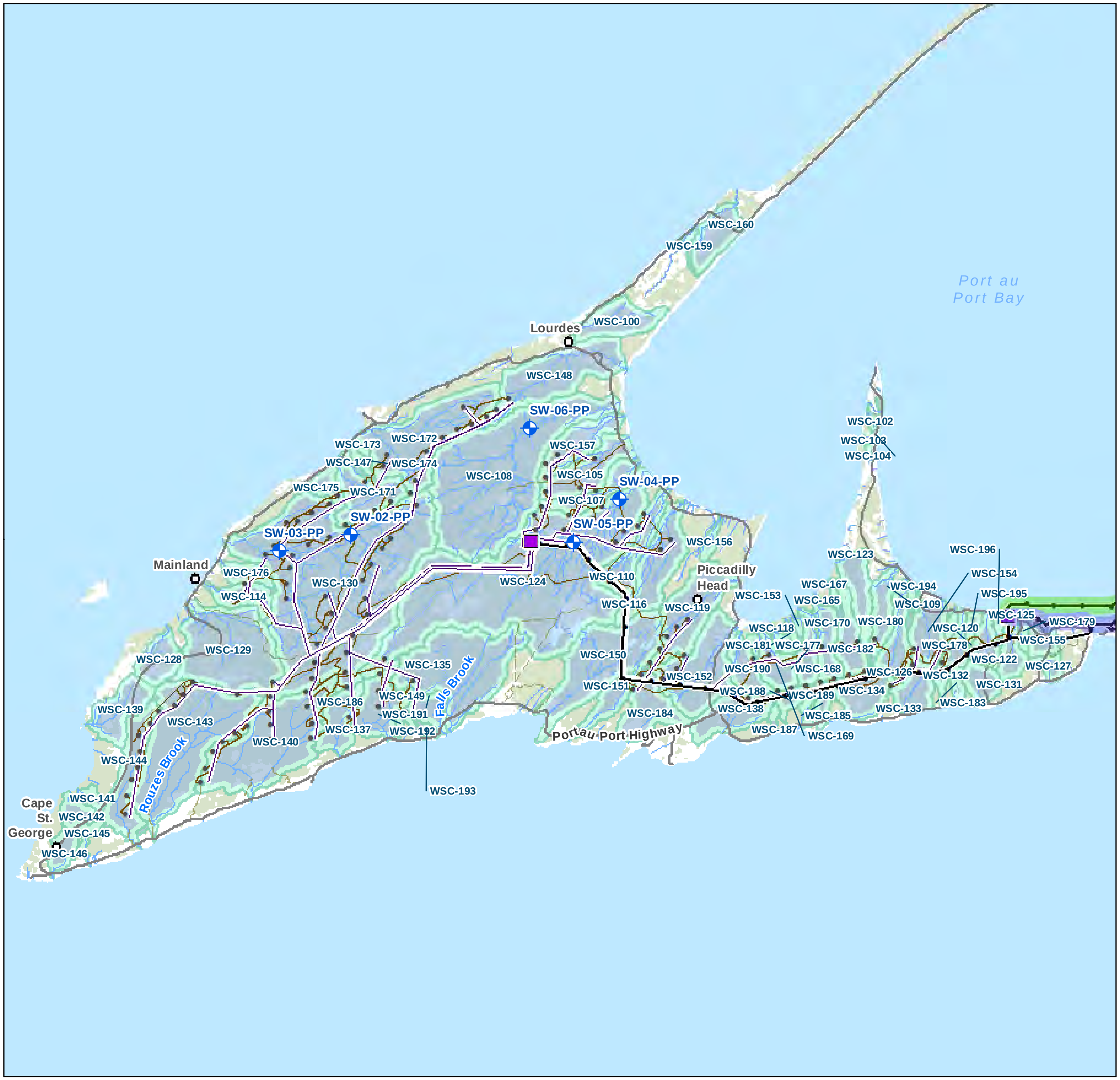
A surface water quality monitoring field program will be carried out within watersheds at the Port au Port and Codroy wind farms and associated infrastructure in conjunction with fish habitat assessment work in the Spring/Summer of 2023. Monitoring locations will include watercourses within identified Protected Public Water Supply Areas (PPWSAs) providing surface water supply and a subset of select watercourses in major catchment areas at locations upstream and downstream of proposed project infrastructure. The preliminary Surface Water Monitoring Plan (SWMP) outlined in this section will be reviewed and updated based on available information prior to undertaking sampling. Upon completion of field work and sample analysis a separate report on the results will be prepared. A high-level description of planned monitoring locations and methods are provided in the following subsections.

Surface Water Quality Monitoring Locations

Eleven distinct monitoring locations are proposed for surface water quality monitoring. Locations are selected based on proximity to project infrastructure (Table 2.2, Figures 2.3 to 2.6)

Table 2.2 Proposed Surface Water Quality Monitoring Locations by Project Area

Port au Port Peninsula Wind Farm			
Stream Name	**Station ID**	**Identifier**	**Watershed**
Phillips Brook	SW-01-PP	Adjacent to Project Infrastructure, WCA-092a	WSC-211
Mainland Brook	SW-02-PP	Adjacent to Project Infrastructure, WCA-020	WSC-130
Mainland Brook	SW-03-PP	Adjacent to Project Infrastructure, WCL-713	WSC-130
Harry's Brook	SW-04-PP	Adjacent to Project Infrastructure, WCA-113	WSC-124
Harry's Brook	SW-05-PP	Adjacent to Project Infrastructure, WCA-769e	WSC-124
Victor's Brook	SW-06-PP	Adjacent to Project Infrastructure, downstream of WCA-118	WSC-108
Codroy Wind Farm			
Stream Name	**Station ID**	**Identifier**	**Watershed**
Morris Brook	SW-01-CD	Downstream of Project Infrastructure, at highway	WSC-315
Unnamed Tributary to North Branch Grand Codroy	SW-02-CD	Adjacent to Project Infrastructure, WCC-219b	WSC-315
Port of Stephenville			
Stream Name	**Station ID**	**Identifier**	**Watershed**
Unnamed	SW-01-ST	Discharge point of Gull (Mine) Pond	Gull (Mine) Pond Watershed
Warm Creek	SW-02-ST	Supply Stream to Noels Pond	Warm Creek Watershed
Warm Creek	SW-03-ST	Outlet of Noels Pond	Warm Creek Watershed



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Stantec

⊕ Sampling Station

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

● Turbine Location

■ Substation

— Access Road

— Collector Line

— Transmission Line 230 kV

▬ Proposed Route

▬ Alternate Route

Other Features

— Trans-Canada Highway

— Road / Highway

-- Resource Road / Trail

— Watercourse

▭ Waterbody

▭ Watershed

N

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Kilometres
(At original document size of 8.5x11)
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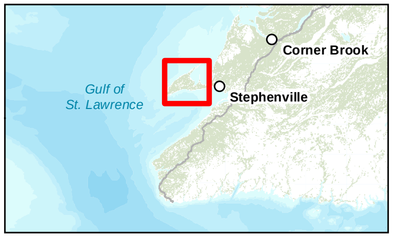
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

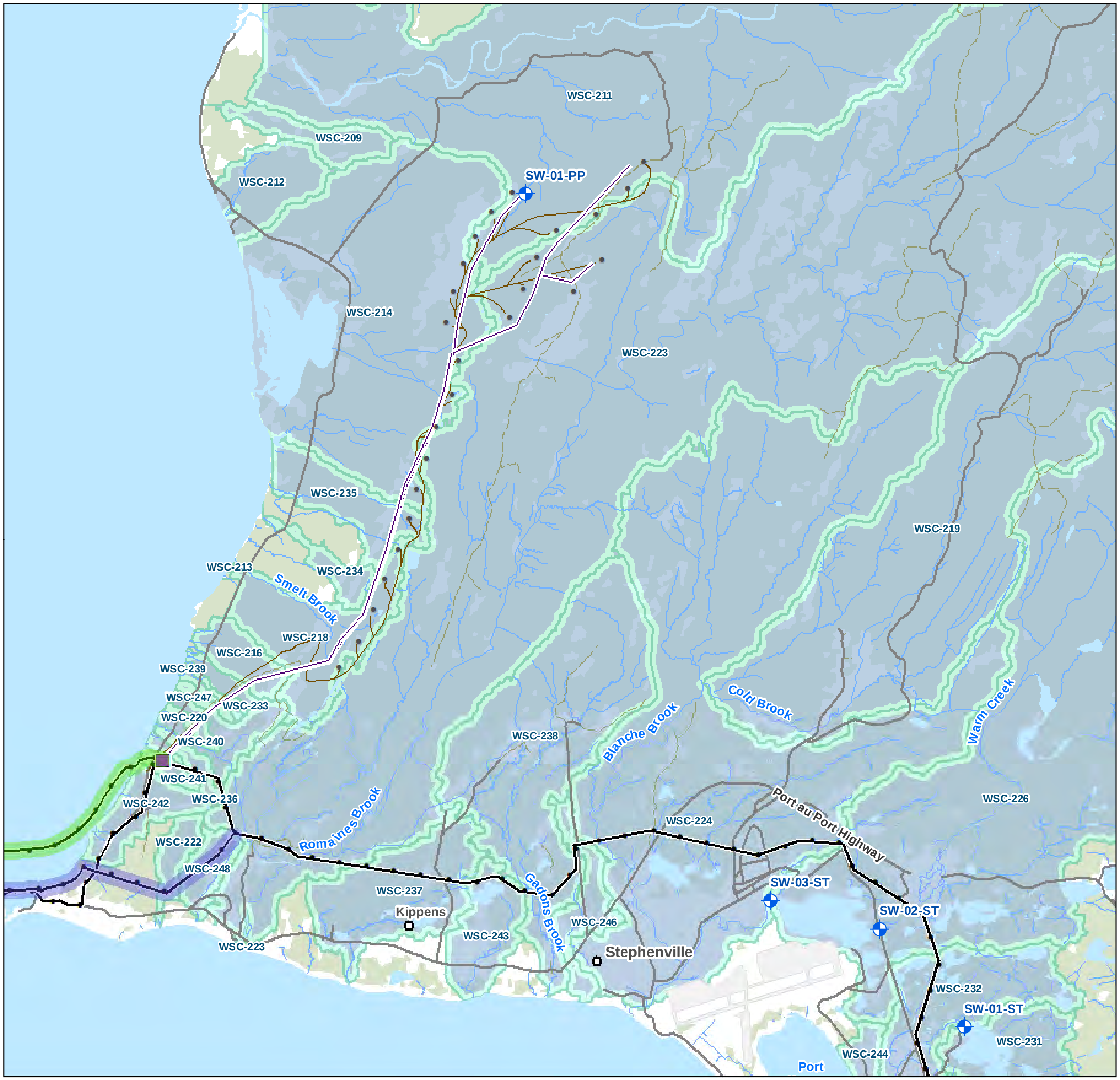
Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.3

121417233_071b

Port au Port Wind Farm
Surface Water Sampling Stations



Stantec

⊕ Sampling Station

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

● Turbine Location

■ Substation

— Access Road

— Collector Line

●— Transmission Line 230 kV

▬ Proposed Route

▬ Alternate Route

Other Features

— Trans-Canada Highway

— Road / Highway

--- Resource Road / Trail

— Watercourse

▭ Waterbody

▭ Watershed

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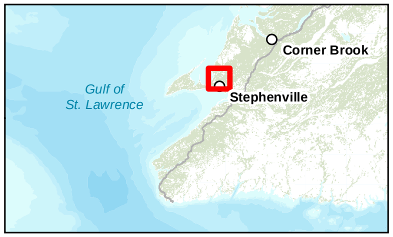
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.4

121417233_071b

Port au Port Wind Farm (East)
Surface Water Sampling Stations

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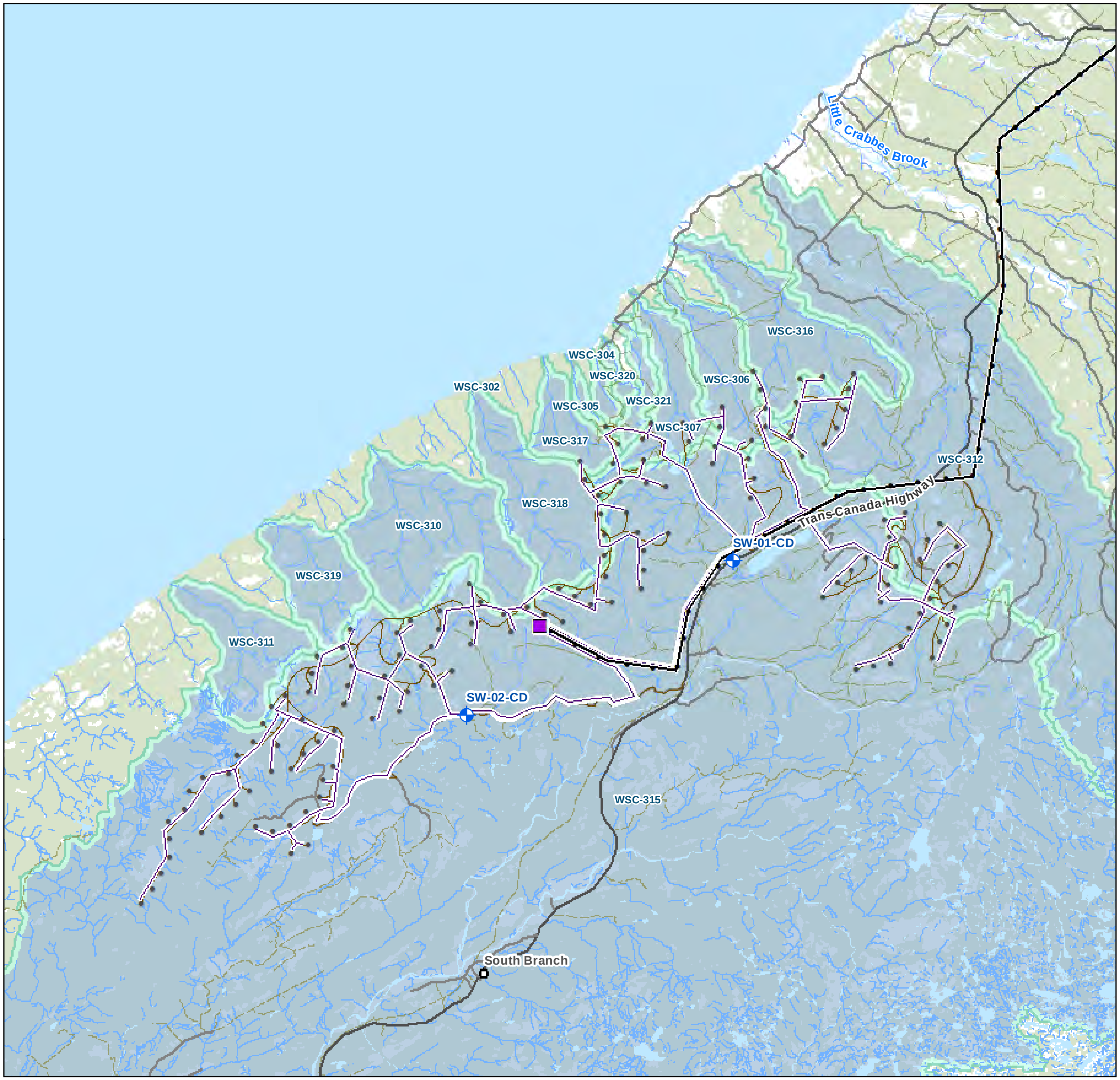


Stantec

⊕ Sampling Station

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

● Turbine Location

■ Substation

— Access Road

— Collector Line

●— Transmission Line 230 kV

Other Features

— Trans-Canada Highway

— Road / Highway

- - Resource Road / Trail

— Watercourse

🟦 Waterbody

▨ Watershed

N

0 2.5 5
Kilometres
(At original document size of 8.5x11)
1:232,000

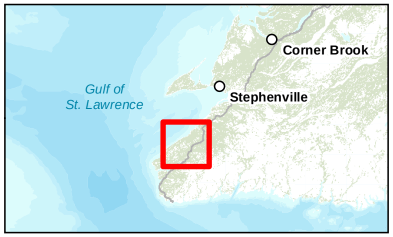
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N

2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap

3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

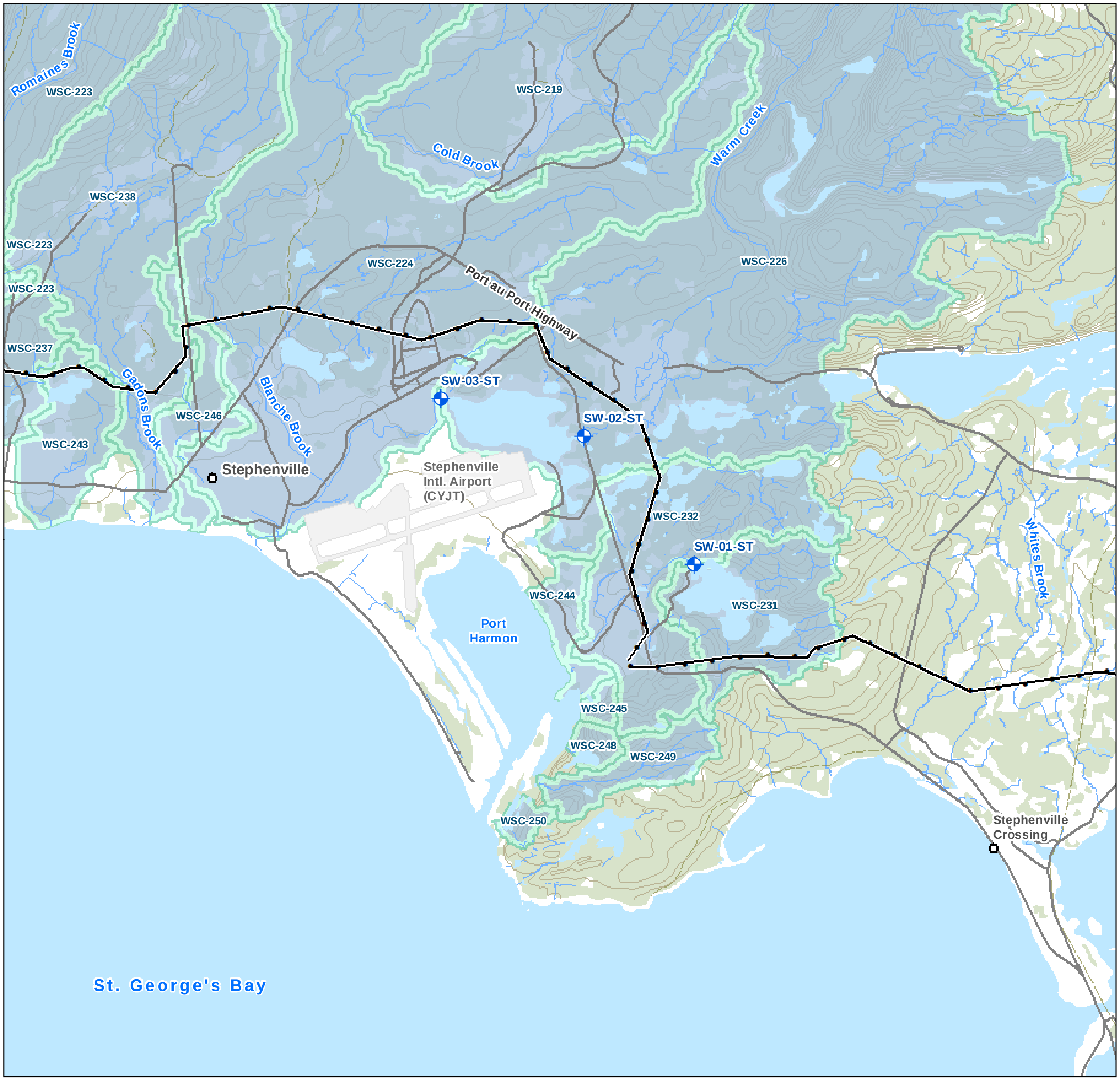
Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.5

121417233_071b

Codroy Wind Farm
Surface Water Sampling Stations



Stantec

⊕ Sampling Station

Proposed Project Features

●— Transmission Line 230 kV

Other Features

— Trans-Canada Highway

— Road / Highway

-- Resource Road / Trail

— Watercourse

▨ Waterbody

▨ Watershed

N

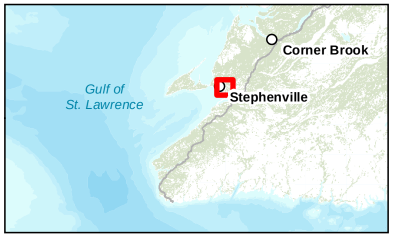
0 1 2 Kilometres

(At original document size of 8.5x11)
1:81,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.6

121417233_071b

Port of Stephenville
Surface Water Sampling Stations

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_071b_Fig2.3_2.6_SW_Sample_Stations_REVC.mxd Revised: 2023-08-04 By: NiWhite

2.3 Results

2.3.1 Groundwater Resources

The baseline hydrogeological conditions for the Project, based on the documents listed in Section 2.2.1.1, are summarized below. Bedrock and surficial geology in the RAA are presented in Figures 2.7 to 2.10. Locations of water supply wells and PPWSAs related to groundwater are presented in Figure 2.11.

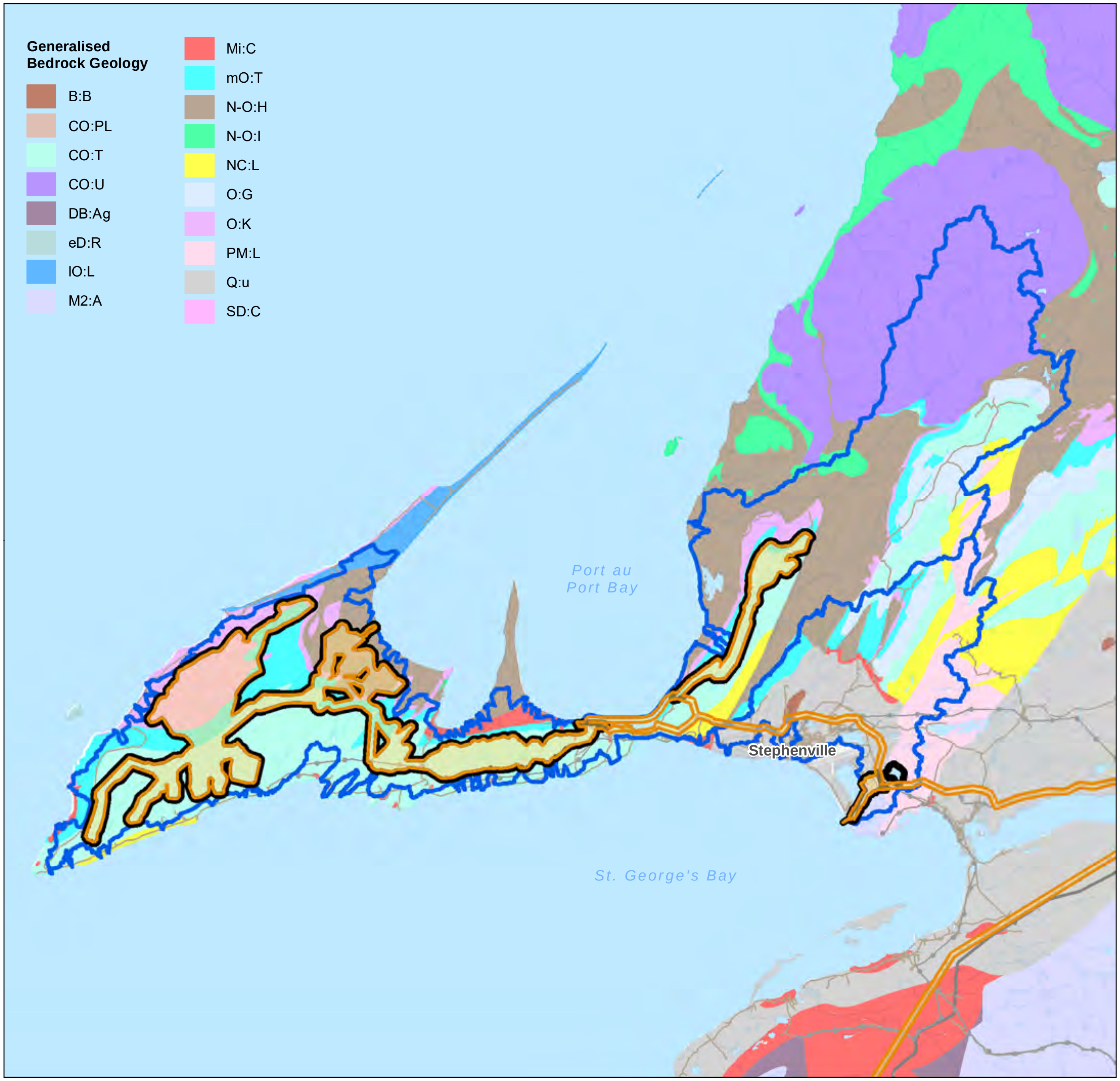
2.3.1.1 Port au Port Wind Farm

The portion of the RAA associated with the Port au Port wind farm (Port au Port RAA) is comprised of two areas – one on the Port au Port Peninsula itself (referred to as Port au Port West) and one near the communities of Port au Port East and Point au Mal (referred to as Port au Port East).

Bedrock geology underlying the Port au Port RAA consists of Paleozoic-aged rocks of the Table Point, Table Cove, and Black Cove Formations belonging to the Table Head Group, and the March Point and Petit Jardin Formations belonging to the St George Group. The Table Head and St George groups are described as mainly carbonate and clastic limestone and are indicated as mO:T and CO:T on Figure 2.7 respectively. Bedrock along the northern coast of the Port Au Port Peninsula is comprised of Paleozoic-aged rocks of the Mainland Formation, belonging to the Goose Tickle Group, consisting mostly of sandstone and other siliciclastic marine rocks(O:K on Figure 2.7).Bedrock along the eastern coast of the Port Au Port Peninsula is comprised of lower-Ordovician-aged rocks of the Humber Arm Supergroup, consisting of shales and other sedimentary bedrock (N-O:H on Figure 2.7) (Williams 1985).

Surficial geology (Figure 2.9) is largely shallow bedrock concealed by vegetation, patches of till, sand and gravel, and bog. Surficial deposits of marine clay, sand, gravel, and diamicton are common near coastal areas, particularly on the northern shore of the peninsula (Liverman and Taylor 1993). Areas of till veneer and exposed bedrock are associated with poor infiltration rates; greater recharge potential is expected where sands and gravels are present at surface (Acres 1992).

Hydrogeology of Western Newfoundland (AMEC 2008) contains records for thousands of water wells drilled on the western side of the Island of Newfoundland. Hydrostratigraphic units are defined for various surficial materials with letters (Units A and B) and for various bedrock lithologies with numbers (Units 1 through 6) based on well depths and yield.



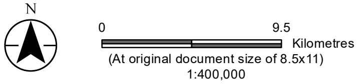
Stantec

Proposed Project Features

- Project Area
- Local Assessment Area
- Regional Assessment Area

Other Features

- Transmission Line, Existing
- Trans-Canada Highway
- Road
- Watercourse
- Waterbody



(At original document size of 8.5x11)
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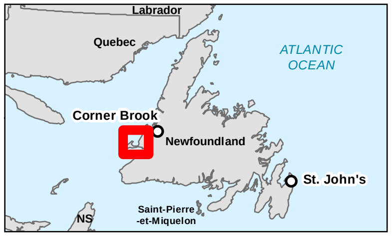
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap, Newfoundland and Labrador Geological Survey
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by MB on 2023-08-01
QR by AW on 2023-07-31

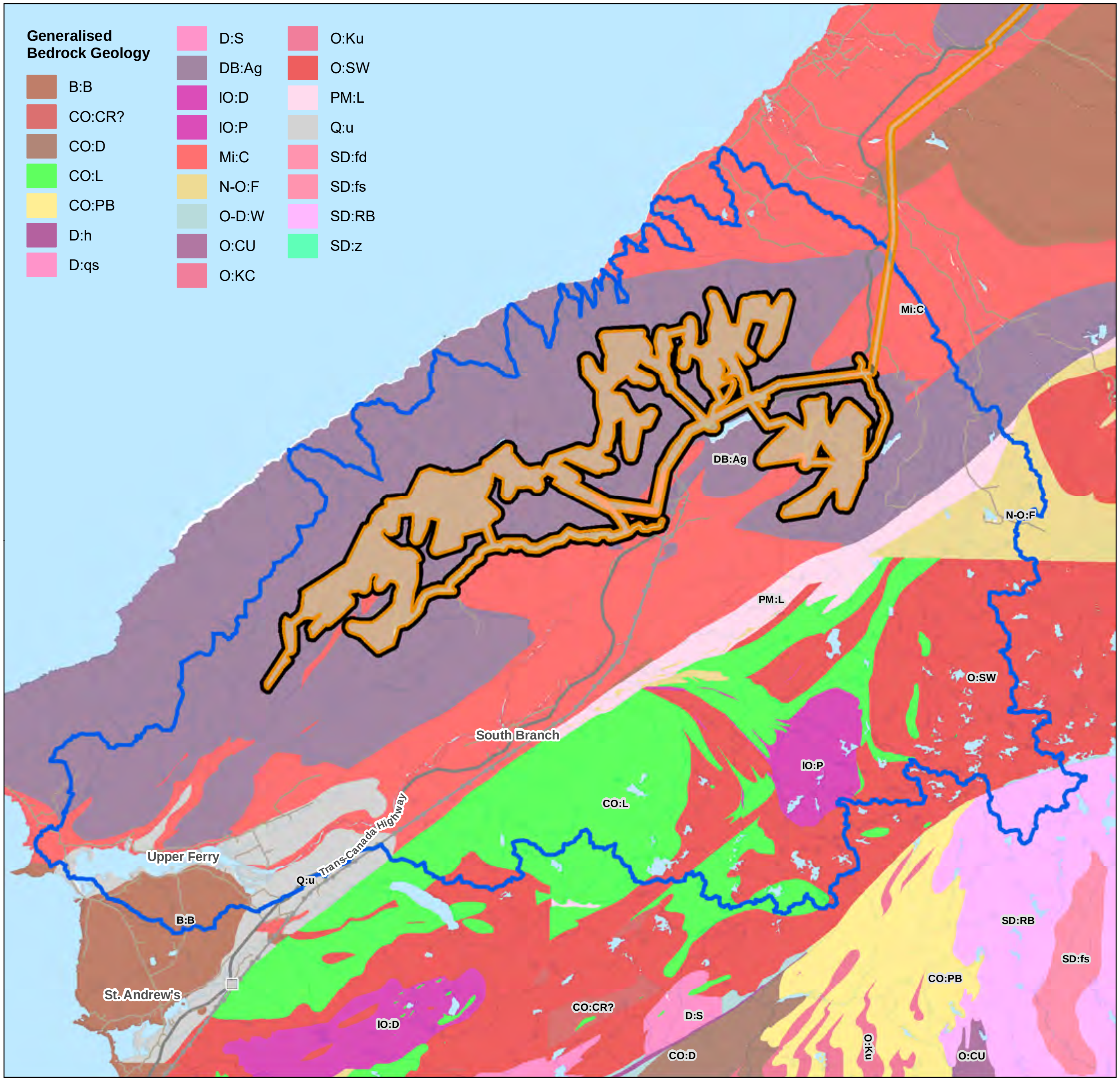
Client/Project
World Energy GH2
Project Nujio'qonik

121417233_040

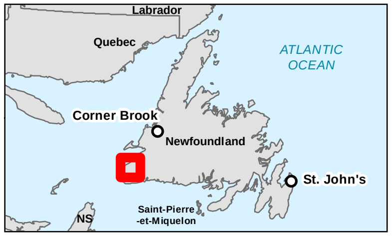
Figure No.
2.7

Bedrock Geology in the Port au Port and Stephenville Regional Assessment Areas

V:\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Hydrogeology\121417233_040_Geology_Bedrock_RevD_PaP.mxd   Revised: 2023-08-01 By: mblackwood



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap, Newfoundland and Labrador Geological Survey
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by MB on 2023-08-01
QR by AW on 2023-07-31

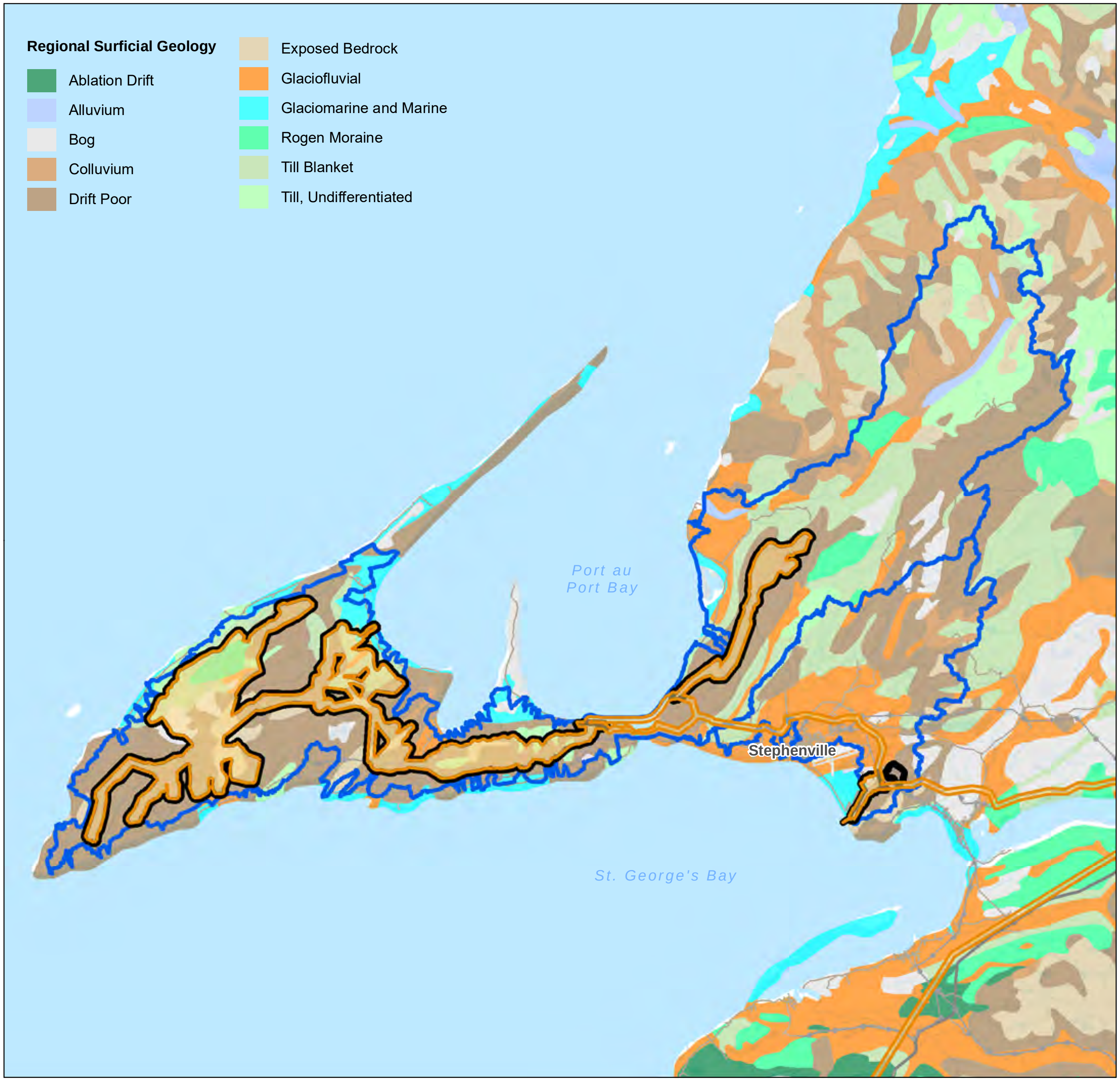
Client/Project
World Energy GH2
Project Nujio'qonik

121417233_040a

Figure No.
2.8

Bedrock Geology in the Codroy Regional Assessment Area

V:\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Hydrogeology\121417233_040a_Geology_Bedrock_RevD_Codroy.mxd Revised: 2023-08-01 By: mblackwood



Stantec

Proposed Project Features

- Project Area
- Local Assessment Area
- Regional Assessment Area

Other Features

- Transmission Line, Existing
- Trans-Canada Highway
- Road
- Watercourse
- Waterbody

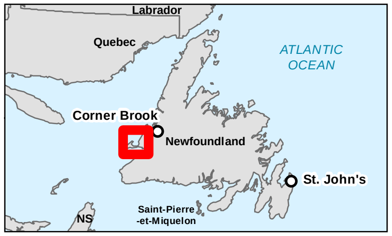
N

0 9 Kilometres

(At original document size of 8.5x11)
1:400,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap, Newfoundland and Labrador Geological Survey
3. Background: NRCan CanVec

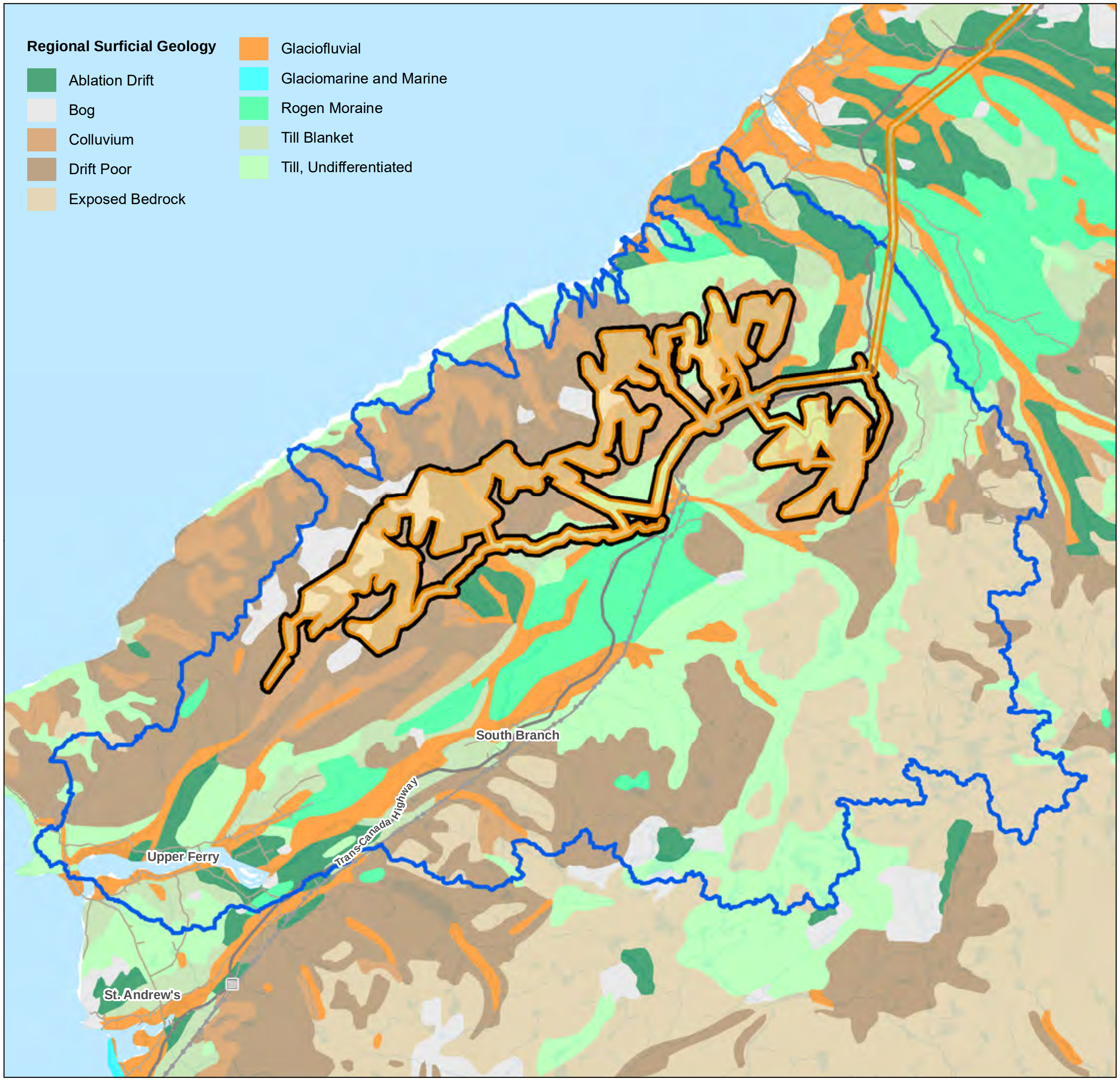


Project Location Stephenville NL	Prepared by MB on 2023-08-01 QR by AW on 2023-07-31
Client/Project World Energy GH2 Project Nujio'qonik	121417233_041

Figure No.
2.9

Surficial Geology in the Port au Port and Stephenville Regional Assessment Areas

V:\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Hydrogeology\121417233_041_Geology_Surficial_RevD_PaP.mxd Revised: 2023-08-01 By: mblackwood



Stantec

Proposed Project Features

- 🟧 Project Area
- ⬛ Local Assessment Area
- 🟦 Regional Assessment Area

Other Features

- ■ Substation, Existing
- — Transmission Line, Existing
- — Trans-Canada Highway
- — Road
- — Watercourse
- ■ Waterbody

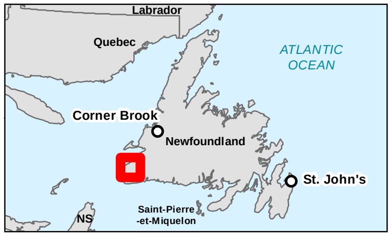
N

0 7.5 Kilometres

(At original document size of 8.5x11)
1:320,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap, Newfoundland and Labrador Geological Survey
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by MB on 2023-08-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

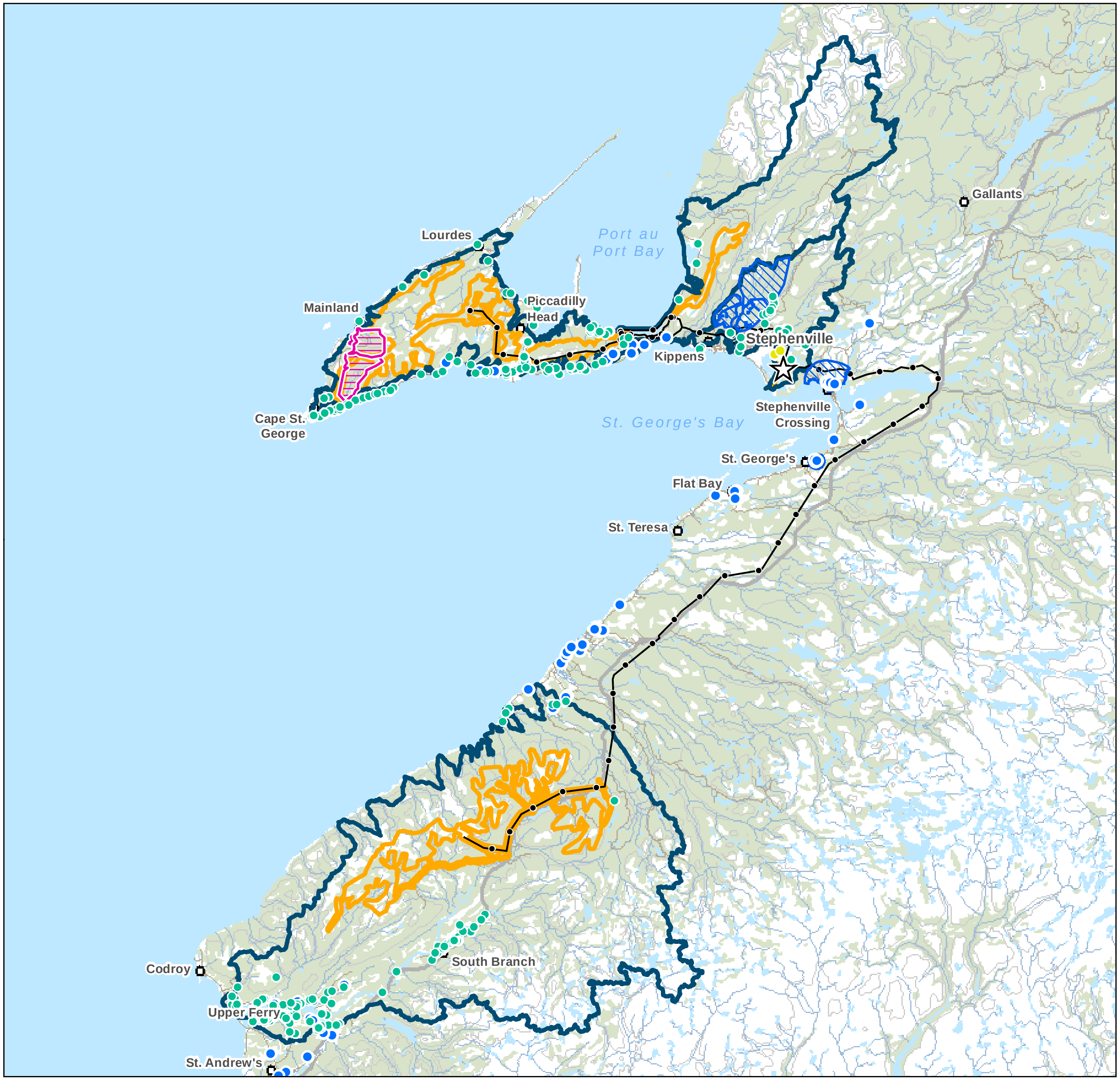
121417233_041a

Figure No.
2.9

Surficial Geology in the Codroy Regional Assessment Area

V:\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Hydrogeology\121417233_041a_Geology_Surficial_RevD_Codroy.mxd Revised: 2023-08-01 By: mblackwood

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_042_Fig_2.11_Public_Groundwater_Supplies_and_Drilled_Well_Records.mxd Revised: 2023-08-03 By: NWhite



Stantec

● Northern Harvest Smolt Drilled Well

● Drilled Well Record

● Public Groundwater Supply

Public Water Supplies

▨ Protected Water Supply

■ Other Public Water Supply

▨ ILUC (Interdepartmental Land Use Committee) Water Supply

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

—•— Transmission Line 230 kV

☐ Regional Assessment Area

Other Features

— Trans-Canada Highway

— Road

— Watercourse

■ Waterbody

■ Forested Area

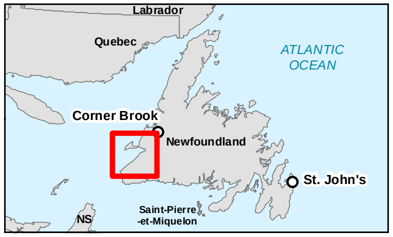
N

0 9 18 Kilometres

(At original document size of 8.5x11)
1:700,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: NLECC Water Resources Management Division, World Energy GH2, NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by AC on 2023-05-11
Rev. by NW on 2023-07-04
QR by AW on 2023-08-03

Client/Project
World Energy GH2
Project Nujio'qonik

121417233_042

Figure No.
2.11

Title
Public Groundwater Supplies and Drilled Well Records

The majority of drilled wells in the Port au Port RAA are located in hydrostratigraphic Unit 3, which is described as moderate yield carbonate sedimentary rock comprised of limestone and dolostone from the Port au Port, St. George, and Table Head groups (AMEC 2008). This description is consistent with the bedrock geology described above (Williams 1985). Unit 3 is described as having moderate yield with a median well depth of approximately 36 metres below ground surface (mbgs). The average estimated safe yield from 37 aquifer tests conducted on wells completed in Unit 3 is reported to be 54 litres per minute (L/min) with a range of 1 to 250 L/min (AMEC 2008). Surficial hydrostratigraphic units (i.e., Unit A and B) were not identified within the Port au Port RAA based on mapping from the Hydrogeology of Western Newfoundland (AMEC 2008) and well records for the Port au Port RAA do not indicate many shallow wells. It is noted, however, that many drilled or dug wells in the province do not have records (Acres 1992). Shallow wells in the area would lie within surficial hydrostratigraphic Unit A and B, consisting of till deposits and sand/gravel deposits with higher average yields of 48.2 and 73.9 L/min respectively (AMEC 2008).

Groundwater on the Port au Port peninsula is expected to be recharging mainly near the topographic highs inland near the center of the peninsula and discharging north or south to the coast. Groundwater near Port au Port East and Port au Mal is expected to be recharging upland to the east-northeast and discharging near the shores of Port au Port East and Port au Mal. It is expected that the shallow groundwater systems in these areas will be largely controlled by surface runoff and local recharge, while at moderate depths the flow system may be influenced by recharge at higher elevations (Tóth 2009). The movement of groundwater through the underlying bedrock can be expected to mainly occur within secondary openings, such as fractures and joints, and will be variable depending on the frequency and interconnection of these structural features. The underlying bedrock aquifer is likely to be under semi-confining conditions with recharge predominantly from lateral inflow of groundwater from adjacent upland areas.

There are 14 public groundwater supply wells along the southern coast of the Port au Port Peninsula, serving the communities of Piccadilly Slant – Abraham's Cove, Port Au Port West – Aguathuna – Felix Cove, Sheaves Cove, and Ship Cove – Lower Cove – Jerry's Nose. These public groundwater supply wells are considered PPWSAs, with the exception of the Piccadily Slant and Abraham's Cove wells. These public groundwater supply wells are located within the Port au Port RAA with the exception of those serving the community of Ship Cove – Lower Cove – Jerry's Nose. There are no public groundwater supply wells in the portion of the Port au Port RAA near Port au Port East and Point au Mal.

Source water quality for the public supply wells within the Port Au Port RAA is described in the Community Water Resources Reports available on the Water Resources Portal (NLDECC 2023b). Source water generally meets the Guidelines for Canadian Drinking Water Quality (GCDWQ; Health Canada 2022) with the occasional exceedance of criteria for the aesthetic, chemical and physical parameters of colour, turbidity, arsenic, lead, and manganese. The quality of source water for the public groundwater supply wells within the Port Au Port RAA is consistent with the general quality of groundwater in Western Newfoundland that periodically exceeds chemical/physical GCDWQs for turbidity, arsenic, lead, and manganese (AMEC 2008). Provincial water quality data for the Port au Port RAA is provided in Appendix A.

The Drilled Water Well Database (NLDECC 2023c) contains records for 87 water supply wells within the Port au Port LAA and RAA, which includes the public groundwater supplies described above (Figure 2.11). Available records for these wells are shown in Appendix B and are summarized herein. Six of the water supply wells are screened in the overburden, 53 in bedrock (dolostone, limestone, sandstone, shale, and granite), with the remainder unknown. The median well depth is approximately 45 mbgs with a median static water level of approximately 8 mbgs. The median yield of these wells is reported in the Drilled Water Well Database as 24 L/min. Four wells are located within the Port au Port LAA in the community of Piccadilly and draw water from the moderate yield carbonate sedimentary bedrock aquifer (Unit 3) with yields of between 1 and 27 L/min (AMEC 2008).

2.3.1.2 Codroy Wind Farm

Bedrock geology underlying the Codroy wind farm portion of the RAA (Codroy RAA) consists of Late Devonian to Mississippian-aged rocks of the Snakes Bight and Kennels Brook Formations, belonging to the Anguille Group, consisting mostly of siliciclastic nonmarine bedrock (DB:Ag on Figure 2.8) (Knight 1982).

Surficial geology (Figure 2.10) consists mostly of shallow bedrock concealed by vegetation, patches of till, sand and gravel, and bog. Thicker colluvium deposits of coarse-grained bedrock derived surficial sediments existing in low lying areas or at the base of steep rock faces (Liverman and Taylor 1993 and Kirby et al. 2009). Exposed bedrock at surface is associated with low recharge potential (Acres 1992).

The majority of drilled wells in the Codroy RAA are located in Unit 4, which is described as moderate yield carboniferous sedimentary rock comprised of strata of the Anguille, Deer Lake, Codroy, and Barachois groups (AMEC 2008). This description is consistent with the bedrock geology described above (Knight 1982). Unit 4 is described by AMEC as having moderate yield with a median well depth of approximately 38 mbgs. The average estimated safe yield from 84 aquifer tests conducted in Unit 4 is reported to be 125.8 L/min with a range of 2 to 1530 L/min (AMEC 2008). Surficial hydrostratigraphic units (i.e., Unit A and B) were not identified within the Codroy RAA based on mapping from the Hydrogeology of Western Newfoundland (AMEC 2008) and well records for the Codroy RAA do not indicate many shallow wells. It is noted, however, that many drilled or dug wells in the province do not have records (Acres 1992). Shallow wells in the area would lie within surficial hydrostratigraphic Unit A and B, consisting of till deposits and sand/gravel deposits with higher average yields of 48.2 and 73.9 L/min respectively (AMEC 2008).

Groundwater in the Codroy RAA is expected to be recharging mainly near the topographic highs on either side of the Grand Codroy River and discharging to the Atlantic Ocean in the southwest of the RAA. Discharge areas along the west coast are also common in smaller catchments along the length of the Codroy LAA. It is expected that the shallow groundwater systems in these areas will be largely controlled by surface runoff and local recharge, while at moderate depths the flow system may be influenced by recharge at higher elevations (Tóth 2009). The movement of groundwater through the underlying bedrock can be expected to mainly occur within secondary openings, such as fractures and joints, and will be variable depending on the frequency and interconnection of these structural features. The underlying bedrock aquifer is likely to be under semi-confining conditions with recharge predominantly from lateral inflow of groundwater from adjacent upland areas.

There are no public water supply wells or groundwater PPWSAs within the Codroy RAA.

In the absence of public water supply well chemistry data from within the Codroy RAA, expected water quality in the RAA is evaluated instead from other public water supply wells outside the Codroy RAA, but within hydrostratigraphic Unit 4. Of 606 groundwater samples analyzed from 14 public water supply wells, no exceedances of GCDWQ chemical/physical parameters were noted with the exception of turbidity, arsenic, manganese, iron, total dissolved solids (TDS), and sulphate from one public water supply (AMEC 2008).

The Drilled Water Well Database (NLDECC 2023c) contains records for 203 water supply wells within the Codroy RAA (Figure 2.1). Available records for these wells are shown in Appendix B and are summarized herein. 27 of the private water supply wells are screened in the overburden, 158 in bedrock (e.g., limestone, sandstone, shale, and granite), with the remainder unknown. The median well depth is approximately 32 mbgs with a median static water level of approximately 6 mbgs. The median yield of these wells is reported in the Drilled Water Well Database as 45 L/min. There are no wells reported in the Drilled Water Well Database within the Codroy LAA. The closest reported wells to the LAA are three domestic wells located in the community of Bay St. George South. Two of these wells are screened in the overburden, with one completed in bedrock. The three wells have reported yields of approximately 5 L/min.

2.3.1.3 Port of Stephenville

The bedrock geology of the Stephenville RAA is highly variable. The portion of the Stephenville RAA adjacent to the Stephenville LAA is described mostly as Cenozoic-aged siliciclastic surficial deposits overlying carboniferous rock (Q:u on Figure 2.7) (Williams 1985). To the east of the Stephenville LAA, bedrock geology is described as Proterozoic-aged granites and anorthositic gabbro of the Indian Head Complex (M2:A on Figure 2.7) and gneiss of the Long Range gneiss complex (PM:L on Figure 2.7).

Surficial geology (Figure 2.9) in the Stephenville RAA consists of poorly to well sorted glaciofluvial gravel and sand close to the LAA with till blankets more prominent further upstream in the watershed (Liverman and Taylor 1993). The presence of these coarse-grained sediments in the Stephenville LAA suggest a higher recharge potential than in the Port au Port or Codroy RAAs.

The local hydrogeology of the Stephenville Project Area is described in the Preliminary Geotechnical Interpretive Report for the Former Abitibi Mill Site (Fracflow 2023a). Observations from test pit excavation and borehole drilling show that the native surficial geology consists mainly of sandy sediments which is consistent with the regional interpretation (Liverman and Taylor 1993). Boreholes drilled for Fracflow investigations did not encounter bedrock to the maximum investigated depth of approximately 12 mbgs. Depths to groundwater measured in wells in the Stephenville Project Area in 2007 range from -0.15 (artesian) to 10.4 mbgs. Groundwater is expected to flow towards the harbour.

The majority of drilled wells in the Stephenville RAA are located in hydrostratigraphic Unit B, which is described as moderate yield sand and gravel, representing primarily outwash plain deposits (AMEC 2008). This description is consistent with bedrock geology (Williams 1985), surficial geology (Liverman and Taylor 1993), and site-specific studies (Fracflow 2023a) described above. Unit B is described as having moderate yield with a median well depth of approximately 24 mbgs. Aquifer tests conducted on wells within Unit B provide an average estimated safe yield of 131 L/min (AMEC 2008). Potable water in the town of Stephenville is supplied from the 10 wells of the Stephenville well field located north of the town (Figure 2.11) and screened in Unit B. Deeper wells intersecting bedrock in the Stephenville RAA are inferred to be part of Unit 4, which is described as moderate yield carboniferous sedimentary rock (AMEC 2008). This description is consistent with the bedrock geology described above (Williams 1985). Unit 4 is described as having moderate yield with a median well depth of approximately 38 mbgs; however, in the vicinity of the Stephenville LAA, thick deposits of outwash would indicate greater depth to bedrock. The average estimated safe yield from 84 aquifer tests conducted in Unit 4 is reported to be 125.8 L/min with a range of 2 to 1,530 L/min (AMEC 2008).

Groundwater in the Stephenville RAA is expected to be recharging mainly near the topographic highs to the north of the town and discharging south to the coast and to ponds near the coast. It is expected that the shallow groundwater systems in these areas will be largely controlled by surface runoff and local recharge, while at moderate depths the flow system may be influenced by recharge at higher elevations (Tóth 2009). The movement of groundwater through the surficial outwash aquifer is expected to be unconfined, while flow within the bedrock unit underlying the RAA is likely to be under semi-confining conditions with recharge predominantly from lateral inflow of groundwater from adjacent upland areas. Mine Pond, which is located in the RAA to the east of the Project Area and is being considered for use as the Industrial Water Supply for the Project, may interact with shallow groundwater through seeps on the steep terrain surrounding the pond (Fracflow 2022).

Provincial water quality data for the Stephenville RAA, including source water quality for the Stephenville well field, is provided in Appendix A. Source water meets the GCDWQ except for frequent exceedances of both the maximum allowable concentration (health based) and the aesthetic objective for manganese.

The hydrogen / ammonia plant will be constructed at the former Abitibi mill property in the Stephenville Project Area. The former mill site is a known brownfield with historical effects of total petroleum hydrocarbons (TPH) and metals exceeding provincial guidelines in groundwater, including historical presence of free-phase liquid petroleum hydrocarbons (Stantec 2022).

There are no public water supply wells or groundwater PPWSAs within the Stephenville LAA. Within the Stephenville RAA, Northern Harvest Smolt Ltd. holds a Water Use License (WUL) (number 18-9929) for a commercial aquaculture facility. The WUL permits withdrawal of up to 4,493,880 m^3/year of groundwater from freshwater wells and 2,102,400 m^3/year of groundwater from saltwater wells. The freshwater and saltwater wells are located approximately 1.5 km and 300 m north of the Stephenville LAA, respectively (Figure 2.11). Entries in the Drilled Water Well Database indicate that the freshwater and saltwater wells are screened in the overburden aquifer (Unit B).

The Drilled Water Well Database (NLDECC 2023c) contains records for 115 water supply wells within the Stephenville RAA (Figure 2.11). Available records for these wells are shown in Appendix B and are summarized herein. 66 of the water supply wells are screened in the overburden, 42 in bedrock (e.g., limestone, sandstone, shale, and granite), with the remainder unknown. The median well depth is approximately 24 mbgs with a median static water level of approximately 9 mbgs. The median yield of these wells is reported in the Drilled Water Well Database as 48 L/min. There are no wells reported in the Drilled Water Well Database within the Stephenville LAA.

2.3.2 Surface Water Resources

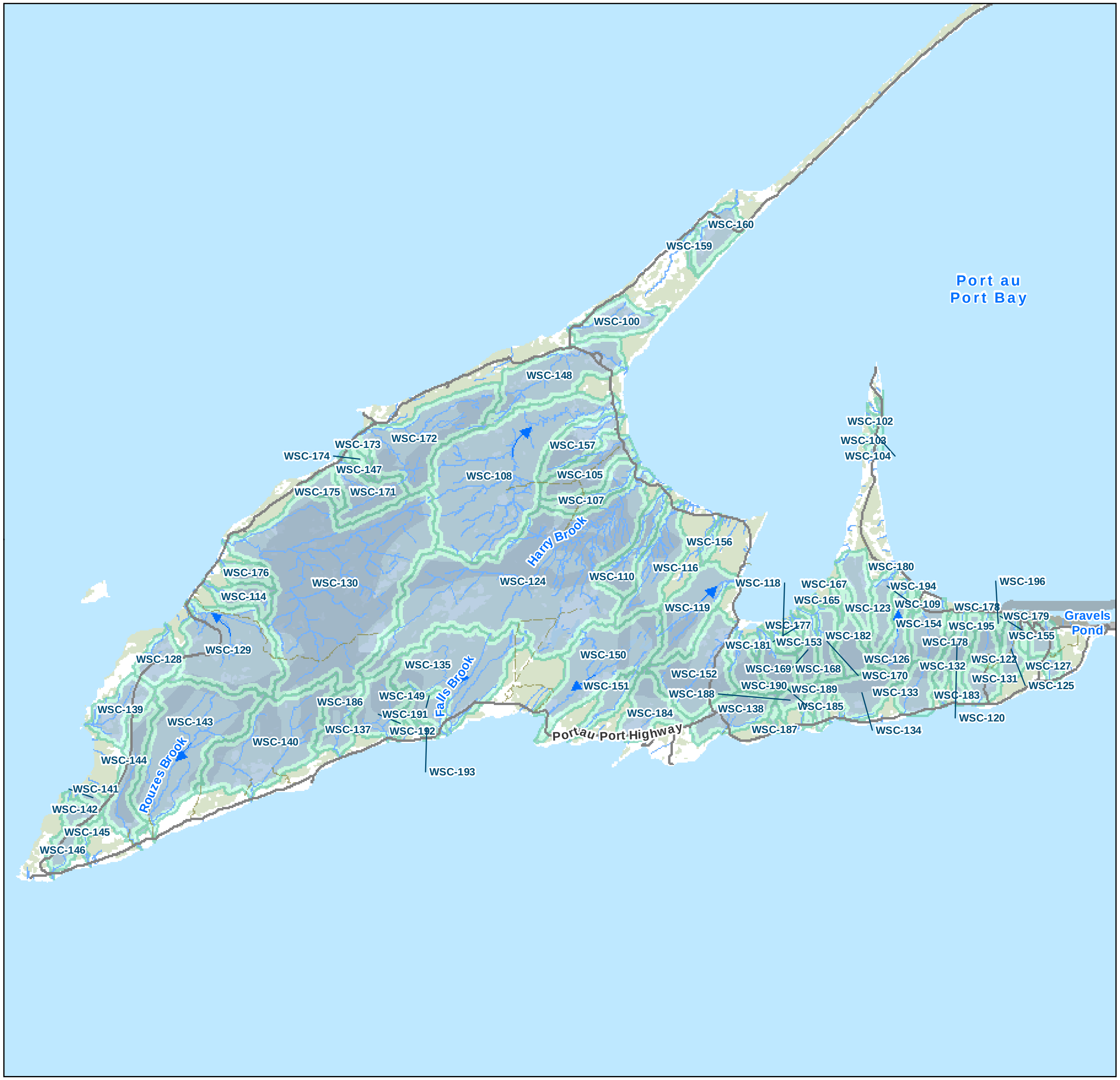
2.3.2.1 Port au Port Wind Farm

Hydrological Features and Land Use

The Port au Port wind farm is located on the Port au Port Peninsula, a peninsula bounded to the west by the Gulf of St. Lawrence, to the south by Bay St. George, and the northeast by Port au Port Bay (Figures 2.12 and 2.13). There are nine primary watersheds located on the peninsula. The nine primary watersheds are comprised of seven public surface water protection areas (Rouzes Brook, Caribou Brook, Cointres Brook, Victor's Brook, Unnamed Brook, and Jim Rowe's Brook) as well as three primary watercourse watersheds (Harry's Brook, Mainland Brook, and Falls Brook). Additionally, there are roughly 115 small coastal watersheds that drain directly to the Gulf of St Lawrence on the western coast of the Port au Port peninsula; as these watersheds drain directly to the ocean, they were not considered in this analysis.

Rouzes Brook is the westernmost protected public water supply watershed on the Port au Port peninsula and drains an area of 140 km². Caribou Brook (drainage area of 2.4 km²) and Cointres Brook (drainage area of 10.4 km²) drain directly to the Gulf of St Lawrence on the west coast of the Port au Port peninsula. Victor's Brook is located in the central region of the Port au Port peninsula and has a drainage area of 21.0 km². Flow from Victor's Brook watershed drains into Port au Port Bay on the northeastern coast of the Port au Port peninsula. The Unnamed Brook has a watershed area of 5.3 km² and drains to the Port au Port Bay south of the Victor's Brook watershed outlet. Land use in the protected water supply watersheds (Rouzes Brook, Caribou Brook, Cointres Brook, Unnamed Brook, Victor's Brook, and Jim Rowe's Brook) are primarily forested with some developed areas in the form of roads and buildings near the shore, and areas of wetlands and shrubs.

Harry's Brook and Mainland Brook are centrally located on the Port au Port peninsula and are the two largest watersheds on the peninsula with drainage areas of 34.0 and 34.8 km², respectively. Harry's Brook drains northeast to the Port au Port Bay, while Mainland Brook drains west to the Gulf of St Lawrence. Falls Brook is located south of Harry's Brook watershed and drains an area of 12.6 km² south to Bay St. George and the Gulf of St. Lawrence. The primary land use in Harrys Brook, Mainland Brook, and Falls Brook watersheds is forested area with wetland and marsh land in low lying areas, and shrubland in areas of higher elevations.



Stantec

- Watercourse
- Flow Direction
- 🟦 Waterbody
- 🟩 Watershed

Other Features

- Trans-Canada Highway
- Road / Highway
- Resource Road / Trail
- ▨ Project Area

N

0 2.5 5
Kilometres
(At original document size of 8.5x11)
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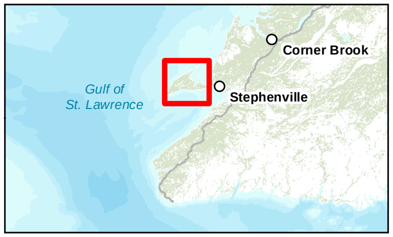
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

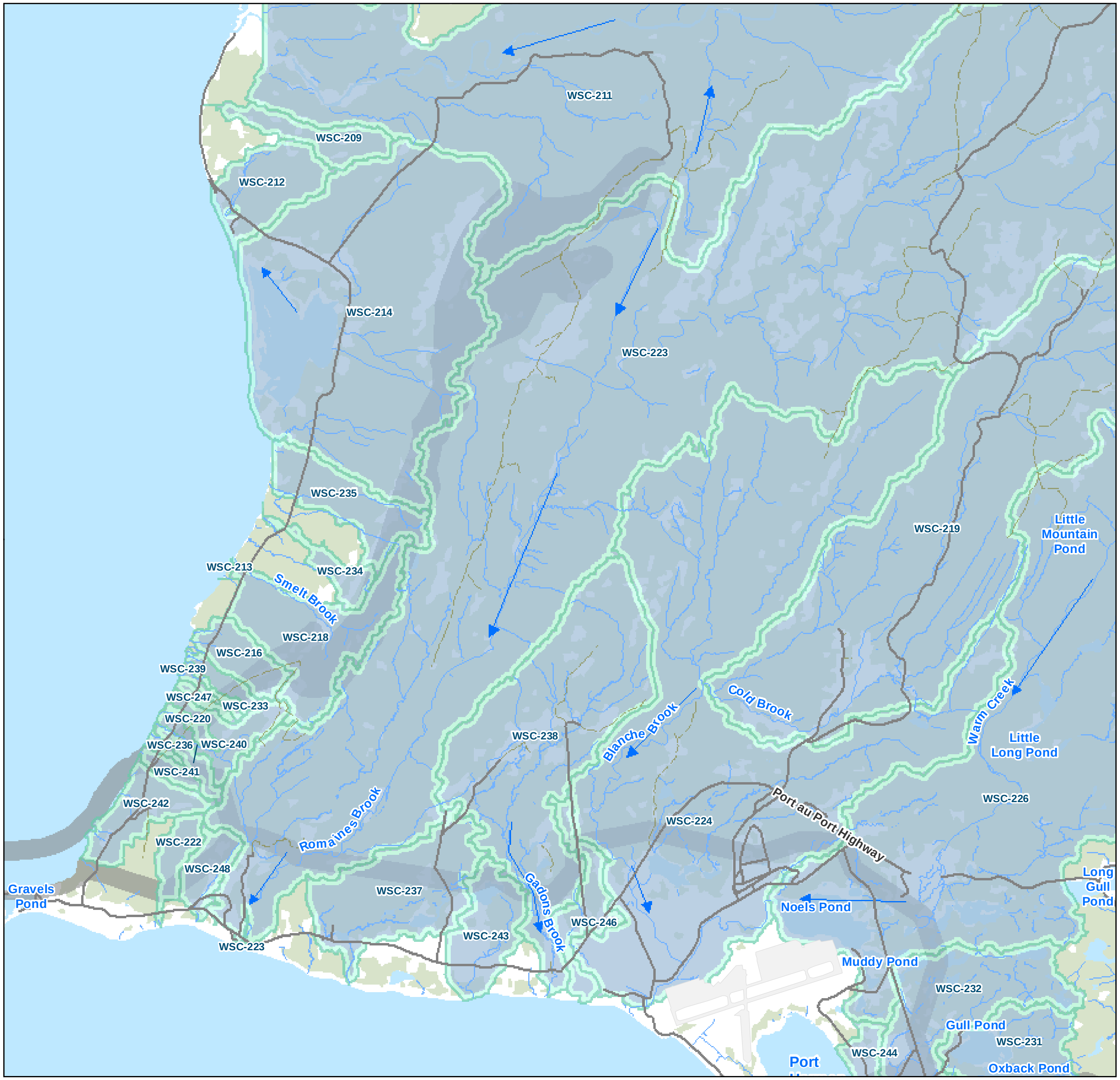
Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.12

121417233_071c

Port au Port Wind Farm
Surface Water Resources

\\ca0151-ppfss01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_071c_SW_Features_REVA.mxd Revised: 2023-08-02 By: NWhite



Stantec

— Watercourse

→ Flow Direction

▭ Waterbody

▭ Watershed

Other Features

— Trans-Canada Highway

— Road / Highway

- - Resource Road / Trail

▨ Project Area

N

0 1 2 Kilometres

(At original document size of 8.5x11)

1:106,000

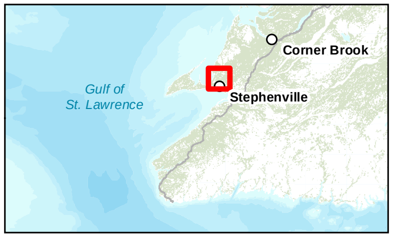
Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N

2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap

3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.13

121417233_071c

Port au Port Wind Farm (East) Surface Water Resources

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_071c_SW_Features_REVA.mxd Revised: 2023-08-03 By: NiWhite

Surface Water Quantity

Using the available regional regression relationships (Appendix C) applied to the Port au Port area, an estimate of MAF and MMF were developed for the described catchment areas (Table 2.3, Figure 2.14). The MAF values range from 1.56 m^3/s at Mainland Brook to 0.09 m^3/s at Jim Rowe's Brook. The difference in MAF values is attributed to the differences in drainage area size and may also vary due to local precipitation and climate in each watershed.

Table 2.3 Flow Metrics for Existing Catchments, Port au Port Wind Farm

Catchment ID	Catchment Name	Area (km^2)	Mean Annual Flow (MAF) (m^3/s)	30% MAF (m^3/s)
WSC-143	Rouzes Brook	14.0	0.65	0.20
WSC-128	Caribou Brook	2.4	0.12	0.04
WSC-129	Cointres Brook	10.4	0.49	0.15
WSC-108	Victor's Brook	21.0	0.96	0.29
WSC-156	Unnamed Brook	5.3	0.26	0.08
WSC-127	Jim Rowe's Brook	1.7	0.09	0.03
WSC-124	Harry's Brook	34.0	1.52	0.46
WSC-130	Mainland Brook	34.8	1.56	0.47
WSC-135	Falls Brook	12.6	0.59	0.18

Estimates of MMF for each catchment and sub-catchment show seasonal fluctuations in flow with peak runoff occurring during the spring and late fall months. Largest MMF values are seen in the Mainland Brook and Harry's Brook watersheds with a range in flows from 0.7 m^3/s to 3.0 m^3/s. Seasonal changes in flow are dampened in Jim Rowe's Brook, with a flow range of 0.04 to 0.18 m^3/s. Seasonal low flows occur during the months of July and August for the subject catchments. Flows are above the 30% MAF threshold for the subject catchments, including during the low-flow period.

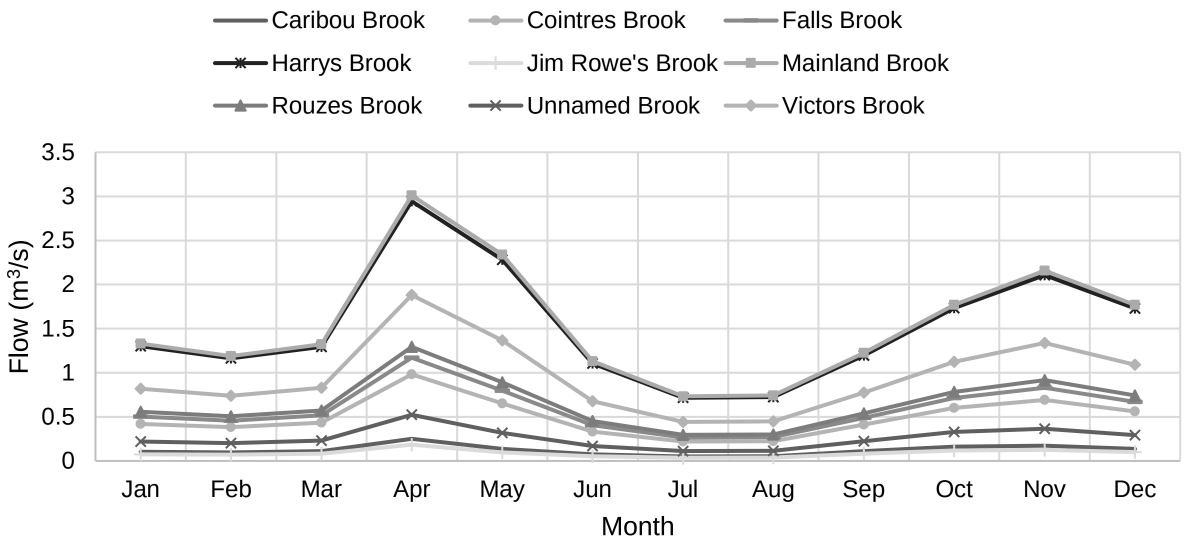


Figure 2.14 MMF for Select Watersheds, Port au Port Wind Farm

Surface Water Quality

Regional water quality data was obtained from surface water sourced drinking water supplies for the communities of Lourdes (Victor's Brook), Mainland (Caribou Brook), West Bay (Unnamed Brook), Port au Port/West-Aguathuna-Felix Cove (Jim Rowe's Brook) and Cape St. George (Rouzes Brook) as there are no provincial Water Resources Management Division (WRMD) -managed sites on the Port au Port peninsula. A summary of water quality statistics can be found in Table 2.4.

Values for the public water supply areas were compared to the Guidelines for Canadian Drinking Water Quality (CDWQ) as these sites are source water sites for community drinking water and the CCME Freshwater Aquatics Life (FAL) guidelines. The CDWQ guidelines differ from natural waterbody guidelines (i.e., CCME FAL guidelines) as the guidelines monitor different parameters and have more stringent limits. Maximum concentration values exceeded the CDWQ guidelines for at least one sampling event for color, pH, and turbidity. The exceedances for color occurred at least once at each public water supply area, and the public water supply areas for West Bay, Port au Port/West-Auguathuna-Felix Cove, and Lourdes consistently exceeded the CDWQ guideline for color. Similarly, values for turbidity exceeded the CDWQ guideline for at least one sampling event at the Mainland, Port au Port/West-Auguathuna-Felix Cove, Lourdes, and West Bay stations. Minimum and average pH values are within the CDWQ guidelines for pH at all stations; however, maximum pH values at the Port au Port/West-Auguathuna-Felix Cove and Cape St. George stations exceeded the upper limit of the CDWQ guideline during one sampling event.

Maximum concentration values exceeded the CCME FAL guidelines for Aluminum for at least one sampling event at the Cape St. George, Mainland, Lourdes, and West Bay public supply areas. Mean concentration values exceeded the CCME FAL guidelines for Aluminum for at least one sampling event at the West Bay public supply area. Finally, maximum concentration values exceeded the CCME FAL guidelines for fluoride at the Port au Port/West Auguathuna-Felix Cove and West Bay public supply areas for at least one sampling event.

Metals concentrations for all parameters at all stations were below the CDWQ guidelines.

There are five additional water quality monitoring stations planned within the area of the proposed Port au Port wind farm as outlined in Section 2.2.2.4.

Table 2.4 Water Quality Data for Protected Water Supply Areas on the Port Au Port Peninsula (NLDECC 2023)

Parameter	Units	CDWQ Guideline	CCME FAL Guideline	Cape St. George (Rouzes Brook)			Mainland (Caribou Brook)			Port au Port/ West Aguathuna-Felix Cove (Jim Rowe's Brook)			Lourdes (Victor's Brook)			West Bay (Unnamed Brook)		
				Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Alkalinity	mg/L	-	-	158	231	185.9	132	182	155.8	92.6	465	161.6	56.6	137	98.2	59	110	95.4
Color	TCU	15	-	0	40	13.4	0	55	16	28	101	60.7	13	110	51.2	47	109	68.4
Conductivity	µS/cm	-	-	250	449	387	196	478	357	180	456	341	163	379	271	125	269	221
Hardness	mg/L	-	-	163	227	201	144	198	172	132	208	159	93	140	116	94	130	107
pH		6.5- 8.5	6.5 to 9.0	7.9	8.6	8.3	8.2	8.5	8.3	6.9	8.6	8.10	7.5	8.3	8.0	6.7	8.4	7.85
TDS	mg/L	500	-	212	292	247	178	265	220	179	296	219	110	242	172	117	186	142
TSS	mg/L	-	-	2	2	2	2	2	2	1	2	1.7	1	3	1.3	2	4	2.4
Turbidity	NTU	1	-	0.12	0.8	0.33	0.18	3.8	0.62	0.12	1.1	0.51	0.08	4	0.91	0.17	3.2	1.5
Boron	mg/L	5	1.5	0	0.03	0.008	0	0.03	0.016	0	0.03	0.015	0	0.03	0.021	0	0.03	0.01
Bromide	mg/L	-	-	0	0.03	0.005	0	0.03	0.006	0	0.16	0.026	0	0.03	0.015	0	0.03	0.008
Calcium	mg/L	-	-	40	59	50.7	44.9	61	51.6	27.6	62	43.8	21.6	42	33.4	21	40	32.6
Chloride	mg/L	250	120	11	20	16.1	10	30	17.8	17	36	23.4	12	45	22.6	6	28	10.7
Fluoride	mg/L	1.5	0.120	0	0.11	0.02	0.03	0.09	0.05	0	0.56	0.08	0	0.1	0.02	0.03	0.16	0.07
Potassium	mg/L	-	-	0	0.8	0.34	0.5	0.7	0.58	0	1	0.64	0	1.02	0.45	0	0.7	0.45
Sodium	mg/L	200	-	9	11	10	11	14	12	11	20	15	7	15	12	5	10	8
Sulphate	mg/L	500	-	4	8	5.5	6	9	7.5	2	12	5.3	2	9	5.8	0	7	4.2
Ammonia	mg/L	-	Variable[2]	0	0.12	0.02	0	0.07	0.008	0	0.07	0.018	0	0.14	0.03	0	0.06	0.01
DOC	mg/L	-	-	0.7	5	2.18	2.1	8.7	3.6	1.1	10.6	5.8	1.7	12	6.1	1.5	14.8	7.9
Nitrate	mg/L	10	13	0	0.23	0.11	0	0.54	0.24	0	0.15	0.03	0	0.16	0.04	0	0.14	0.05
Kjeldahl Nitrogen	mg/L	-	-	0	0.22	0.04	0	0.35	0.09	0	0.65	0.27	0	0.45	0.22	0	0.97	0.32
Total Phosphorus	mg/L	-	Trophic Status[4]	0	0.04	0.005	0	0.02	0.004	0	0.04	0.008	0	0.02	0.004	0	0.07	0.011
Aluminum	mg/L	-	0.005 / 0.11	0	0.6	0.04	0	0.18	0.035	0	0.09	0.038	0.025	0.13	0.058	0.025	0.25	0.101
Antimony	mg/L	0.06	-	0	0.0005	0.0002	0	0.0005	9E-05	0	0.0005	0.0001	0	0.005	0.0014	0	0.0005	6E-05
Arsenic	mg/L	0.01	0.005	0	0.001	0.0003	0	0.001	0.0005	0	0.025	0.003	0	0.01	0.0022	0	0.025	0.0028
Barium	mg/L	2	-	0.02	0.03	0.0238	0.03	0.04	0.0372	0.025	0.06	0.0396	0.03	0.051	0.0414	0.025	0.072	0.0505
Cadmium	mg/L	0.007	Variable[3]	0	0.0005	0.0002	0	0.0005	0.0002	0	0.001	0.0003	0	0.001	0.0005	0	0.001	0.0002
Chromium	mg/L	0.05	-	0	0.005	0.0006	0	0.002	0.0005	0	0.01	0.0022	0	0.005	0.0018	0	0.005	0.0013
Copper	mg/L	1.0/2.0	Variable[3]	0	0.005	0.001	0	0.005	0.0021	0	0.01	0.0028	0	0.005	0.0023	0	0.01	0.0021
Iron	mg/L	0.3	0.3	0	0.06	0.0133	0	0.118	0.0237	0.005	0.31	0.1456	0	0.27	0.0691	0	0.32	0.1053
Lead	mg/L	0.005	Variable[3]	0	0.001	0.0007	0	0.001	0.0007	0	0.01	0.0014	0	0.001	0.0006	0.001	0.007	0.0023
Magnesium	mg/L	-	-	14	20	17	7	12	9.2387	7	13	9.3424	4.41	8.81	6.4856	3.13	6.3	4.925
Manganese	mg/L	0.02/0.12	Variable[3]	0	0.014	0.0037	0	0.005	0.0027	0	0.04	0.0154	0	0.08	0.0104	0	0.03	0.0071

Table 2.4 Water Quality Data for Protected Water Supply Areas on the Port Au Port Peninsula (NLDECC 2023)

Parameter	Units	CDWQ Guideline	CCME FAL Guideline	Cape St. George (Rouzes Brook)			Mainland (Caribou Brook)			Port au Port/ West Aguathuna-Felix Cove (Jim Rowe's Brook)			Lourdes (Victor's Brook)			West Bay (Unnamed Brook)		
				Min	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
Mercury	mg/L	0.001	0.0026	0	0	0	0	0	0	0	0.0005	0.0001	0	0.0005	0.0003	0	0.0005	0.0002
Nickel	mg/L		Variable[3]	0	0.005	0.0013	0	0.003	0.0016	0	0.005	0.0024	0	0.005	0.0037	0.003	0.005	0.0035
Selenium	mg/L	0.001	0.001	0	0.001	0.0002	0	0.001	0.0007	0.001	0.005	0.002	0	0.005	0.0013	0.001	0.005	0.0023
Uranium	mg/L	0.02	0.015	0	0.0002	8E-05	0	0.0002	7E-05	0	0.0003	0.0001	0.0001	0.0003	0.0002	0	0.0004	0.0002
Zinc	mg/L	5	Variable[3]	0	0.008	0.0016	0	0.011	0.0042	0	0.08	0.0099	0	0.012	0.0042	0.003	0.18	0.0271

Notes:

[1] Guideline value of 5 ug/L if pH < 6.5, 100 ug/L if pH ≥ 6.5

[2] Ammonia guideline value based on Temperature and pH.

[3] Copper, Cadmium, Lead, Manganese, Nickel, and Zinc guideline values are dependent on hardness, Zinc is dependent on hardness and DOC

[4] Trophic status classification based on CCME FAL guidance framework

Bold indicates the parameter exceeds the CDWQ Guidelines

Underlined indicates the parameter exceeds the CCME FAL Guidelines

Surface Water Supply Resources

Public source water on the Port au Port peninsula is supplied by active public surface water supplies located in the Caribou Brook, Cointres Brook, Rouzes Brook, Victor's Brook, Unnamed Brook, and Jim Rowe's Brook watersheds. These public water supplies supply water to a population of approximately 2,500 people including the communities of Victors Brook, Port au Port West / Aguathuna / Felix Cove, Cape St. George, Mainland, and Piccadilly Head, Sheaves Cove (Stantec 2016). The quality of surface water supplies on the Port au Port Peninsula is generally considered good to excellent and is moderate to very hard, of moderate alkalinity (JWEL 2008) Domestic water supply areas are indicated in Figure 2.15, showing the protected surface water legal boundary that closely represents all or part of the catchment area for a water supply.

There are two approved industrial WULs issued by the NL Department of Municipal Affairs (NLDMA) to Atlantic Mining Ltd. The first WUL (WUL 21-11790) is for water withdrawal from Goose Pond. The second WUL issued to Atlantic Mining Ltd. (WUL 21-12062) permits the holder to dewater four quarry pits and discharge the water to Harry's Brook, Duck Pond, and Unnamed Marsh Land through a settling pond.

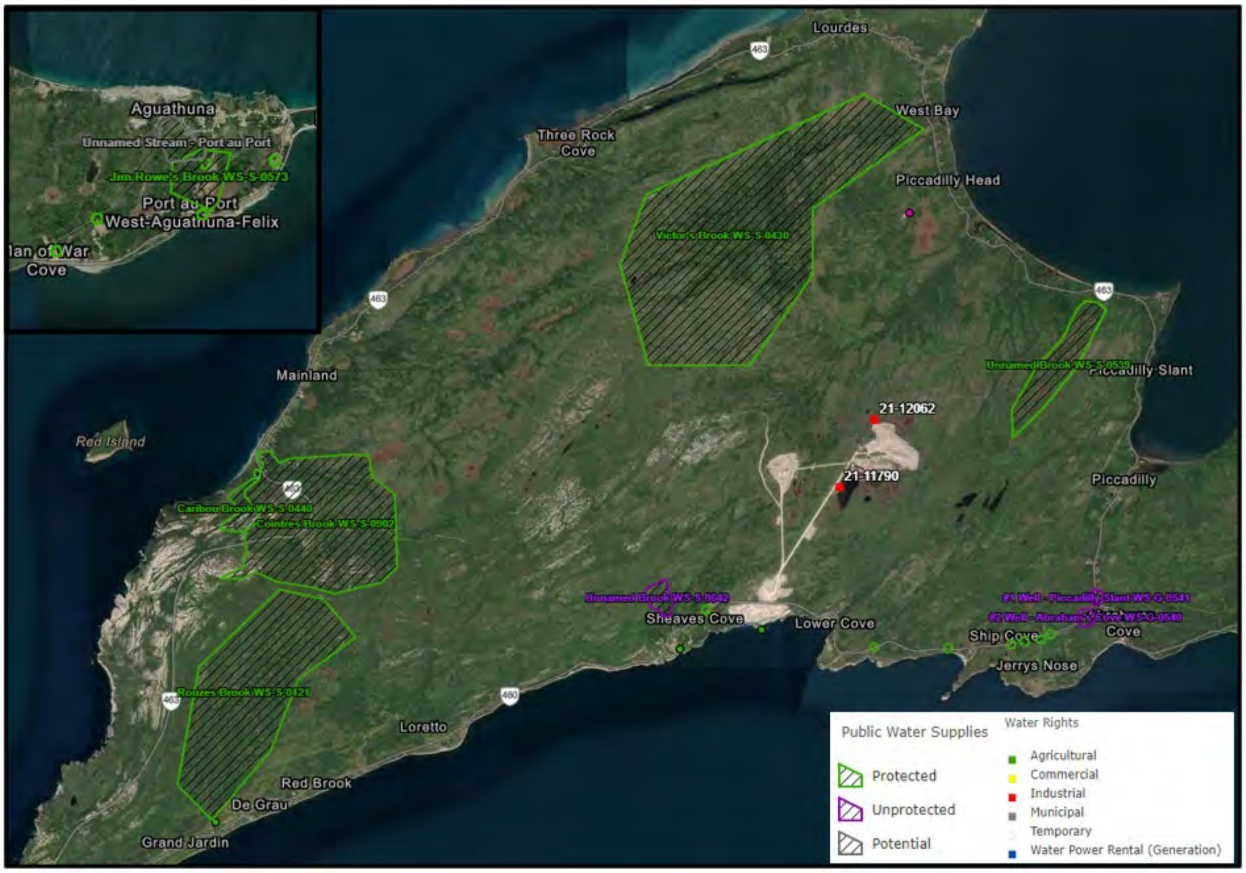


Figure 2.15 Public Water Supply Areas and Water Rights, Port au Port Peninsula (NL Water Resources Portal)

2.3.2.2 Codroy Wind Farm

Hydrological Features and Land use

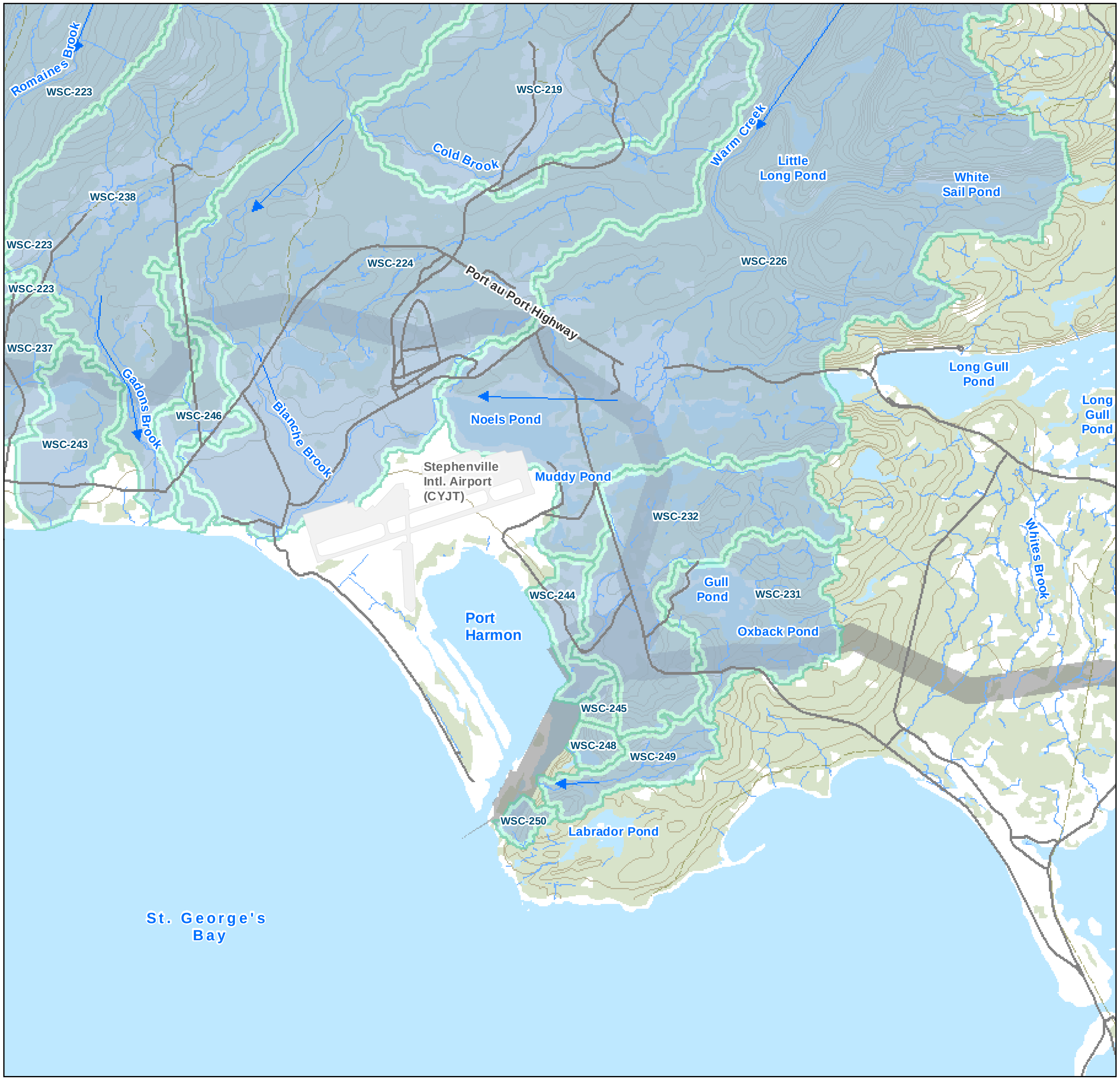
The Codroy wind farm is located in the Anguille Mountain Range near the communities of Cape Anguille and Codroy. Twelve project-related watersheds have been delineated in the Codroy wind farm area. The primary watercourse flowing through this area is the Grand Codroy River that receives flow from a number of tributaries including Big Brook, Ryans Brook, Muises Brook, Muddy Hole Brook, Johns Brook, Stephen's Brook, and Broom Brook. The Grand Codroy River has a drainage area of 932 km^2. Rainy Brook is the next largest watercourse located north of the Grand Codroy River watershed, and it has a watershed area of 160 km^2 and drains directly to the Gulf of St Lawrence on the southwest coast of Newfoundland. The remaining ten watersheds drain directly into the Gulf of St Lawrence and have drainage areas 30 km^2 or less. These coastal watersheds include Little Spout Brook (1.47 km^2), French Brook (13.8 km^2), Shoal Point Brook (13.0 km^2), Butter Brook (24.4 km^2), and six unnamed watercourse drainage areas; A (2.21 km^2), B (30.3 km^2), C, (7.9 km^2), D (21.4 km^2), E (15.6 km^2), and F (13.3 km^2).

Land in the Codroy wind farm region is primarily forested, wetland and shrubland, with little to no development. The communities of Cape Anguille, Shoal Point, Codroy, and Woodville are located approximately 12 km south and west of the wind farm. The region is mountainous with a natural watershed divide located north of the wind farm site and divides the Great Codroy River watershed from the eleven coastal watersheds.

Surface Water Quantity

Using the available regional regression relationships applicable to the Codroy wind farm area, an estimate of MAF and MMF were developed for the described catchment areas (Table 2.5, Figures 2.17 and 2.18). As the Grand Codroy River and Rainy Brook watersheds are an order of magnitude larger than the remaining watershed areas, the MMF values are presented in separate figures. The MAF for the larger catchments are 37.8 and 6.7 m^3/s for Grand Codroy River and Rainy Brook, respectively. For the smaller catchment areas, the MAF values range between 0.08 and 1.37 m^3/s for Little Spout Brook and Unnamed Brook-B, respectively. The differences in MMF and MAF values are attributed to differences in drainage areas.

Estimates of MMF for each catchment and sub-catchment show seasonal fluctuations in flow with peak runoff occurring during the spring and late fall months. The MMF values are largest in the Grand Codroy River watershed with a range in flows from 20.0 to 78.8 m^3/s. Seasonal changes in flow are smallest in Little Spout Brook watershed, with a flow range of 0.03 to 0.16 m^3/s. Seasonal low flows occur during the months of July and August for the subject catchments. Flows are above the 30% MAF threshold for the subject catchments, including during the low-flow period.



Stantec

— Watercourse

→ Flow Direction

▢ Waterbody

▢ Watershed

Other Features

— Contour (20m)

— Trans-Canada Highway

— Road / Highway

- - Resource Road / Trail

■ Project Area

N

0 1 2 Kilometres

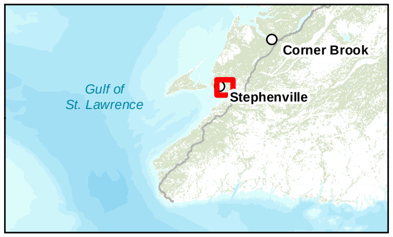
(At original document size of 8.5x11)

1:81,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.16

121417233_071c

Port of Stephenville
Surface Water Resources

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Table 2.5 Flow Metrics for Existing Catchments, Codroy Wind Farm

Catchment ID	Catchment Name	Area (km^2)	Mean Annual Flow (MAF) (m^3/s)	30% MAF (m^3/s)
WSC-315	Grand Codroy River	963.5	37.8	11.3
WSC-312	Rainy Brook	160.6	6.7	2.02
WSC-305	Little Spout Brook	1.47	0.08	0.02
WSC-306	French Brook	13.8	0.64	0.19
WSC-320	Shoal Point Brook	13.0	0.61	0.18
WSC-321	Butter Brook	24.4	1.11	0.33
WSC-304	Unnamed Brook-A	2.21	0.11	0.03
WSC-310	Unnamed Brook-B	30.3	1.37	0.41
WSC-317	Unnamed Brook-C	7.85	0.38	0.11
WSC-318	Unnamed Brook-D	21.5	0.98	0.29
WSC-311	Unnamed Brook-E	15.6	0.72	0.22
WSC-319	Unnamed Brook-F	13.3	0.62	0.19

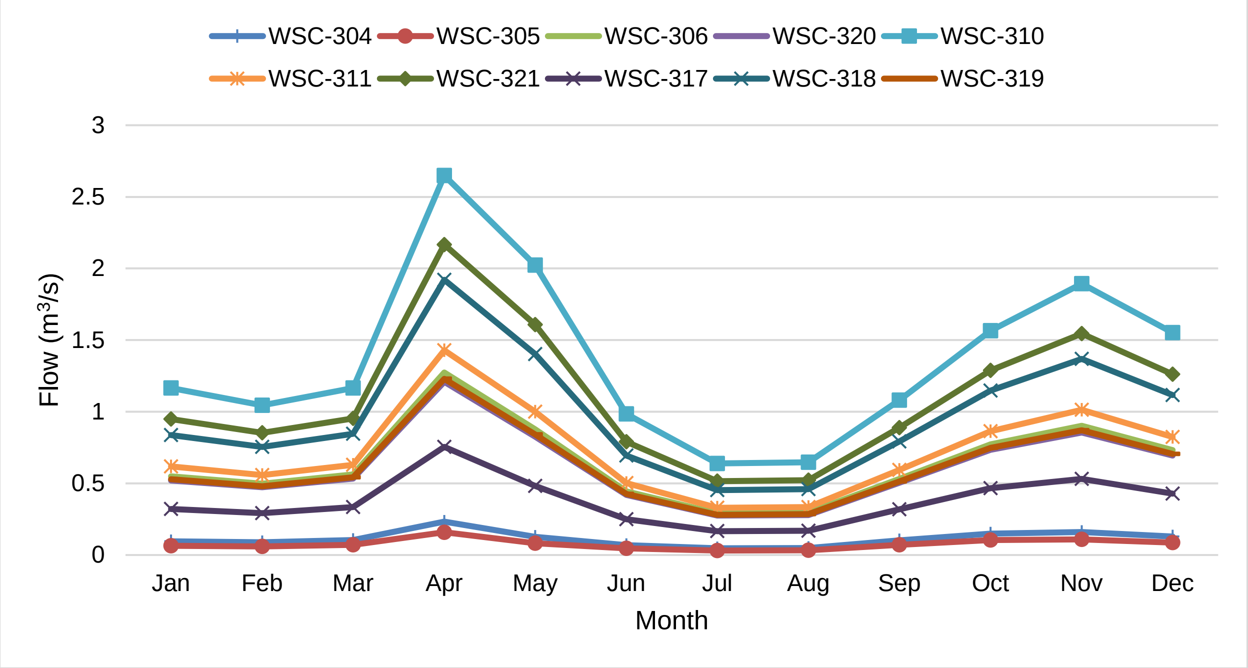


Figure 2.17 MMF for Select Watersheds, Codroy Wind Farm

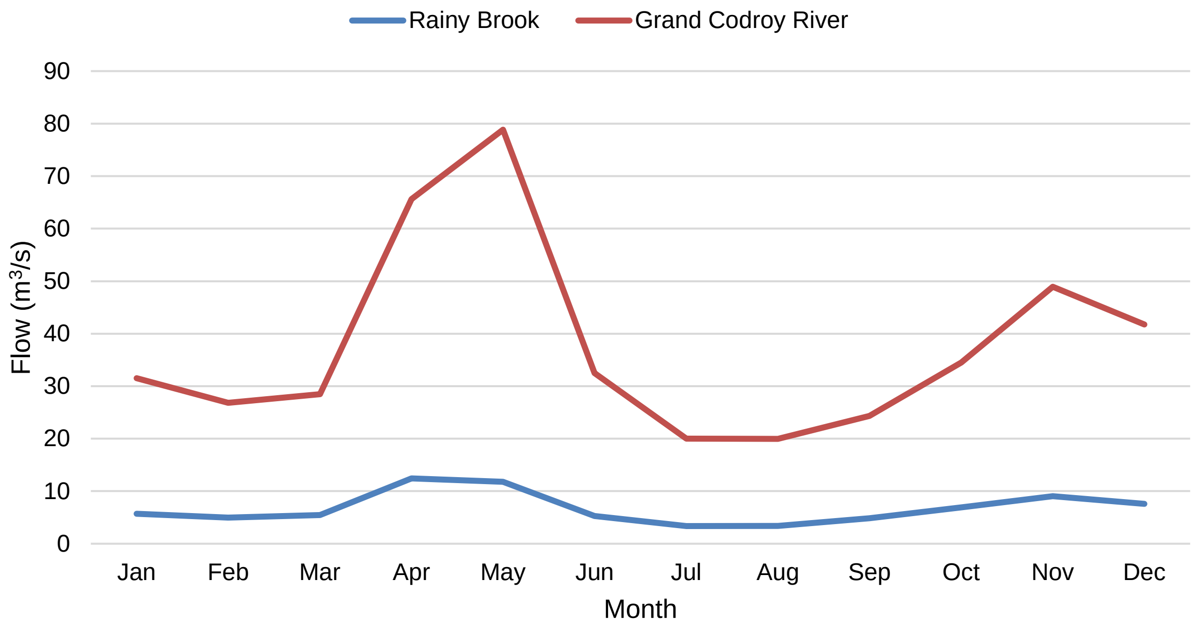


Figure 2.18 **MMF for Rainy Brook and Grand Codroy River Watersheds, Codroy Wind Farm**

Surface Water Quality

There are no PPWSAs or water use licenses identified in the area of the proposed Codroy wind farm. A single, active WQMA station is located on the Grand Codroy River below Overfall Brook (Station NF02ZA0006). The province monitors the station on a quarterly basis for a suite of physical and chemical water quality parameters. A summary of the historical station data was completed in 2021 by the Water Resources Management Division of NLDECC (NLDECC 2021) with results shown in Table 2.6.

Maximum concentration values were reported as below CCME FAL guideline detection limits for the sampled parameters. Minimum pH values are below the CCME FAL pH range; however, average and maximum concentrations are within the range. Turbidity ranges from 0.1 to 14 NTU with a mean value of 0.83 which indicates natural fluctuations occurring outside the range of CCME FAL guidelines. The phosphorus concentrations of the samples show a ranging trophic status, from ultraoligotrophic to eutrophic. Where sodium concentrations and conductivity range from 3.8 – 13.4 mg/L and 26.5 to 1,480 us/cm, respectively, it is possible that tidal flushing occurs at this WQMA location.

There are two additional water quality monitoring stations planned within the area of the proposed Codroy wind farm as outlined in Section 2.2.2.4.

Table 2.6 Water Quality Summary for Grand Codroy River (NLDECC 2021)

Parameter	Unit	CCME FAL	Min	Max	Mean
Turbidity	NTU	2-8[1]	0.1	14	0.832
Conductivity	us/cm	-	26.5	1480	120
Dissolved Calcium	mg/L	-	2.36	32.4	11.0
Dissolved Magnesium	mg/L	-	0.4	2.93	1.55
Dissolved Organic Carbon	mg/L	-	1.2	11.3	4.55
pH	-	6.5 – 9.0	6.17	8.27	7.10
Potassium	mg/L	-	0.25	0.75	0.47
Silica	mg/L	-	1.38	5.45	3.14
Sodium	mg/L	-	3.8	13.4	7.54
Total Aluminum	mg/L	0.005/0.1[2]	0.0185	1.84	0.148
Total Arsenic	mg/L	0.005	0.0001	0.0005	0.0001
Total Barium	mg/L	-	0.0055	0.0544	0.022
Total Beryllium	mg/L	-	0.000003	0.05	0.007
Total Cadmium	mg/L	Variable[3]	0.000002	0.0002	0.00004
Total Chromium	mg/L	-	0.00019	0.0037	0.0004
Total Cobalt	mg/L	-	0.000017	0.0014	0.0001
Total Colour	TCU	-	5	140	37.8
Total Copper	mg/L	Variable[3]	0.0002	0.0046	0.0008
Total Iron	mg/L	0.300	0.0136	1	0.139
Total Lead	mg/L	Variable[3]	0.000012	0.002	0.000352
Total Lithium	mg/L	-	0.0001	0.0025	0.000513
Total Molybdenum	mg/L	0.073	0.000035	0.0022	0.000168
Total Nickel	mg/L	Variable[3]	0.00015	0.0032	0.000401
Total Nitrogen	mg/L	-	0.12	0.33	0.222263
Total Phosphorous	mg/L	Trophic Status[4]	0.0003	0.0543	0.004584
Total Selenium	mg/L	0.001	0.00005	0.00076	0.000117
Total Strontium	mg/L	-	0.0124	0.241	0.080432
Total Sulphate	mg/L	-	3	40.8	12.9369
Total Vanadium	mg/L	-	0.0001	0.0036	0.000336
Total Zinc	mg/L	Variable[3]	0.0002	0.0152	0.00127

Notes:

CCME FAL = CCME Guidelines for the Protection of Freshwater Aquatic Life **Bold value exceeds guideline**

[1] Increase over background value of <2 NTU for long term exposure, <8 NTU for short term exposure

[2] Guideline value of 0.005 mg/L if pH < 6.5, 0.10 mg/L if pH ≥ 6.5

[3] Copper, Cadmium, Lead and Nickel guideline values are dependent on hardness, Zinc is dependent on hardness and DOC

[4] Trophic status classification based on CCME FAL guidance framework

Surface Water Supply Resources

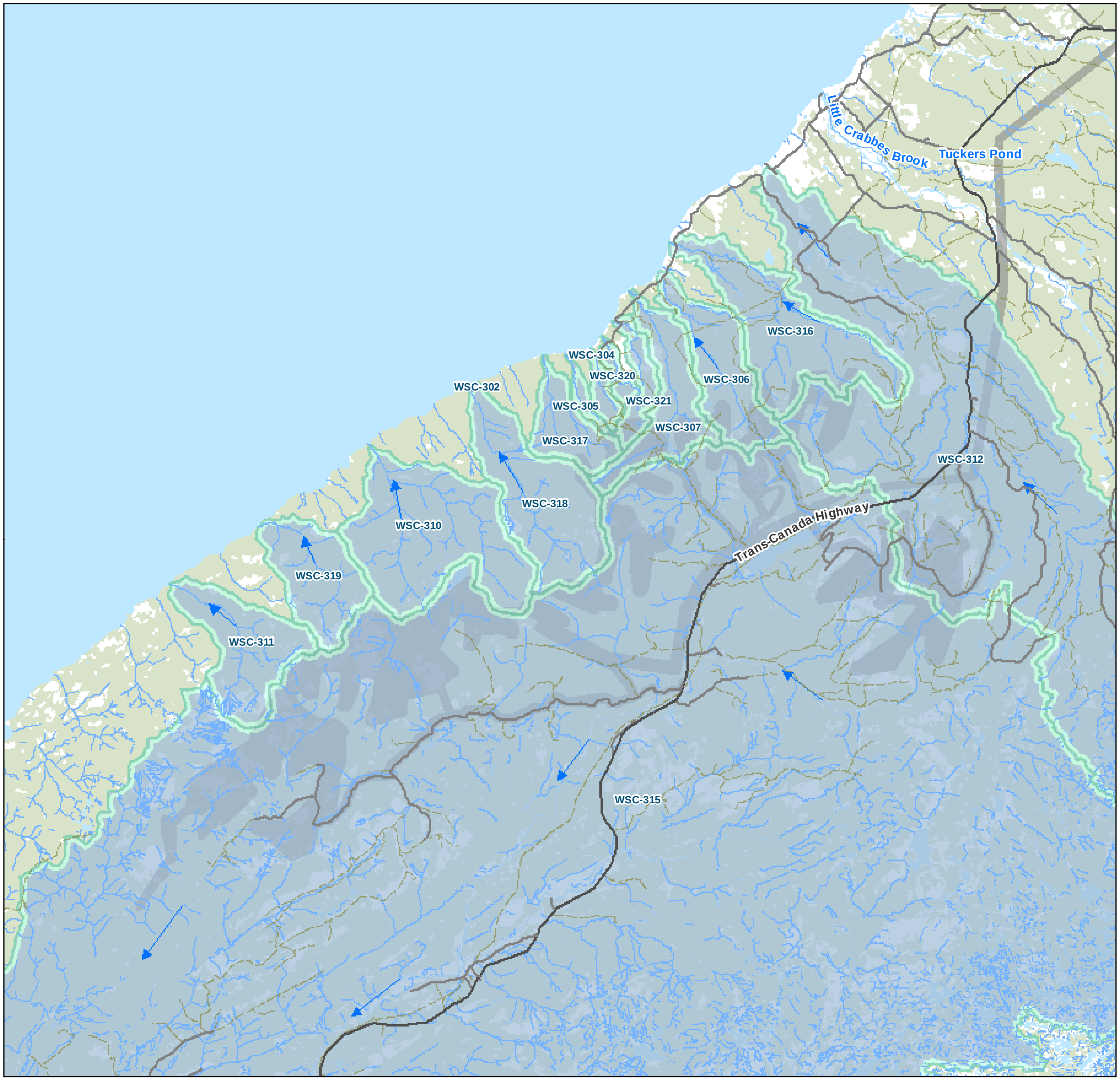
Development is limited in the Codroy wind farm LAA/RAA and there are no designated water supply areas. No WUL have been identified as issued by NLDMA for the area.

2.3.2.3 Port of Stephenville

Hydrological Features and Land Use

The Port of Stephenville is located on the north shore of St. George's Bay. The bay is the receiving water for Blanche Brook, which drains the primary watersheds in the vicinity of the Project area, and Port Harmon. Blanche Brook is located to the east of the project site and drains an approximate 120 km^2 catchment area to the mouth of the bay. Cold Brook and Warm Creek are the two primary tributaries to Blanche Brook. Cold Brook drains a 30 km^2 sub-catchment area into Blanche Brook at a confluence point 8 km north of the bay. Warm Creek is located east of Blanche Brook and drains a 50 km^2 sub-catchment area into the brook at a confluence point 1.5 km from the mouth of the bay. Storage is provided in the Warm Creek sub-catchment within several named ponds, the largest being Noels Pond which is hydraulically connected to the adjacent Muddy Pond via culverts.

Port Harmon is a seaport located immediately east of Blanche Brook and adjacent to the Project site on the north side of the port. The southern boundary of the port is protected from St. George's Bay by partial land mass with an eastern discharge location into the bay. An unnamed watercourse drains the small catchment area (4 km^2) of Oxback Pond and Gull (Mine) Pond into the port. Although this catchment is topographically separate from the adjacent Warm Creek sub-catchment, a pressurized industrial water pipeline is installed between Muddy Pond and Gull (Mine) Pond, hydraulically connecting the two catchments when pumps are operational.



Stantec

— Watercourse

→ Flow Direction

▭ Waterbody

▭ Watershed

Other Features

— Trans-Canada Highway

— Road / Highway

-- Resource Road / Trail

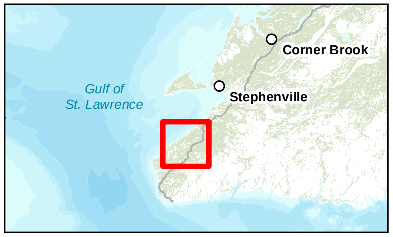
▨ Project Area

N

0 2.5 5
Kilometres
(At original document size of 8.5x11)
1:232,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec

Key Map



Project Location
Stephenville
NL

Prepared by NW on 2023-06-01
QR by AW on 2023-07-31

Client/Project
World Energy GH2
Project Nujio'qonik

Figure No.
2.19

121417233_071c

Codroy Wind Farm
Surface Water Resources

\\ca0151-ppfss01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_071c_SW_Features_REVA.mxd Revised: 2023-08-02 By: NWhite

Surface Water Quantity

Using the developed regional regression relationships applicable to the Port of Stephenville area, an estimate of MAF and MMF were developed for the described catchment and sub-catchment areas (Table 2.7, Figure 2.20). MAF for the Warm Creek sub-catchment area is approximately 2.20 m^3/s draining to Noels and Muddy Pond. Gull (Mine) Pond has a smaller drainage area and proportionally reduced MAF at approximately 0.20 m^3/s.

Table 2.7 Flow Metrics for Existing Catchments, Port of Stephenville

Catchment Name	Area (km^2)	Mean Annual Flow (MAF) (m^3/s)	30% MAF (m^3/s)
Blanche Brook	129.3	5.47	1.64
Cold Brook (Sub)	30.5	1.37	0.41
Warm Creek (Sub)	48.4	2.13	0.64
Gull (Mine) Pond	3.8	0.88	0.06

Estimates of MMF for each catchment and sub-catchment show seasonal fluctuations in flow with peak runoff occurring during the spring and late fall months. Seasonal fluctuations are more pronounced in the Blanche Brook watershed with a range in flows from 3.5 m^3/s to 13 m^3/s. Seasonal changes in flow are dampened in Gull (Mine) Pond, with a flow range of 0.15 to 0.40 m^3/s. Seasonal low flows occur during the months of July and August for the subject catchments. Flows are above the 30% MAF threshold for the subject catchments, including during the low-flow period.

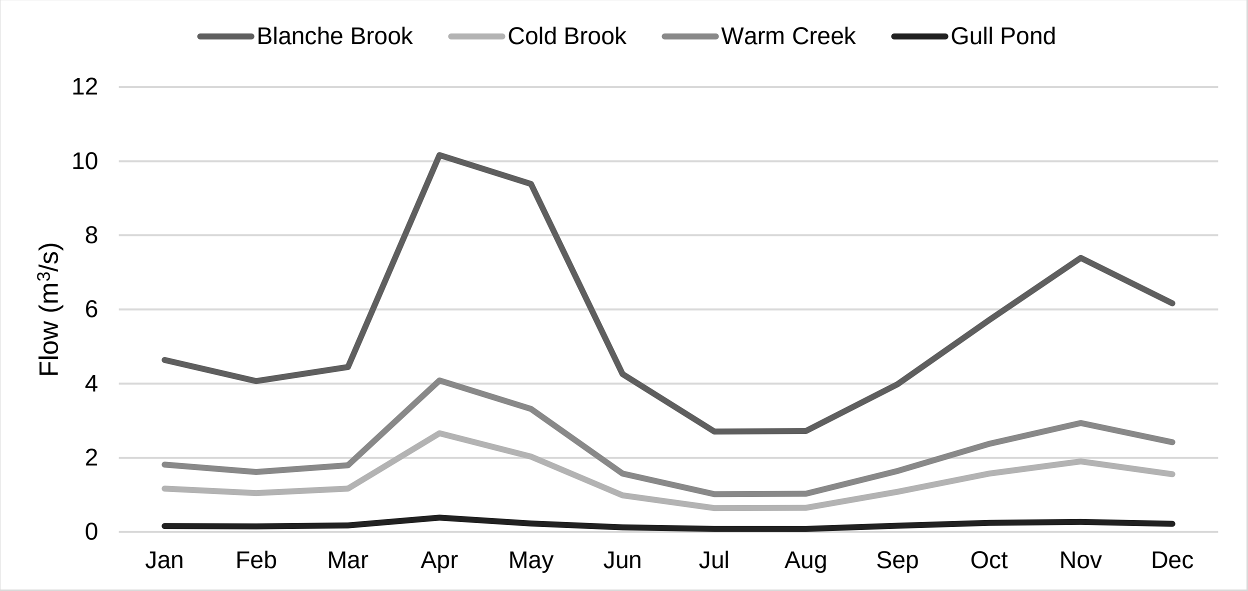


Figure 2.20 MMF for Port of Stephenville Watersheds

A bathymetric survey was completed of the three primary study waterbodies by Fracflow (Fracflow 2022) and is shown in Figures 2.21 to 2.23. Noels Pond has an approximate surface area of 105 hectare (ha) with three identified deep zones ranging from 10 to 18 m in depth. Muddy Pond, located to the immediate south of Noels Pond, has an approximate surface area of 11 ha. The northern ponded area of Muddy Pond slopes steeply to a single deep zone of 20 m. The southern ponded area remains shallow at 0 to 2 m in depth. Gull (Mine) Pond has an approximate surface area of 70 ha and two distinct deep zones at 20 and 29 m, respectively.

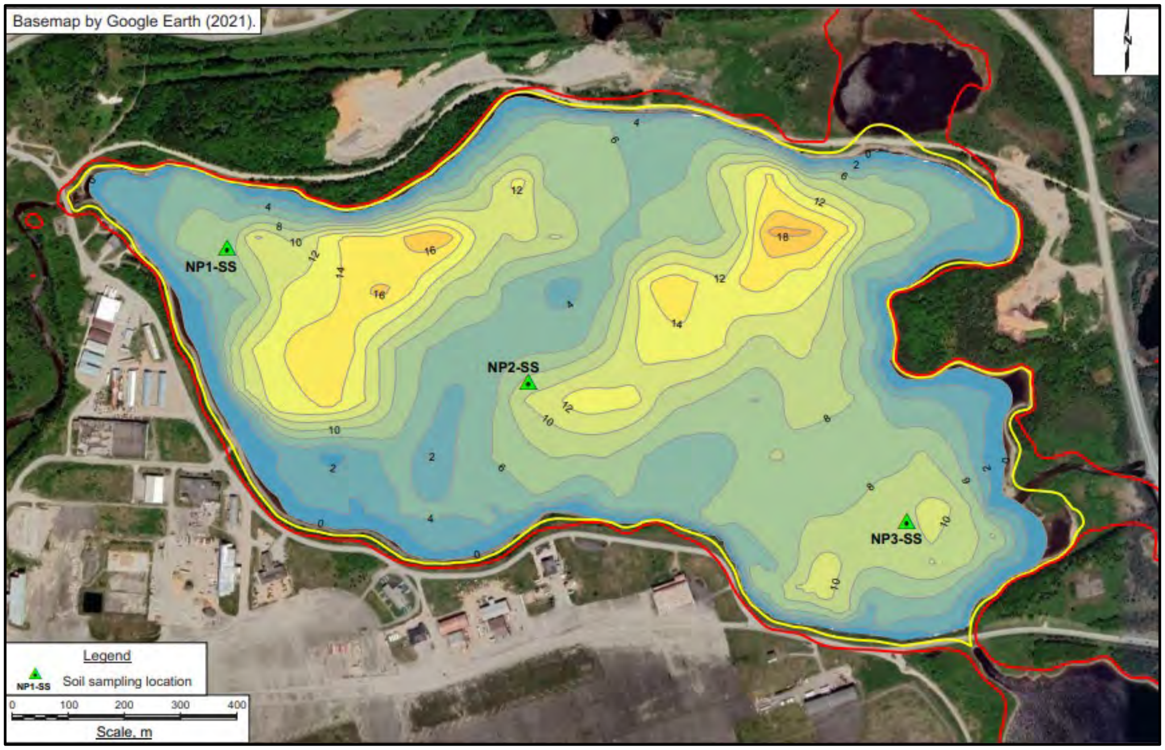


Figure 2.21 Bathymetry at Noels Pond (Fracflow 2022)

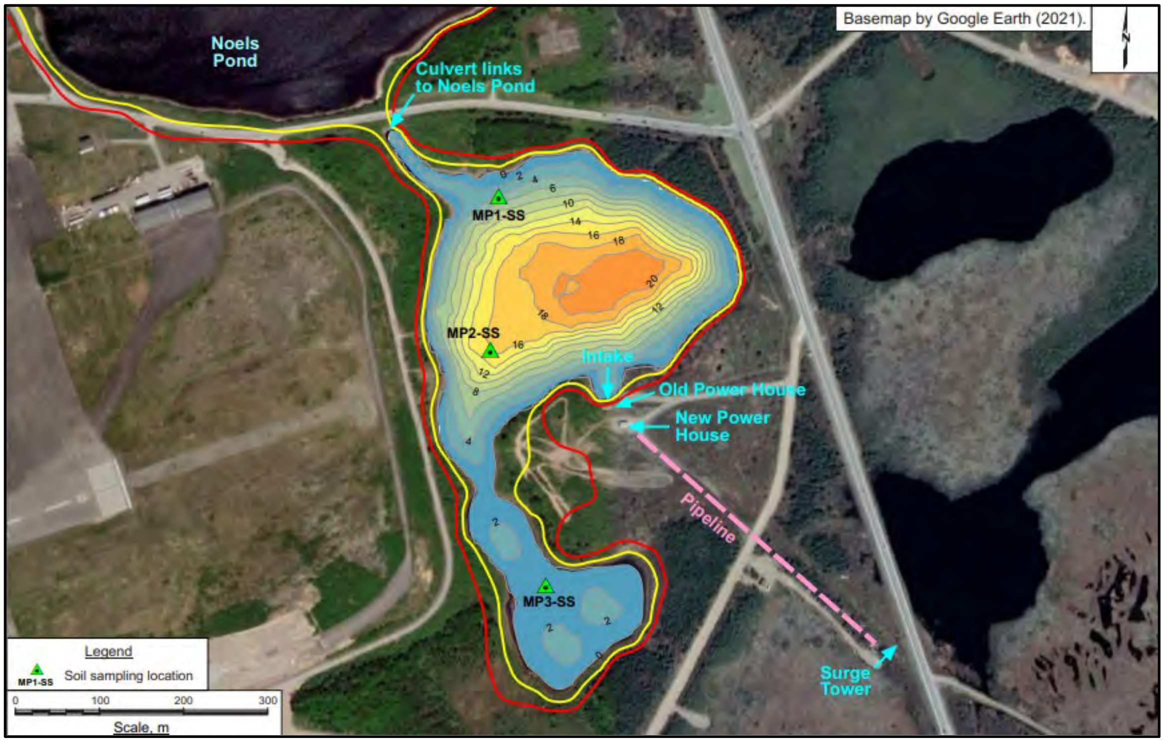


Figure 2.22 Bathymetry at Muddy Pond (Fracflow 2022)

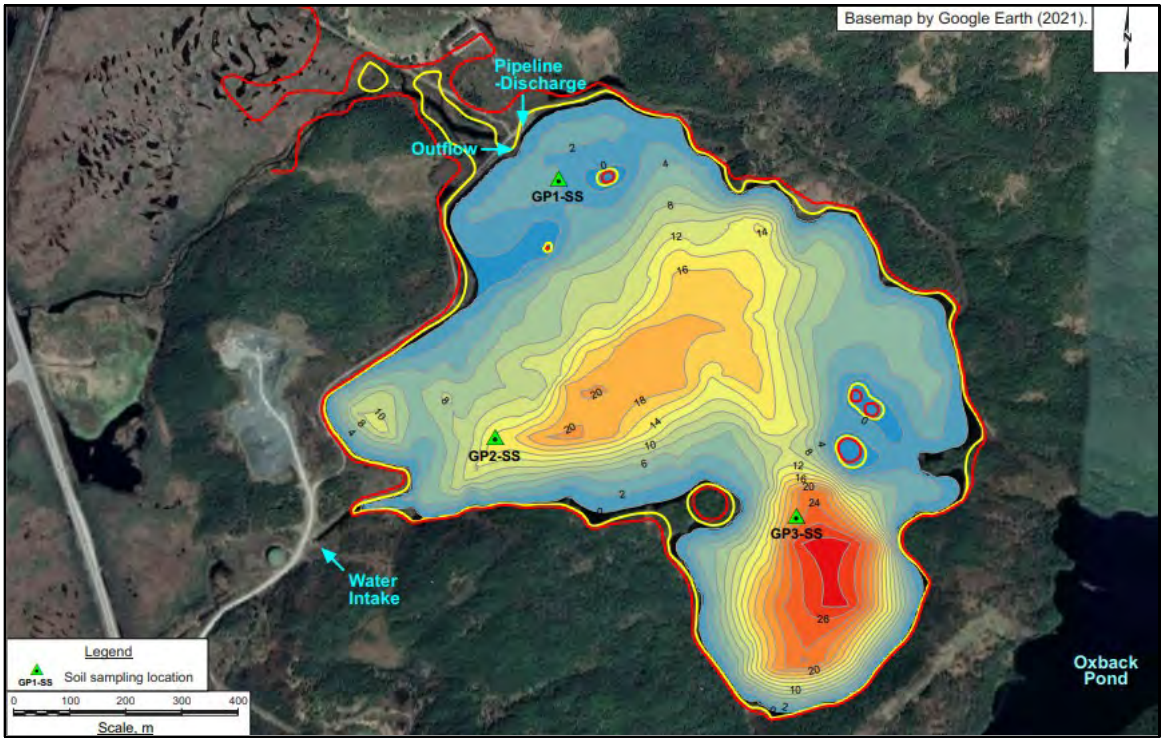


Figure 2.23 Bathymetry at Gull (Mine) Pond (Fracflow 2022)

Surface Water Quality

Water quality samples were taken by Fracflow in September 2022 within Noels Pond, Muddy Pond, and Gull (Mine) Pond. Samples were taken following the previous development of the site for the former paper mill and indicate current baseline concentrations in the sampled waterbodies. Three locations were sampled within each lake, linearly from inflow to outflow location. Sample locations are not associated with lake deep zones. Samples were taken at surface (WS-1) and 1.5 m above lake bottom (WS-2), where depth allowed, and analyzed for the following standard suite of water quality parameters:

- General chemistry
- Total and dissolved metals
- Total petroleum hydrocarbons
- Volatile organic compounds (VOCs)

Results of the analysis were compared to the CCME FAL guidelines and were generally reported as below guideline values. Iron and aluminum concentrations exceeded the guideline values in a single sample within Noels Pond. Total aluminum was exceeded in a single sample in Gull (Mine) Pond. Both TPH and VOC concentrations were reported as below laboratory detection limits in the sampled ponds (Fracflow 2022).

Gull (Mine) Pond

Select analytical results for Gull (Mine) Pond are shown in Table 2.8. The water is low in suspended solids and associated turbidity. Colour ranges from 30 to 40 TCU and is likely associated with elevated total dissolved solids. Total iron and aluminum are elevated, but do not exceed guidelines except an aluminum exceedance in a single bottom sample at GP-03. Nitrate concentrations are low to non-detect. Total phosphorous concentrations range from 20 to 30 ug/L, classifying the lake as meso-eutrophic. This trophic status is associated with moderate levels of vegetation growth and limited clarity.

Noels Pond

Select analytical results for Noels Pond are shown in Table 2.9. The water is low in suspended solids and associated turbidity. Colour and total dissolved solids are elevated, with colour ranging from 39 to 53 TCU. Average total dissolved solids is 76.5 mg/L, with the exception of an elevated bottom sample result of 104 mg/L at NP-01. Total iron and aluminum are elevated, but do not exceed guidelines except an exceedance in a single bottom sample at NP-01. Nitrate concentrations are low. Total phosphorous concentrations range from 20 to 30 ug/L, classifying the lake as meso-eutrophic. This trophic status is associated with moderate levels of vegetation growth and limited clarity. There is a noted concentration difference between surface and bottom samples at sample location NP-01.

Table 2.8 Gull (Mine) Pond Water Quality, Sampled September 23, 2022

			GP-01	GP-02		GP-03	
Parameter	**Units**	**CCME FAL**	**WS-1**	**WS-1**	**WS-2**	**WS-1**	**WS-2**
pH	-	6.5 – 9.0	6.6	6.59	6.48	7.32	6.5
Nitrate	mg/L	3.0	<0.05	<0.05	0.06	<0.05	0.08
Colour	TCU	-	32.1	34.6	34.6	31.4	40.1
Turbidity	NTU	2 /8[1]	1.7	<0.5	1.8	0.7	0.7
Total Dissolved Solids	mg/L	-	76	74	74	60	72
Total Suspended Solids	mg/L	-	<5	<5	<5	<5	<5
Total Phosphorous	ug/L	Trophic Status[2]	30	30	30	20	30
Total Aluminum	ug/L	5/100[3]	49	44	**74**	53	83
Total Iron	ug/L	300	72	60	113	98	204

Notes:

CCME FAL = CCME Guidelines for the Protection of Freshwater Aquatic Life

[1] Increase over background value of <2 NTU for long term exposure, <8 NTU for short term exposure

[2] Trophic status classification based on CCME FAL guidance framework

[3] Guideline value of 5 µg/L if pH < 6.5, 100 µg/L if pH ≥ 6.5

Table 2.9 Noels Pond Water Quality Summary, Sampled September 22, 2022

			NP-01		NP-02		NP-03	
Parameter	**Units**	**CCME FAL**	**WS-1**	**WS-2**	**WS-1**	**WS-2**	**WS-1**	**WS-2**
pH	-	6.5 – 9.0	7.26	7.26	7.25	7.25	7.16	7.26
Nitrate	mg/L	3	0.08	0.07	0.08	0.08	0.07	0.08
Colour	TCU	-	52.8	43.3	42.5	44.6	39	39.8
Turbidity	NTU	2-8[1]	2.5	2.7	2	1.2	3	1.6
Total Dissolved Solids	mg/L	-	78	104	78	78	76	74
Total Suspended Solids	mg/L	-	<5	<5	<5	<5	<5	<5
Total Phosphorous	ug/L	Trophic Status[2]	30	30	30	20	20	30
Total Aluminum	ug/L	5/100[3]	36	**183**	34	36	39	40
Total Iron	ug/L	300	96	**391**	91	94	109	152

Notes:

CCME FAL = CCME Guidelines for the Protection of Freshwater Aquatic Life **Bold value exceeds guideline**

[1] Increase over background value of <2 NTU for long term exposure, <8 NTU for short term exposure

[2] Trophic status classification based on CCME FAL guidance framework

[3] Guideline value of 5 µg/L if pH < 6.5, 100 µg/L if pH ≥ 6.5

Muddy Pond

Select analytical results for Muddy Pond are shown in Table 2.10. The water is low in suspended solids and associated turbidity. Colour and total dissolved solids are elevated, with colour ranging from 44 to 72 TCU. Average total dissolved solids is 52.5 mg/L. Total iron and aluminum are elevated, but do not exceed guideline values. Nitrate concentrations are low. Total phosphorous concentrations are consistently reported at 30 ug/L, classifying the lake as meso-eutrophic. This trophic status is associated with moderate levels of vegetation growth and limited clarity.

Table 2.10 Muddy Pond Water Quality, Sampled September 25, 2022

			MP-01	MP-02		MP-03
Parameter	**Units**	**CCME FAL**	**WS-1**	**WS-1**	**WS-2**	**WS-1**
pH	-	6.5 – 9.0	6.84	6.91	6.76	6.83
Nitrate	mg/L	3	0.05	0.06	0.13	<0.05
Colour	TCU	-	51.1	49.1	71.6	43.7
Turbidity	NTU	2-8[1]	<0.5	1.1	5	4.8
Total Dissolved Solids	mg/L	-	64	54	48	44
Total Suspended Solids	mg/L	-	<5	<5	<5	10
Total Phosphorous	ug/L	Trophic Status[2]	30	30	30	30
Total Aluminum	ug/L	5/100[3]	72	71	85	62
Total Iron	ug/L	300	118	111	119	124

Notes:
CCME FAL = CCME Guidelines for the Protection of Freshwater Aquatic Life **Bold value exceeds guideline**
[1] Increase over background value of <2 NTU for long term exposure, <8 NTU for short term exposure
[2] Trophic status classification based on CCME FAL guidance framework
[3] Guideline value of 5 μg/L if pH < 6.5, 100 μg/L if pH ≥ 6.5

Surface Water Supply Resources

Public water supply in the Stephenville area is supplied by groundwater with no identified active public surface water supplies within the Blanche Brook or Gull (Mine) Pond watersheds. A single approved WUL is issued by the NL DMA for a commercial aquaculture facility adjacent to Port Harmon (WUL-18-9929). There are no surface water sources identified associated with the approval. An inactive industrial surface water supply is associated with the former paper mill at the site, with historic average withdrawal rates of approximately 16,000 L/min (Fracflow 2023b).

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3.0 Wastewater Discharge

The Project is proposing to discharge wastewater from the hydrogen / ammonia plant into the existing wastewater discharge infrastructure and the subsequent marine receiving environment. The baseline study characterizes the wastewater and estimates the annual volume of effluent discharge, describes the existing and proposed infrastructure used for effluent discharge, and describes the receiving environment for wastewater discharged during hydrogen and ammonia production. There are no planned wastewater discharges associated with wind farm or transmission line locations.

This information is needed to:

- Assess the effects of wastewater discharge and treatment needed to produce required water quality for hydrogen and ammonia production or other desired use, on the receiving environment
- Assess the capacity of the wastewater infrastructure to manage wastewater flow from the facility

3.1 Scope And Objectives of the Wastewater Discharge Study

The objectives of this wastewater discharge study are:

- To describe the existing and proposed infrastructure, proposed effluent discharge quality and quantity, and provide a general characterization of the receiving water in the vicinity of the Port of Stephenville site
- To describe future design and additional assessment work associated with the proposed wastewater discharge

The characterization of effluent discharge quality and quantity is subject to modifications and is anticipated to be finalized during the detailed design process. The development of an Assimilative Capacity (AC) Study for the receiving environment will be used through the approval and design process as an iterative tool to assess and mitigate effects to the receiving environment from the planned discharge.

Where the treated effluent is designed to be discharged to the ocean, specific regulatory requirements must be met. Provincial discharge limits are described under Schedule A of *NLR65/03: Environmental Control Water and Sewage Regulations* under the *Water Resource Act*. Discharges to the natural receiving environment must also meet Federal requirements of Environment and Climate Change Canada (ECCC) and its enforcement arm, DFO. Guideline and Guidance Documents from the Canadian Council of Ministers of the Environment (CCME) will be used to provide context to federal requirements for the protection of receiving water environments.

3.2 Methods

Methods for this study includes the review of existing desktop baseline information and the development of a comprehensive framework to support the assessment of the assimilative capacity of the receiving environment throughout the development of the project.

3.2.1 Baseline Data Review

The baseline data review focuses on publicly available data, guidelines and supporting design and planning studies specific to the Project.

3.2.2 Assimilative Capacity Study Planning

AC Study planning for the site largely follows an Ecological Risk Assessment (ERA) approach to assessing the dilution capacity of water receiving effluent discharge. The proposed ERA approach is carried out using guidance from the CCME Strategy for the Management of Municipal Wastewaters (2009) which provides two comprehensive technical supplements on ERAs in receiving waters that are applicable to various discharge streams; CCME Technical Supplement 2 and 3 (CCME 2008a,b) outlining the ERA framework and standard methods for completing effluent mixing zone studies of receiving waters. The CCME ERA approach is considered suitable for the type of water proposing to be discharged to the marine environment.

A reject process stream of concentrated source water is proposed to be discharged from the effluent treatment train to the marine environment. Reject process water is expected to be 3x to 5x the concentration of the source water; however, this will be refined during the design process. Reject process water is not anticipated to be oxygen depleting (negligible biological oxygen demand).

The AC study approach focuses on the re-dilution of source water using a limited marine mixing zone with the commitment to meet the CCME Guidelines for the Protection of Marine Aquatic Life at the extent of the mixing zone. The AC study will be used to assess the mixing zone. Parameters included in the AC study will be identified as design progresses.

The methods for the AC study includes the following tasks:

- Initial characterization
  - Background water quality of receiving waters
  - Available current profile data within the receiving waters
  - Detailed characterization of quality of reject process water
- Determine Environmental Quality Objectives (EQOs)
  - EQOs will be considered and include CCME PMAL, background concentration data, and criteria from other jurisdictions, where applicable
  - Mixing Zone Study

- Completed using CORMIX modeling software
  - Considers inputs determined in previous phases, including proposed reject process water quality, background water quality in receiving waters, and current profile of the receiving water.
- Site-Specific Environmental Discharge Objectives (EDOs)
- Develops end-of-pipe discharge criteria considering effluent quality required to meet EQOs within the mixing zone

Effluent treatment is required should EDOs be lower than anticipated reject process water quality. The AC study is anticipated to be an iterative document, updated as design progresses.

3.3 Results

3.3.1 Effluent Discharge Quality and Quantity

Effluent discharge quantity is directly related to the proposed industrial water usage needs of the Project less losses within the system. The average weekly water demand for the three phases of the hydrogen /ammonia plant with the peak demand averaged over one week intervals is estimated at 2,381 m^3/hr (Fracflow 2023). The industrial wastewater flow is estimated to be 36% percent of the water supplied (Fracflow 2023).

Effluent water quality is dependent on influent water quality which is represented by the baseline water quality of the source water. Water is currently proposed to be supplied from the Warm Creek drainage basin, specifically withdrawn from Mine Pond/Gull Pond and Noels Pond/Muddy Pond. An analysis of the raw water from the source water locations Pond indicates the waters are low in suspended solids (TSS <10 mg/L) and associated turbidity (<5 NTU) with colour ranging from 31.4 to 71.6 TCU. Total Dissolved Solids (TDS) ranged between 44 and 104 mg/L with an average concentration of 70 mg/L. Nitrate concentrations (<0.06 mg/L) and phosphorous concentrations were less than 30 µg/L which is low in comparison to seawater (Bricker et al. 1999). Total metals in the source water were below the CEQG for the Protection of Aquatic Life – Marine (CCME 1999) (Fracflow 2022 in Stantec 2023).

To achieve preferred performance and meet specifications of the reverse osmosis and deionization units, the assumed process water temperature at discharge is 15 °C (winter) and 25 °C (summer). In addition to temperature being different from ambient marine environment conditions, the effluent will have lower a lower salinity and closer similar to fresh water because of the low concentration of total dissolved solids (TDS) in the reject process effluent. The resulting effluent temperature and salinity are unlikely to meet CEQG in the marine environment at the end of pipe.

TSS discharged at the treated effluent target of 30 mg/L may periodically exceed the CEQGs, though the magnitude of the exceedance is much lower than the magnitude of the temperature and salinity exceedances. TSS will require a dilution ration of 5:1 at the end-of-pipe to meet CEQGs, for the current scenario this is instantaneous. Modelling the mixing zone for temperature and salinity will encompass the TSS mixing zone therefore, conservatively the two parameters of concern identified for the treated effluent are temperature (heated discharge) and salinity.

3.3.2 Existing and Proposed Infrastructure

The Facility's treated effluent is proposed to discharge via an exiting bottom-mounted pipe, extending into the harbor. The effluent pipe design is not known, but for the purposes of this assessment, it has been conservatively assumed to be a 0.15 m diameter pipe located on the riser approximately perpendicular to the shoreline and dominant tidal flow. The outfall crib was assumed to be at 1.16 m above seabed. Water depth at the outfall is 12.9 m at the chart datum.

3.3.3 Receiving Water Characterization

The climate in the vicinity of the outfall is classified as maritime temperate and is heavily influenced by the water in the Gulf of St. Lawrence and continental air masses. Mean air temperatures in the Gulf range from approximately -7°C in February to 18°C in August (Galbraith et al. 2022). Throughout most of the year, the prevailing winds are northwesterly, westerly, or southwesterly. Northwesterly and westerly winds are dominant during colder months, while southwesterly winds are more frequent during warmer months. Hourly wind data available within the study area were obtained from Environment and Climate Change Canada (ECCC) climate stations 8403800 and 8403801 at Stephenville Airport and MSC50 grid M6013677 located 66 km southwest of Stephenville.

Ocean currents in the region are influenced by tides, regional meteorological events, freshwater runoff from the St. Lawrence River and transport from the Strait of Belle Isle and the Cabot Strait. Prominent features of the region include coastal currents, gyres, massive eddies in the estuary, and tidal fronts. Currents within the Gulf flow counterclockwise with main currents directed towards the northeast along Western Newfoundland and to the southwest along Quebec's coast in the north (AMEC 2014). Currents are strongest near the surface (0-20 m), except in winter months and along the slopes of the deep Laurentian and Esquiman channels (Galbraith et al. 2022).

Recorded sea surface water temperature data at Stephenville crossing by the National Oceanic and Atmospheric Administration (NOAA) (seatemperature.org) which indicates a range from -1.8 ºC (degrees Celsius) to 17.4 ºC for near surface temperature. A review of literature indicates that depth-averaged salinity approximately varied between 30 PSU (practical salinity unit) and 33.7 PSU with an average 31.8 PSU from 0 to 50 m depth near the study area (Cyr et al. 2021).

3.3.4 Assimilative Capacity Study

Stantec completed a detailed mixing zone assessment of the reject process water effluent discharge from the Facility (Stantec 2023). The CCME marine water quality guidelines for the protection of aquatic life for temperature and salinity were used as water quality objectives in this assimilative capacity study. A three-dimensional model (CORMIX version 12.0) was used to derive the mixing zone for the Facility effluent. Physical and metocean characteristics of the receiving environment were modelled conservatively based on available information. The outfall configuration was conservatively assumed based on available information. The results indicate the mixing zone is less than 1 m for temperature and salinity in most scenarios. The worst-case scenario occurs during the winter period with an average current speed when the mixing zone for temperature and salinity can extend up to 3 m from the outfall before meeting the respective CCME guidelines. Using the conservative modelling parameters, it can be concluded that no exceedances of marine water quality objectives are observed at the end of the 3 m mixing zone.

3.4 References

CCME (Canadian Council of Ministers of the Environment). 2008a. Technical Supplement 2. Canada-wide Strategy for the Management of Municipal Wastewater Effluent Environmental Risk Management: Framework and Guidance. Available online at: https://ccme.ca/en/res/mwwe_techsupp_2_e.pdf

CCME. 2008b. Technical Supplement 3 Canada-wide Strategy for the Management of Municipal Wastewater Effluent Standard Method and Contracting Provisions for the Environmental Risk Assessment. Available online at: https://ccme.ca/en/res/mwwe_techsupp_3_e.pdf

CCME. 2009. Canada-wide Strategy for the Management of Municipal Wastewater Effluent. February 17, 2009. Available online at: https://www.ccme.ca/en/res/mwwe_strategy_e.pdf

Fracflow. 2022. Active Storage and Water Quality Noels Pond, Muddy Pond and Gull (Mine) Pond Stephenville, NL. December 16, 2022.

Fracflow. 2023b. Industrial Water Supply Infrastructure Stephenville, NL. January 10, 2023.

Stantec 2023. Assimilative Capacity Study - Mixing Zone Modelling for Marine Discharge Project Nujio'qonik. August 2023

4.0 Freshwater Fish and Fish Habitat

The baseline freshwater fish and fish habitat study to support the EIS was conducted using available desktop information, which is a similar approach to other topics within the Aquatic Baseline Report. A field program is underway to verify the results of the desktop assessment and support future permitting.

4.1 Scope And Objectives of the Fish and Fish Habitat Study

The objectives of this fish and fish habitat baseline study are based on the final EIS Guidelines established for the Project and include:

- Identification of potential watercourse crossings associated with the Project Area
- Characterization fish habitat based on aerial imagery
- Use of existing available literature to characterize fish communities by species and life stage
- Identification of critical and sensitive habitats for spawning, nursery, rearing, feeding and migration
- Identification of species at risk (SAR) or species of conservation concern with potential to be found within the LAA

4.2 Regulatory Framework

This section identifies the primary regulatory requirements and policies which influence the scope of the assessment on fish and fish habitat and govern the management and protection of fish and fish habitat in Canada and NL.

In addition to the NL *Environmental Protection Act* (NL EPA) which guides the EA process, the Project is subject to other federal and provincial legislation, policies and guidance. This includes the federal *Fisheries Act*, the federal *Species at Risk Ac*t (SARA), the *NL Endangered Species Ac*t (NL ESA) and the NL *Water Resources Act.*

The *Fisheries Act* provides a legal basis for conserving and protecting fish and fish habitat. The Act includes prohibitions against

- the harmful alteration, disruption or destruction (HADD) of fish habitat (section 35(1))
- the death of fish, other than by fishing (section 34.4(1))
- the deposition of deleterious substances (Section 36)
- the obstruction of fish passage (Section 34.3(2)).

Works which may result in the death of fish or the HADD of fish habitat can be approved by and carried on in accordance with conditions established by the Minister of Fisheries, Oceans and the Canadian Coast Guard (Fisheries Minister) (section 35(2)(b)). This generally includes requirements to avoid, mitigate harmful effects to the extent practical, and offset remaining potential residual effects.

SARA provides protection for SAR in Canada. The legislation provides a framework to facilitate recovery of species listed as Threatened, Endangered or Extirpated, and to prevent species listed as special concern from becoming threatened or endangered. SAR and their habitats are protected under SARA, which prohibits: 1) the killing, harming, or harassing of endangered or threatened SAR (sections 32 and 36), and 2) the destruction of critical habitat of an endangered or threatened SAR (sections 58, 60 and 61). These species are listed in Schedule 1 of SARA.

While the primary legislation protecting fish and fish habitat is the federal *Fisheries Act*, provincial legislation is also considered in the assessment of effects on fish and fish habitat. This includes the NL EPA and the NL ESA. The NL ESA provides protection for plant and animal species considered to be Endangered, Threatened or Vulnerable.

The *NL Water Resources Act* provides legislation to manage water resources in the province, with the intent of providing clean water for environmental, social, and economic well-being. Works in freshwater waterbodies require a permit for the construction of water crossing structures (e.g., culvert, bridge, ford).

4.3 Methods

This baseline report was conducted using available desktop information including, the provincial 5 m digital elevation model (DEM), satellite imagery and publicly available information. Field studies to support the Project were developed in consultation with regulators and will be implemented in 2023.

4.3.1 Spatial Boundaries

The Project Area is the direct footprint of the Project and is consistent across VECs. The Project Area encompasses the immediate area in which Project activities and components will occur and is comprised of following distinct areas: the Port au Port wind farm, the Codroy wind farm, the hydrogen / ammonia plant, port facilities, and the 230 kV transmission lines, as well as associated infrastructure including roads, substations, and water supply. The Project Area is the potential area of direct physical disturbance associated with the construction, operation and decommissioning and rehabilitation of the Project. The Project Area also includes a up to a 175 m buffer (350 m RoW) around key Project components to allow for micro-siting during detailed design and mitigation to avoid ecological and culturally sensitive habitats.

The LAA for freshwater fish and fish habitat incorporates the Project Area and watercourses and waterbodies that intersect with the Project Area, as shown in Figure 4.1. The LAA also includes Noel Pond, Muddy Pond, Gull (Mine) Pond and their downstream tributaries, within the proposed area of the industrial water supply. A 500 m buffer has also been applied to the access roads, collector lines and transmission line RoW to capture potential upstream and downstream effects related to placement of culverts and bridges, clearing of the RoW, and operation and maintenance of the access road and RoWs.

The RAA for freshwater fish and fish habitat incorporates the Project Area and LAA, and extends from the headwaters of the watershed to the head of tide where tributaries discharge into the marine environment and potential Project interactions may be observed.

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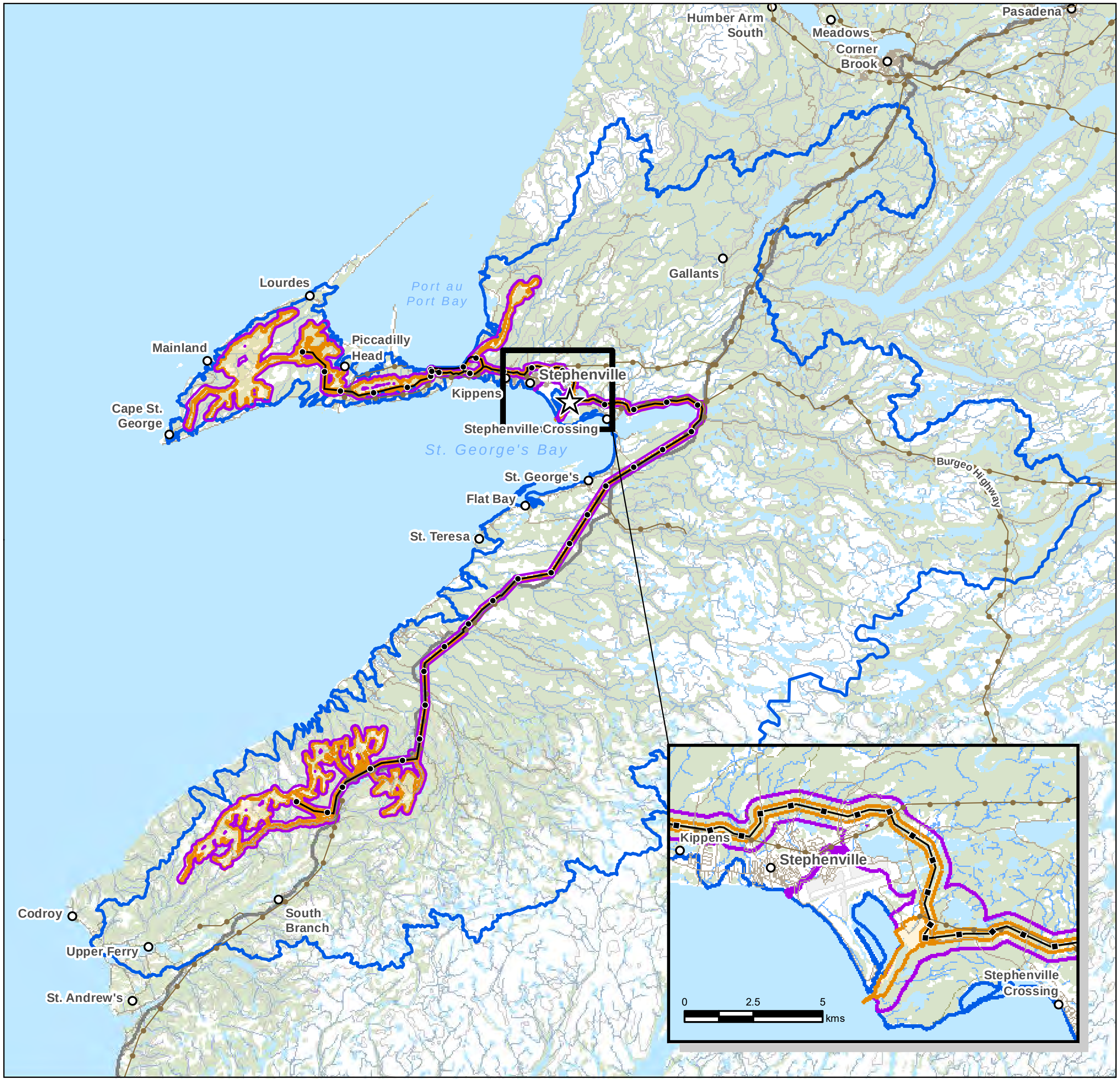


Stantec

🟧 Project Area

🟪 Local Assessment Area

🟦 Regional Assessment Area

Proposed Project Features

☆ Hydrogen / Ammonia Plant Location

Transmission Line 230 kV

Other Features

Existing Transmission Line

Trans-Canada Highway

Road

Watercourse

Waterbody

Wooded Area

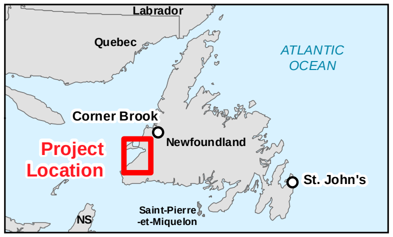
N

0 10 20 Kilometres

(At original document size of 8.5x11)
1:820,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NL Fisheries, Forestry, and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-06-02
QR by AW on 2023-07-07

Client/Project
World Energy GH2
Project Nujio'qonik

121417233_070b

Figure No.
4.1

Local and Regional Assessment Areas

4.3.2 Watercourse Crossing Identification

Potential watercourse crossings were identified within the proposed access road crossings, transmission line RoWs, collector line RoWs, and substation and turbine footprints using the 1:50,000 topographic mapping (Government of Canada n.d.) and existing satellite imagery. For the purposes of the baseline report, overprinting occurred when the area of Project disturbance was physically over a mapped or unmapped watercourse, while encroaching occurred when the area of Project disturbance was within 15 m of a mapped or unmapped watercourse.

4.3.3 Fish Habitat Characterization

A desktop analysis of digital satellite imagery was used to characterize fish habitat at the proposed crossing locations or potentially affected waterbodies. The fish habitat parameters assessed included channel status (visible or not visible), habitat type, estimated width, riparian vegetation, dominant substrate, slope, and adjacent relevant features.

Watercourse sizes (i.e., small, medium, large) were classified based on stream order. Small watercourses were considered those with orders of 0, 1, 2, while medium watercourses were considered those between 3 and 5.

When using satellite imagery to characterize fish habitat at watercourse crossing locations, the dominant substrate type assigned was based on substrates visible from satellite imagery (e.g., boulders or bedrock). Where substrates were not visible, substrate was assigned based on the type of riparian vegetation present at the crossing. These assumptions were based on professional experience from numerous field surveys in Atlantic Canada, where substrate type was found to be generally related to the type of riparian vegetation present or channel slope. Thus, the following assumption of substrate type was applied when characterizing fish habitat from satellite imagery where substrates were not readily visible, unless professional judgment indicated otherwise:

- Fine substrates are typically associated with wetland riparian vegetation
- Mixed substrates (i.e., fine and coarse) are associated with shrub riparian vegetation
- Coarse substrates are associated with treed riparian vegetation

Ponds associated with the hydrogen / ammonia plant were characterized based on existing available information (e.g., bathymetry) and publicly available imagery.

4.3.4 Fish Community

Satellite imagery, publicly available information, watercourse connectivity, and professional knowledge was used to inform the presence of fish and species potentially present in watercourses and waterbodies within the Project Area.

4.3.5 Aquatic Species at Risk

Publicly available literature, aquatic SAR mapping and data from Atlantic Canada Conservation Data Centre (AC CDC) were used to assess the potential for aquatic SAR. For the purposes of this baseline report, SAR are defined as species that are:

- listed on Schedule 1 of SARA as Extirpated, Endangered, Threatened or Special Concern
- listed as Extirpated, Endangered, Threatened, or Vulnerable under the NL ESA

Species of Conservation Concern (SOCC) are defined as those species that are:

- assessed as Extirpated, Endangered, Threatened, or Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) but have not yet been added to Schedule 1 of SARA
- recommended for listing by the Species Status Advisory Committee (SSAC) as Endangered, Threatened or Vulnerable but are not yet listed under the NL ESA
- ranked as provincially rare by the AC CDC including species with provincial status (S-ranks) of S1 (Critically Imperiled), S2 (Imperiled) or combinations thereof (e.g., S1S2) upon review by the AC CDC (AC CDC 2023)

4.4 Results

4.4.1 Watercourse and Waterbody Identification

Watercourse and waterbody identification was conducted for the four Project components: the Port au Port wind farm; the Codroy wind farm; the 230 kV transmission line; and the hydrogen / ammonia plant. For each location watercourses which crossed access roads, transmission lines or collector lines were identified based on the proposed RoWs. The proposed watercourse crossings are shown in Figures 4.2 to 4.4. More detailed figures are shown in Appendix D.

4.4.1.1 Port au Port Wind Farm

The Port au Port wind farm overlaps 44 small watersheds which drain from the Peninsula to the Atlantic Ocean. The various RoWs cross Mainland Brook, Three Rock Cove Brook, South Brook, Red Brook, Smelt Brook, Fox River and Harry Brook proper or their tributaries.

In total, 112 potential watercourses crossings associated with the proposed access road RoWs were identified through the review of existing information and satellite imagery collected for the Project (Figure 4.2). Of the watercourses identified, 86 were mapped watercourses identified through the 1:50,000 topographic mapping and 26 potential watercourses were identified through the review of satellite imagery (Figure 4.2).

In addition, 132 potential watercourse crossings associated with the proposed collector lines were identified through the review of existing information (Figure 4.2). Of the watercourses identified, 102 were mapped watercourses identified through the 1:50,000 topographic mapping and 30 potential watercourse crossings were identified through the review of satellite imagery (Figure 4.2).

In addition, 17 potential watercourses/waterbodies associated with the wind turbine and substation footprints were identified through the review of existing information (Figure 4.2). Of the watercourses identified, 15 were mapped watercourses identified through the 1:50,000 topographic mapping and 2 potential watercourse crossings were identified through the review of satellite imagery (Figure 4.2).

4.4.1.2 Codroy Wind Farm

Codroy wind farm overlaps the Grand Codroy River Watershed, which is 724 km^2 in area, as well as twelve other smaller watersheds that drain into the Atlantic Ocean (Figure 4.3). The various RoWs cross the Grand Codroy River (including larger tributaries such as Broom's Brook, Big Brook, Crooked Brook, Morris Brook), Shoal Point Brook and Bald Mountain Brook or their tributaries. The Codroy wind farm drains the Anguille Mountains which incorporates several ecoregions including the Long Range Barrens Ecoregion, Southern Long Range Subregion and the Western Newfoundland Forest Ecoregion, Codroy Subregion (NLDECC n.d.-a).

In total, 90 potential watercourses crossings associated with the proposed access road RoWs were identified through the review of existing information and satellite imagery collected for the Project (Figure 4.3). Of the watercourses identified, 76 were mapped watercourses identified through the 1:50,000 topographic mapping and 14 potential watercourses were identified through review of satellite imagery (Figure 4.3).

In addition, 87 potential watercourse crossings associated with the proposed collector lines were identified through the review of existing information (Figure 4.3). Of the watercourses identified, 70 were mapped watercourses identified through the 1:50,000 topographic mapping and 17 potential watercourse crossings were identified through the review of satellite imagery (Figure 4.3).

In addition, 15 potential watercourses/waterbodies associated with the wind turbine footprints were identified through the review of existing information (Figure 4.3). There were no watercourses/waterbodies associated with the substation footprints. Of the watercourses identified, 6 were mapped watercourses identified through the 1:50,000 topographic mapping and 9 potential watercourse crossings were identified through the review of satellite imagery (Figure 4.3).

4.4.1.3 230 kV Transmission Line

The 230 kV transmission line spans approximately 60 watersheds which flow towards the western side of the Island of Newfoundland to the Atlantic Ocean. The transmission line is located Western Newfoundland Forest Ecoregion, and the Codroy, St. George's Bay and Port au Port subregions (NLDECC n.d.-a).

In total, 146 potential watercourses crossings associated with the proposed transmission line RoW (associated with both Port au Port and Codroy wind farms) were identified through the review of existing information and satellite imagery collected for the Project (Figure 4.4). Of the watercourses identified, 141 were mapped watercourses identified through the 1:50,000 topographic mapping and 5 potential watercourses were identified through the review of satellite imagery (Figure 4.4).

Stantec

Watercourse Crossings

●	Road Crossing
●	Collector Line Crossing
●	Substation Crossing
●	Transmission Line Crossing

Proposed Project Features

•	Turbine Location
—	Collector Line
—	Access Road
•—	Transmission Line 230 kV
▬	Proposed Route
▬	Alternate Route
☐	Project Area

Other Features

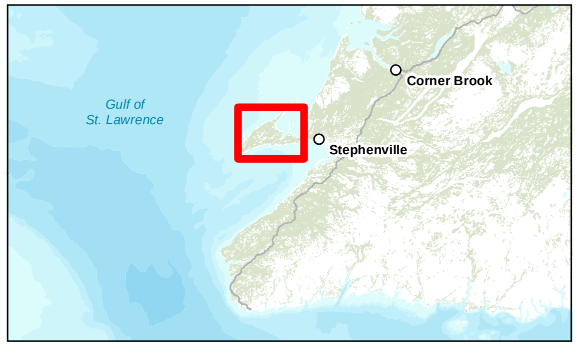
•—	Transmission Line, Existing
—	Road / Highway
—	Watercourse
■	Waterbody
■	Wetland
■	Forested Area

N

0 2 4 Kilometres

(At original document size of 11x17)
1:135,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
QR by AW on 2023-07-14

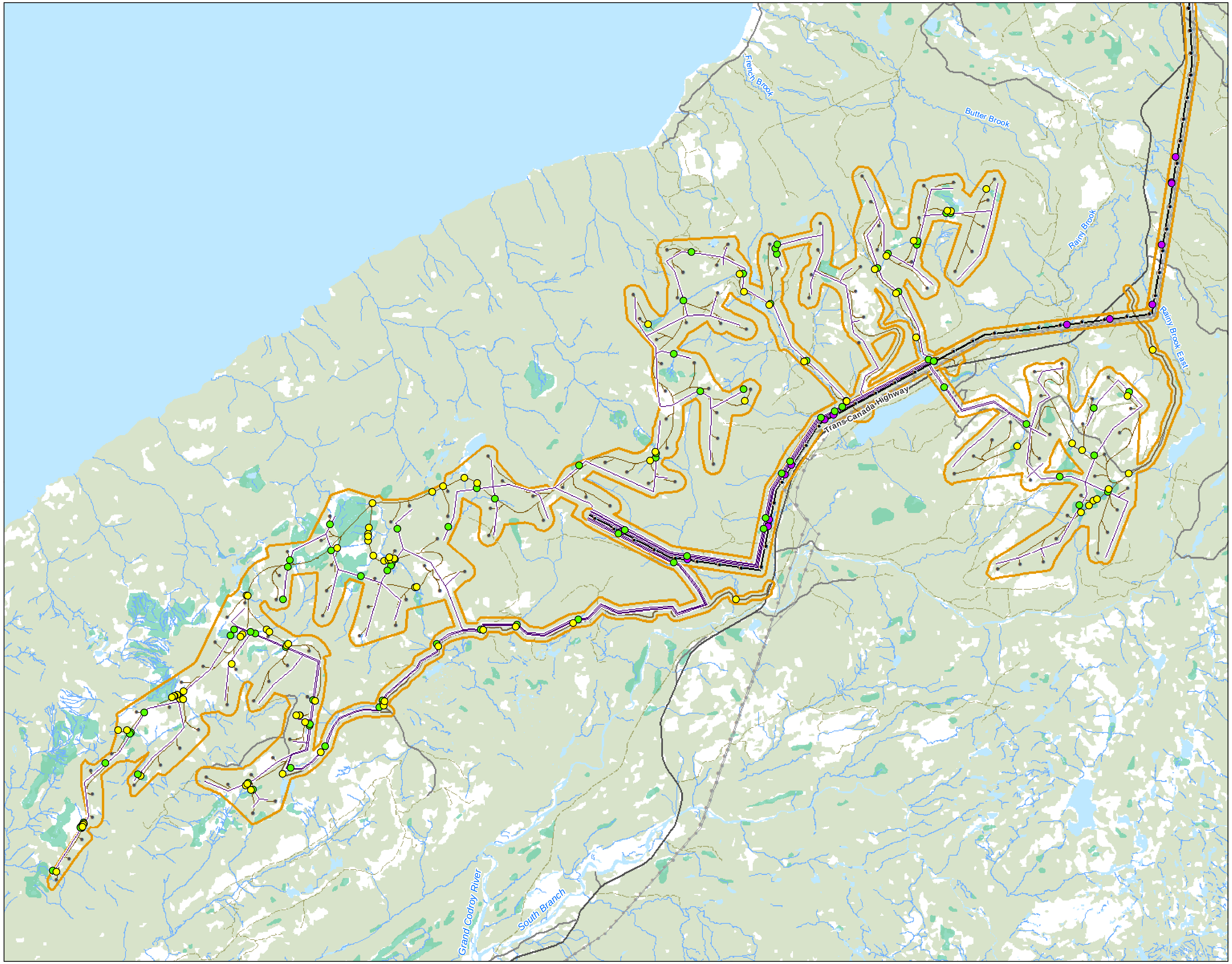
Client/Project

121417233_66a REVA

World Energy GH2
Project Nujio'qonik

Figure No.
4.2

Title
Potential Watercourse Crossings for Project Nujio'qonik GH2 - Port au Port Wind Farm



Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features

- — Collector Line
- — Access Road
- —•— Transmission Line 230 kV
- ☐ Project Area

Other Features

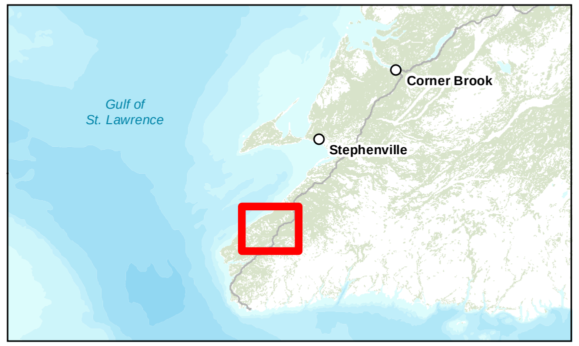
- —•— Transmission Line, Existing
- — Trans-Canada Highway
- — Road / Highway
- — Watercourse
- ■ Waterbody
- ■ Wetland
- ■ Forested Area

N

0 1.5 3 Kilometres

(At original document size of 11x17)
1:115,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
QR by AW on 2023-07-14

Client/Project

121417233_66b REVA

World Energy GH2
Project Nujio'qonik

Figure No.
4.3

Title
Potential Watercourse Crossings for Project Nujio'qonik GH2 - Codroy Wind Farm

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Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing
- 🔵 Within Plant Site
- 🟣 Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- — Collector Line
- — Access Road
- —•— Transmission Line 230 kV
- ▬ Proposed Route
- ▬ Alternate Route
- ☐ Project Area

Other Features

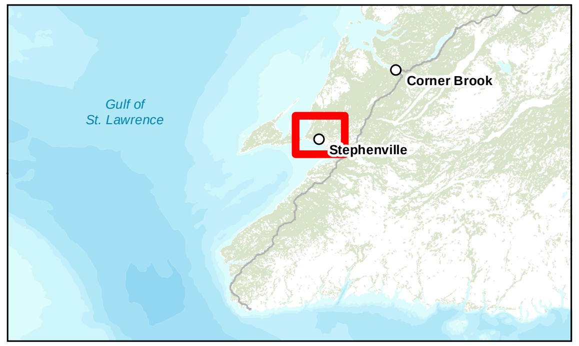
- —•— Transmission Line, Existing
- — Road / Highway
- — Watercourse
- ▨ Waterbody
- ▨ Wetland
- ▨ Forested Area

N

0 1.5 3 Kilometres

(At original document size of 11x17)
1:100,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec; OpenStreetMap
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
QR by AW on 2023-07-24

Client/Project

121417233_66c REVA

World Energy GH2
Project Nujio'qonik

Figure No.

4.4

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2 - Stephenville Area

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_066c_Watercourse_Crossings_Stephenville_REVD.mxd Revised: 2023-08-03 By: NiWhite

4.4.1.4 Hydrogen / Ammonia Plant

Muddy Pond and Noels Pond are located within the Warm Brook Watershed (48.4 km^2), which flows into the Blanch Brook Watershed (129.5 km^2) and into the Atlantic Ocean (Figure 4.4). Gull (Mine) Pond is located within an unnamed Watershed (WSC-232; 10.1 km^2), which flows into Port Harmon within the Port of Stephenville (Figure 4.4). The hydrogen / ammonia plant is located within the Western Newfoundland Forest Ecoregion, St. George’s Bay Subregion (NLDECC n.d.-a).

The outlet of Gull Pond and its associated tributaries (1,570 m of stream length) flows through the plant site into Port Harmon.

4.4.2 Fish Habitat Characterization

4.4.2.1 Port au Port Wind Farm

Of the 112 potential watercourse crossings associated with the proposed Port au Port wind farm access road RoWs, 40 watercourses / waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. 37 are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies and 3 are considered medium. Of those remaining, 42 crossings are likely no visible channel (based on satellite imagery), 25 are likely overland drainage channels and 5 are bog holes (i.e., have no connectivity with downstream watercourses) and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.1.

Based on the satellite imagery, small watercourses associated with the Port au Port wind farm access road RoWs were generally narrow (<3 m). Small watercourses were anticipated to have riffle/run habitats, with primarily coarse substrates, and riparian vegetation consisting of trees (Appendix E, Table E.1). The medium watercourses varied widely in width (approximately 4 to 11 m), with coarse substrates, riffle/run habitats and riparian vegetation consisting of primarily trees (Appendix E, Table E.1).

Of the 132 potential watercourse crossings associated with the proposed Port au Port collector line RoWs, 46 watercourses / waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. 30 are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies, 14 are considered medium and 2 are considered ponds. Of those remaining, 47 crossings are likely no visible channel (based on satellite imagery), 32 are likely overland drainage channels and 7 are bog holes and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.2.

Based on the satellite imagery, small watercourses associated with the Port au Port collector line RoW were generally narrow (<3 m). Small watercourses were anticipated to have riffle/run habitats, with primarily coarse substrates, and riparian vegetation consisting of trees (Appendix E, Table E.2). The medium watercourse were typically wider (approximately 3 to 13 m), with coarse substrates, riffle/run habitats and riparian vegetation consisting of primarily trees (Appendix E, Table E.2). Ponds were generally small (range 34 to 122 m in width), anticipated to have fine substrates and had riparian vegetation consisting primarily of trees (Appendix E, Table E.2).

Of the 17 potential watercourses overprinted with the proposed Port au Port wind farm substations and turbine footprints, 5 watercourses are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. These 5 watercourses are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies. Of those remaining, 8 crossings are likely no visible channel (based on satellite imagery) and 4 are likely overland drainage channels and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.3.

Based on the satellite imagery, small watercourses associated with the Port au Port wind farm substation and turbine footprints were generally narrow (approximately 1 m). Small watercourses were anticipated to have riffle/run habitats, with primarily coarse substrates, and riparian vegetation consisting of trees (Appendix E, Table E.3).

4.4.2.2 Codroy Wind Farm

Of the 90 potential watercourse/waterbody crossings associated with the proposed Codroy wind farm access road RoWs, 78 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. 71 are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies and 6 are considered medium and one is a pond. Based on review of imagery 7 crossings are likely no visible channel and 5 are likely overland drainage channels (i.e., have no connectivity with downstream watercourses) and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.4.

Based on the satellite imagery, small watercourses associated with the proposed Codroy wind farm access road RoWs were generally narrow (<5 m). The majority of small watercourses were anticipated to have riffle/run habitats, with mixed (fine and coarse) or coarse substrates, and riparian vegetation consisting of shrubs or trees (Appendix E, Table E.4). Medium watercourses were typically wider (range 2 to 12 m). The majority of watercourses were anticipated to have coarse substrates, riffle/run habitats and riparian vegetation consisting of trees or shrubs (Appendix E, Table E.4). The pond was small (approximately 100 m in width), anticipated to have fine substrates and had wetland riparian vegetation (Appendix E, Table E.4).

Of the 87 potential watercourse crossings associated with the proposed Codroy collector line RoWs, 65 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. 55 are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies and 10 are considered medium. Of those remaining, 8 crossings are likely no visible channel (based on satellite imagery), 10 are likely overland drainage channels and 4 were bog holes (i.e., no visible connectivity with downstream watercourses), and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.5.

Based on the satellite imagery, small watercourses associated with the proposed Codroy collector line RoWs were generally narrow (<5 m). Approximately 40% of the watercourses were anticipated to have fine substrates and slow-flowing water velocities (e.g., glide habitats) and flow through wetlands or low-lying areas. The remaining 60% of watercourses were anticipated to have riffle/run habitats, with mixed (fine and coarse) or coarse substrates, and riparian vegetation consisting of shrubs or trees (Appendix E, Table E.5). Larger watercourses were typically wider (range 2 to 11 m), with coarse substrates, riffle/run habitats and riparian vegetation consisting of primarily trees (Appendix E, Table E.5).

Of the 15 potential watercourses/waterbodies associated with the proposed Codroy wind farm substation and turbine footprints, 13 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. These 13 watercourses/waterbodies are considered small (first order headwater streams) and drain into larger tributaries or waterbodies. The two remaining watercourses are likely overland drainage channels and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.6.

Based on the satellite imagery, small watercourses associated with the proposed Codroy wind farm turbine footprints were generally narrow (<1 m). The majority of the watercourses were anticipated to have fine or mixed (fine and course) substrates and slow-flowing water velocities (e.g., glide habitats) and flow through wetlands or low-lying areas with shrubs (Appendix E, Table E.6).

4.4.2.3 230 kV Transmission Line

Of the 147 potential watercourse crossings associated with the 230 kV transmission line RoW, 106 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies. 62 are considered small (first or second order headwater streams) and drain into larger tributaries or waterbodies, 37 are considered medium, and 7 are ponds. Of those remaining, 20 crossings are likely no visible channel (based on satellite imagery), 17 are likely overland drainage channels and 4 are bog holes (i.e., have no connectivity with downstream watercourses), and are therefore not considered fish habitat. Detailed fish habitat information based on satellite imagery is provided in Appendix E, Table E.7.

Based on the satellite imagery, small watercourses associated with the transmission line RoW were generally narrow (<3 m), with a few exceptions in steady habitats. The majority of small watercourses were anticipated to have riffle/run habitats, with primarily mixed (fine and coarse) or coarse substrates, and riparian vegetation consisting of trees or shrubs (Appendix E, Table E.7). The medium watercourses ranged widely in size (range 2 to 224 m), with coarse substrates, riffle/run habitats and riparian vegetation consisting of primarily trees (Appendix E, Table E.7). The ponds were small (approximately 16 to 260 m in width), anticipated to have fine substrates and had riparian vegetation consisting primarily of shrubs or trees (Appendix E, Table E.7).

4.4.2.4 Hydrogen / Ammonia Plant

Muddy Pond is a 0.13 km^2 pond which is located immediately adjacent to the Stephenville Airport. It has one inflowing tributary and drains into Noels Pond by a 40 m long culvert. The maximum depth is 20 m and approximately half of fish habitat in the pond would be considered profundal (deeper water habitat) and the remaining half would be considered littoral (shallow) habitats. Substrates along the shoreline area are coarse (e.g., gravel, cobble) with substrates in the profundal zone likely being fine. Riparian vegetation along the pond is primarily forest and shrubs. Runway lighting poles span Muddy Pond. Anthropogenic activities around Muddy Pond include roads and the Stephenville Airport.

Noels Pond is a 1.03 km^2 pond which is located immediately adjacent to the Stephenville Airport. It has four inflowing tributaries and drains to the Atlantic Ocean via Warm Creek. The maximum depth is 18 m and the majority of the fish habitat in the pond would be considered profundal (deeper water habitat) with a smaller proportion being littoral (shallow) habitats. Substrates in the littoral area appear to be coarse (e.g., gravel, cobble) with substrates in the profundal zone likely being fine. Riparian vegetation along the northern and eastern portion of the pond is primarily forest and shrubs, with grass and shrubs being the dominant riparian vegetation along the southern and western shoreline. Anthropogenic activities around Noels Pond include roads, a quarry and the Stephenville Airport.

Gull (Mine) Pond is a 0.60 km^2 pond which is located immediately adjacent to the Stephenville Airport. It has no visible inflowing tributaries and drains into Port Harmon (Atlantic Ocean) via an unnamed outlet. The maximum depth is 28 m and the majority of the fish habitat in the pond would be considered profundal (deeper water habitat) with a smaller proportion being littoral (shallow) habitats. Substrates in the littoral area appear to be coarse (e.g., gravel, cobble) and fine with substrates in the profundal zone likely being fine. Riparian vegetation is primarily forest. Anthropogenic activities around Gull Pond include a road along the western side and a water intake.

The outlet of Gull Pond and its associated tributaries flows through the plant site into Port Harmon. Based on the satellite imagery, the watercourses associated with plant site were generally narrow (< 2 m) and disturbed by an existing access road, a piped stream diversion and the existing plant site. The watercourses were anticipated to have mixed substrates, swift-flowing water velocities (e.g., riffle-run habitats) and riparian vegetation consisting of shrubs.

4.4.3 Fish Communities

Several fish species potentially inhabit rivers and ponds in the Western Newfoundland Forest Corner Brook, Port au Port, St. George's Bay and Codyroy subregions including Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), Arctic char (*Salvelinus alpinus*), American eel (*Anguilla rostrata*), ninespine stickleback (*Pungitius pungitius*), threespine stickleback (*Gasterosteus aculaeatus*), blackspotted stickleback (*Gasterosteus wheatlandi*), mummichog (*Fundulus heteroclitus*), banded killifish (*Fundulus diaphanous*) and rainbow smelt (*Osmerus mordax;* NLDECC_2008a,b,c,d). Based on review of habitat preferences and satellite imagery, Atlantic salmon, brook trout, American eel and stickleback are most likely to be present in watercourses / waterbodies in the RAA.

Freshwater habitat within the RAA provides spawning, nursery, rearing, feeding and migratory habitats on a local scale for brook trout, threespine stickleback, ninespine stickleback, and banded killifish to carry out their life processes. Brook trout are most likely to be found in small streams with coarse substrates, while Atlantic salmon and American eel are most likely to be found in medium streams with coarse substrates (Grant and Lee 2004; Scott and Crossman 1998; Stanley and Trial 1995). Sticklebacks and banded killifish are most likely to be found in ponds or streams flowing through wetlands with fine substrates (Grant and Lee 2004; Scott and Crossman 1998). Mummichogs are found in estuarine areas close to the marine environment (Scott and Crossman 1998).

Atlantic salmon, American eel, and rainbow smelt are diadromous, meaning they require both the freshwater and marine environments to carry out their lifecycles (Scott and Crossman 1998).

Based on the habitat preferences of American eel, freshwater habitat within the RAA likely provides rearing, feeding and migratory habitats on a local scale to carry out their life processes. The Sargasso Sea in the marine environment provides spawning and nursery habitats for American eel. Habitat critical for the long-term survival of American eel is hard to define or quantify given the wide range in habitat preferences occupied by one or multiple life stages (Wildlife Division 2010).

Based on their individual habitat preferences, freshwater habitats within the RAA also provide spawning, nursery, rearing and migratory habitat on a local scale for Atlantic salmon and rainbow smelt, while the marine environment provides additional rearing, feeding and migratory habitat during maturation. Accessible migration corridors are a limiting factor for Atlantic salmon populations (COSEWIC 2010).

In Newfoundland, Arctic char may be anadromous or landlocked (Scott and Crossman 1998). Landlocked forms are typically found year-round in clear, cold deep lake habitats while anadromous forms use the shoals of lakes or quiet pools for rivers for spawning for a short duration (Bradbury et al. 1999). Based on review of satellite imagery, there appears to be little to no habitat (i.e., large deep lakes) within the RAA for land-locked Arctic char and no available information inferring habitat use by anadromous forms.

4.4.4 Aquatic Species at Risk and Species of Conservation Concern

Three aquatic SAR/SOCC are known to inhabit watersheds within the RAA or have the potential to be present within the RAA: American Eel, banded killifish, and mummichog (Table 4.1; COSEWIC 2012; NLDFFA n.d.; DFO 2022, AC CDC 2023). No critical habitats (as defined by SARA or NL ESA) for these species were identified in the RAA.

Table 4.1 Aquatic Species at Risk and/or Species of Conservation Concern that may occur in the RAA

Species	Conservation Status			
	SARA[1]	**COSEWIC[1]**	**NL ESA[2,3]**	**ACCDC S-Rank**
American Eel (*Anguilla rostrata*)	No status (under consideration)	Threatened (2012)	Vulnerable (2006)	S3 (Vulnerable)
Banded Killifish (*Fundulus diaphanous*) - Newfoundland population	Special Concern, Schedule 1	Special Concern (2003)	Vulnerable (2003)	S3 (Vulnerable)
Mummichog (*Fundulus heteroclitus*)	No status	No status	Vulnerable	S3 (Vulnerable)

Notes:

Source: Government of Canada 2021.

Newfoundland and Laborador Fisheries, Forestry and Agriculture (no date) https://www.gov.nl.ca/ffa/wildlife/endangeredspecies/fish/

SSAC 2016

American eel are considered as one panmictic population (Cornic et al. 2021). American eel is catadromous; adults move downstream in late summer or autumn to marine waters and migrate to the Sargasso Sea to spawn (COSEWIC 2012). As young eels grow, also known as glass eels, they drift toward the continental shelf and eventually move into inshore waters. Some eels migrate up rivers to freshwater habitats, while others remain in brackish or salt waters (COSEWIC 2012). Eels are more abundant in medium and large rivers closer to the ocean (Smith and Saunders 1955; Gray and Andrews 1971; Smogor et al. 1995). In Newfoundland, eels are found in almost all lakes and rivers that flow to the sea (NLDFFA n.d.). There has been a general decline in eel abundance over time (Veinott and Clark 2010). Based on habitat characteristics, American eel are most likely to occur at 70 potential Project crossings associated with medium watercourses.

Banded killifish occur within several locations on the Island of Newfoundland. Newfoundland is the eastern most extent of its population and is isolated from mainland populations. They are locally abundant within the areas they inhabit but the locations where they are found are widely scattered. Banded killifish prefer clear ponds with muddy/sandy substrates and submergent aquatic vegetation. Populations are distributed in the vicinity of the Project near Loch Leven (Highlands River), Flat Bay Brook, Little Barachois Brook, Bottom Brook, St. George's Bay, Harry's River and Noel's Pond (DFO 2022, AC CDC 2023). Banded killifish have the potential to occur at 23 potential crossings but based on habitat characteristics of the crossings (e.g., slow moving reaches of rivers or ponds) are most likely to occur at one proposed transmission line crossings (WCT-556; Appendix E, Table E.7). They are also present within Noel's Pond (and likely Muddy Pond based on connectivity) which is associated with the industrial water supply associated with the hydrogen/ammonia plant (AC CDC 2023).

Mummichog occur in brackish waters, usually, in saltmarsh flats, estuaries and tidal areas where there is submergent aquatic vegetation (Scott and Crossman 1998). They are tolerant of a wide range of salinities and temperatures (Scott and Crossman 1998). Populations are known to occur in White's Brook and Gravel's Pond in Port au Port (AC CDC 2023).

4.5 Discussion

In total, 558 potential watercourse crossings and 37 potential areas of overprinting/encroaching were identified and characterized through the review of existing information and satellite imagery.

Of the 235 potential crossings associated with the Port au Port wind farm (103 access road and 132 collector line RoW), 83 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies and 152 were unlikely or not considered to be fish-bearing. The vast majority of small and medium watercourses were anticipated to have riffle/run habitats, with primarily coarse substrates, and riparian vegetation consisting of trees. Ponds were generally small (range 34 to 122 m in width), anticipated to have fine substrates and had riparian vegetation consisting primarily of trees.

Of the 17 potential areas of overprinting/encroaching associated with the Port au Port wind farm (turbine and substation footprints), 5 watercourses are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies and 12 were unlikely or not considered to be fish-bearing.

Of the 177 potential crossings associated with the Codroy wind farm (90 access road and 87 collector line RoW), 143 watercourses/waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies and 34 were unlikely or not considered to be fish-bearing The majority of small watercourses were anticipated to have riffle/run habitats, with mixed (fine and coarse) or coarse substrates, and riparian vegetation consisting of shrubs or trees. The only pond was small and anticipated to have fine substrates and riparian vegetation consisting primarily of wetland vegetation.

Of the 15 potential areas of overprinting/encroaching associated with the Codroy wind farm (turbine footprints only), 13 watercourses are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies and 2 were unlikely or not considered to be fish-bearing. There were no area of overprinting/encroaching associated with the Codroy substation locations.

Of the 146 potential crossings associated with the 230 kV transmission line, 106 potential watercourses / waterbodies are assumed to be fish-bearing as there appears to be connectivity with downstream watercourses or waterbodies and 40 were unlikely or not considered to be fish-bearing. The vast majority of small and medium watercourses were anticipated to have riffle/run habitats, with primarily coarse substrates, and riparian vegetation consisting of trees or shrubs. Ponds were small (approximately 16 to 260 m in width), were anticipated to have fine substrates and had riparian vegetation consisting primarily of shrubs or trees.

Muddy Pond, Noels Pond and Gull (Mine) Pond range in size from 0.6 to 1.0 km^2. Riparian vegetation along the ponds is primarily forest and/or shrubs. Substrates in the littoral area appear to be primarily coarse (e.g., gravel, cobble) with substrates in the profundal zone likely being fine.

Based on the flowing habitat characteristics associated with the vast majority of the crossings, brook trout, Atlantic salmon, American eel, threespine and ninespine stickleback are likely to be the most common and abundant fish species to be encountered within the RoW. There is the potential for banded killfish, mummichog, and rainbow smelt. Based on habitat characteristics, American eel have the potential to occur at 70 crossings associated with medium watercourses and banded killifish have the potential to occur at one crossing.

Field surveys are being conducted prior to the initiation of Project activities to characterize fish habitat at road crossings, confirm the results of the desktop assessment by verifying the presence or absence of fish-bearing watercourses within the RoW or within Project infrastructure footprints, prior to clearing and to confirm the existing fish communities in support of subsequent permitting activities.

4.6 References

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5.0 Freshwater Fisheries

5.1 Scope and Objectives of the Fisheries Study

The objectives of this fisheries baseline study are:

- Identify and characterize existing commercial and recreational freshwater fisheries within the Project Area
- Describe current fisheries management approaches
- Describe local enhancement initiatives and may influence fisheries

5.1.1 Regulatory Setting

Freshwater fishing in Newfoundland and Labrador is governed through the federal *Fisheries Act* and its regulations (*Fishery (General) Regulations* and the *Newfoundland and Labrador Fishery Regulations*) and the NL *Wild Life Act* and its regulations. DFO is responsible for the management of Atlantic salmon fisheries in NL, while the provincial Department of Fisheries, Forestry and Agriculture (formerly Fisheries and Land Resources, Wildlife Division), is responsible for the issuance of licences for inland fisheries (DFO 2020).

The regulations govern daily and yearly quotas, possession limits, and length limit for species fished in the inland and tidal waters. The regulations focus on the management and allocation of domestic fishery resources of the region. These regulations provide for fish harvester licensing, who may hold licences, vessel registration, gear requirements, open and closed seasons, restricted areas and other conservation and management measures.

Indigenous fisheries for food, social and ceremonial purposes are regulated according to the *Aboriginal Communal Fishing Licences Regulations*. Indigenous harvesters can catch what is needed for themselves and/or their community for food, social, and ceremonial (FSC) purposes under a communal FSC licence (DFO 2022).

5.2 Methods

5.2.1 Spatial Boundaries

Spatial boundaries were defined to focus the collection and analysis of data for the study. These include the RAA (Figure 4.1) reflective of the potential areas used for the assessment of potential Project effects in the (EIS). The RAA for freshwater fish and fish habitat incorporates the Project Area and LAA, and extends from the headwaters of the watershed to the head of tide where tributaries discharge into the marine environment and potential Project interactions may be observed.

Local jurisdictions and management units relevant to fisheries within the RAA, include:

- Salmon Angling Zone 13
- Trout Angling Zone 1

5.2.2 Data Sources

Baseline information on fisheries was gathered through a review of existing literature sources and correspondence with relevant government departments and agencies.

In addition to existing literature sources and correspondence with relevant government departments and agencies, information from a Land and Resource Use (LRU) survey was also incorporated into relevant sections of this chapter. The LRU survey was developed to engage the public, help WEGH2 learn about land/freshwater and resource use activities that occur in proposed Project locations, and to identify public perceptions around the potential risks and/or benefits of the Project.

The online LRU survey was open to the public from April 3 to April 17, 2023, and from May 17 to May 31, 2023. It was composed of 98 questions, which included multiple choice, single choice, yes/no, and open-ended question formats. Printed versions of the survey were made available for pick up from several locations from May 3, 2023, to May 17, 2023. Participants had the option of dropping off their completed surveys at the community office or mailing them into the office. The printed versions of the survey were composed of 36 questions specific to either the Port au Port or the Codroy areas. The questions were the same as those in the online survey. The results of the online and paper copies of the LRU survey were combined and analyzed as a single body of data. All versions of the LRU survey were anonymous, and no contact information was sought from the participants.

A copy of the online LRU survey questions is provided in Project Nujio’qonik GH2 - Land and Resource Use Survey Results Report (Stantec 2023b) along with a copy of the printed version of the survey for the Port au Port and Codroy Area.

5.3 Results

5.3.1 Existing Freshwater Commercial, Recreational and Indigenous Fisheries

The Land and Resource Use Study for this Project identified that the majority of freshwater fish and/or aquatic species activities in the areas are for recreational/food purposes or traditional/cultural purposes (Stantec 2023). Species fished include American eel, Arctic char, Atlantic salmon, brook trout, rainbow smelt as well as other species. Fishing activities typically take place once or twice a week when the seasons are open, and fish are consumed one or twice a week (Stantec 2023). A more detailed summary on individual freshwater fisheries and their management is provided below.

5.3.1.1 Commercial Fisheries

Commercial fisheries in freshwater are limited to American eel and smelt. There have been no commercial fisheries for Atlantic salmon since 1992 (DFO 2022b).

Commercial fisheries for American eel exist in the RAA primarily for adult eels (Veinott and Clark 2011, Hawkins, L. pers. comm. July 27, 2023). Most of the commercial fishing effort is concentrated at the mouths of rivers, though some coastal harvesting does occur. In 2009, 154 commercial eel licenses were issued in Newfoundland and Labrador, however only 40 licensed fishers reported sales (DFO, pers. comm. In Wildlife Division 2010). The majority of reported landings came from the area between Cape Ray and Cape St. George (DFO, pers. comm. In Wildlife Division 2010). There are no recent data available. Commercial smelt fisheries also have the potential to occur although there has been no activity in more than a decade (L. Hawkins, pers. comm., July 27, 2023).

5.3.1.2 Recreational Fisheries

Recreational fisheries occur in the RAA for Atlantic salmon, brook trout, Arctic char, rainbow smelt and other species (DFO 2022c; Stantec 2023). According to the Survey of Recreational Fishing in Canada, 2015, Newfoundland and Labrador have some of the highest percentage of active resident anglers (96%) and the highest overall proportion of fish retained (80%) in Canada (DFO 2019). The dominant species caught in freshwater in Newfoundland and Labrador was brook trout (DFO 2019). The total number of resident anglers in Newfoundland and Labrador in 2015 was 110,772 (DFO 2019).

Salmon angling effort in Zone 13 rivers ranged from 15 to 8,978 rod days, with the largest amount of effort on the Humber River, Harry's River and Southwest and Bottom Brooks (DFO 2022c). The number of salmon caught in Zone 13 rivers ranged from 9 to 7,397 fish per river in 2020, with the highest number of fish caught on the Humber River. Catch per unit effort (CPUE) ranged from 0.3 to 1.8 fish per rod day. When standardized by effort, the highest CPUE was on Middle Barachois Brook, Humber River and Serpentine River (DFO 2022c).

The recreational fishery for American eel consists mainly of spearing eel through the ice and is concentrated in the Bay St. George/Port aux Port Bay area (DFO pers. comm. In Wildlife Division 2010). There have been no new recreational fishery American eel licences granted since 1999 (Wildlife Division 2010).

5.3.1.3 Indigenous Fisheries

Miawpukek First Nation hold a FSC licence for Atlantic salmon in Newfoundland (DFO 2022a). They have chosen not to harvest salmon under this licence since 1997 due to conservation concerns (DFO 2022a). The Qalipu First Nation Band also have access to salmon for FSC purposes through the recreational fishery in Newfoundland (DFO 2020).

5.3.2 Current Fisheries Management

5.3.2.1 Commercial Fisheries

Current management practices related to the commercial eel fishery includes eel fishing seasons and minimum length requirements. The commercial inland season runs from July 1 (Inland eel pot fishery) or August 15 (Inland fyke net fishery) until October 31 each year (DFO 2018). The minimum retention size for eels in NAFO Division 4R is 20 cm (Wildlife Division 2010).

No new commercial eel licences are being released and there is a reduction in the overall number of licences through retirement (Veinott and Clark 2011).

5.3.2.2 Recreational Fisheries

Recreational angling / fishing is regulated Federally and Provincially by DFO through the *Newfoundland and Labrador Fishery Regulations*. Licenses, issued by the Government of Newfoundland and Labrador, are required by both residents and non-residents for salmon, and non-residents only for trout and other sport fish (such as arctic char and northern pike). Newfoundland and Labrador inland waters are divided into scheduled salmon rivers; scheduled rainbow and brown trout waters; and non-scheduled inland waters (DFO 2019c). Scheduled rivers are those listed on Schedule 1 and Schedule 2 of the *Newfoundland and Labrador Fishery Regulations*.

Atlantic Salmon

Scheduled salmon rivers include: the main stem of a river, including tidal waters at the mouth of a river inside DFO caution signs; the waters of connected ponds or lakes within 90 m of the river’s entrance and outlet, or as indicated by DFO signs; in many cases, tributary streams; in a few cases, certain lakes and ponds. There are 186 scheduled salmon rivers in Newfoundland and Labrador (DFO 2022c).

Angling occurs on a number of streams and rivers in the RAA. The Project is located in Zone 13 and includes the following scheduled rivers:

1. Great Codroy River and its tributaries (Class 4)
2. Highlands River and its tributaries (Class 2)
3. Crabbe’s River and its tributaries (Class 2)
4. Middle Barachois River and its tributaries (Class 2)
5. Robinson’s River and its tributaries (Class 2)
6. Fischell’s Brook and its tributaries (Class 2)
7. Flat Bay Brook and its tributaries (Class 2)
8. Little Barachois Brook and its tributaries (Class 2)
9. Southwest and Bottom Brooks and its tributaries (Class 2)

10. Harry's River and its tributaries (Class 2)
11. Fox Island River and its tributaries (Class 2)

The salmon season for Zone 13 in 2022-2023 was from June 1 to September 7 (DFO 2022). Closed areas, where no angling is permitted in Zone 13 are:

- the section of Crabbe's River, including Twelve Mile Pool, upstream to its source
- the section of Barachois River, including Mine Pool, upstream to its source
- the section of Robinson's River, including Chatter Pool, upstream to Big Falls at Mile 18
- Highlands River, from TCH upstream to river source.

In addition, angling activities may be modified through management actions (e.g., variation orders) based on environmental conditions (e.g., water temperatures above 20˚C).

Waterbodies used for salmon angling are categorized into classes which determine the daily bag limit/seasonal retention (Table 5.1). Salmon less than 63 cm can be retained based on the river class (Table 5.1). Salmon (e.g., fry, parr and smolt) less than 30 cm cannot be retained. Retention of salmon is also not permitted in non-scheduled waters (GC 2022).

Table 5.1 Salmon River Classification and Catch Limits

River Classification	Limit (Seasonal Retention)
Class 0	Catch and Release – two fish
Class 2	One fish
Class 4	Two fish
Class 6	Two fish
Unclassified (Zone 1 and 2)	Two fish

A few outfitters operate within the RAA, and offer guided salmon fishing, in addition to hunting other wildlife.

Brook Trout and Other Species

Scheduled trout waters are those waters listed by DFO. Non-scheduled inland waters are not individually listed by name in the regulations. The RAA comprises part of Trout Angling Zone 1, which includes all of insular Newfoundland. Only non-residents are required to have a license for trout angling, however residents are required to have a Parks Canada fishing permit to catch and retain trout in a national park. The 2023 winter fishing season in Zone 1 opens February 1 and closes April 15. The summer season runs from May 15 to September 7. The daily bag limit for trout in insular Newfoundland is 12 fish, which can be a combination of any of the species (speckled, brown, rainbow, ouananiche) or 2.25 kg round weight plus one fish of any of those species, whichever is reached first. Rainbow or ouananiche less than 20 cm long cannot be retained. The daily bag limit for arctic char in insular Newfoundland is 12 fish or 2.25 kg round weight plus one fish of that species, whichever is reached first (DFO 2022c).

A few outfitters operate within the RAA, and offer guided trout fishing, in addition to hunting other wildlife.

Smelt angling in non-scheduled inland waters are subject to the same gears as trout angling. Smelt angling dates are also consistent with trout angling dates in non-scheduled inland waters, with the exception of some ponds. Smelt angling in coastal waters is permitted through the year. There is no limit for smelt (DFO 2022c).

There have been no new recreational fishery American eel licences granted since 1999 (Wildlife Division 2010), which infers the existing fishery is relatively limited.

5.3.2.3 Indigenous Fisheries

Indigenous FSC fisheries are managed through an FSC communal fishing licences issued by DFO to individual Indigenous Nations. The Indigenous Nation may then designate some of its members to fish under the communal licence. The sizes and species of fish retained and locations fished are specified in the licence.

5.4 Discussion

Commercial, recreational and Indigenous fisheries exist within and in proximity to the RAA. The majority of freshwater fish and/or aquatic species activities in the areas are for recreational/food purposes or traditional/cultural purposes (Stantec 2023). Commercial fishing for American eel and smelt exist in estuarine and inland waters along the coast near the Project (L. Hawkins, pers. comm., July 27, 2023).

In summary, recreational salmon fishing occurs within the RAA, with the majority of rivers being Class 2 and one river being Class 4 (Great Codroy River and its tributaries). The RAA comprises part of the Trout Angling Zone 1 and a few outfitters operate within the RAA, and offer guided, salmon and brook trout fishing, in addition to hunting other wildlife. Indigenous groups have allocations for FSC purposes in the RAA.

5.5 References

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6.0 Marine Environment and Use

The baseline marine environment and use study to support the EIS was conducted using available desktop information which is a similar approach to other topics within the Aquatic Baseline Report.

6.1 Scope And Objectives of the Marine Environment and use baseline Study

The Project is anticipated to include a number of activities in the marine environment including improvements at the port and installation of a jettyless mooring/loading system, re-activation of the existing marine wastewater outfall, arrival of supplies at the port, loading and shipment of product, barging of wind turbine components from the port to the Port au Port Peninsula, and a short subsea transmission cable in Port au Port Bay adjacent to the isthmus.

The objectives of this study are to:

- Provide an overview of the existing marine environment within the RAA, with a focus on the LAA
- Describe the physical and geophysical environment, biological environment, and the socio-economic environment
- Provide information of both offshore and nearshore environments as they relate to the Project

6.1.1 Regulatory Setting

This section identifies the primary regulatory requirements and policies of the federal and provincial authorities which influence the scope of the assessment on the marine environment.

In addition to the *Newfoundland and Labrador Environmental Protection Act*, the Project is subject to other federal and provincial legislation, policies and guidance based on the proposed activities mentioned above including:

6.1.1.1 Federal

***Canadian Navigable Waters Act* (CNWA)** – The CNWA is overseen by Transport Canada. This Act applies to all navigable water in Canada and protects the public’s right of navigation by regulating activities that could interfere with navigation. Activities that would apply to this Act include infilling, dredging, or removing materials from the bed of a navigable waters as well as installation of moorings or outfalls.

Canadian Environment Protection Act– This Act is overseen by ECCC. Permits or authorizations are issued under this Act for emissions of ozone-depleting substances and halocarbon alternatives, disposal at sea, permits of equivalent levels of environmental safety, and transboundary permits.

Canada Shipping Act, 2001 – This Act and applicable regulations are overseen by Transport Canada and is the principle federal legislation governing safety of marine transportation and recreational boating, as well as the protection of the marine environment. It is linked to regulations that oversee the prevention of pollution from ships, management of ballast water, and management of hazardous chemicals.

Fisheries Act – The *Fisheries Act* is overseen by DFO. Undertakings or activities resulting in the death of fish or the HADD of fish habitat are prohibited under the *Fisheries Act* unless otherwise authorized by the Minister under paragraph 35 (2) (b). Before approving works, alternatives to the undertakings or activities that will result in HADD of fish habitat are considered to avoid adverse effects. If unavoidable, mitigation measures and/or offsetting may be required to minimize and/or counterbalance HADD of fish habitat.

Species at Risk Act – SARA is the primary federal legislation to provide protection and recovery for SAR in Canada and is overseen by ECCC. Authorization may be required if a project adversely affects Schedule 1 species or any part of its critical habitat under Canadian jurisdiction, and authorization is required for relocation or residence destruction of SAR.

Transportation of Dangerous Goods Act – This Act is overseen by Transport Canada and applies to all modes of transportation of dangerous goods in Canada, including transportation, importing, manufacturing, shipping, and packaging of dangerous goods. The main purpose of this Act is to maintain public safety when dangerous goods are being handled, offered for transport, or transported by road, rail, air, or water.

6.1.1.2 Provincial

NL Endangered Species Act – At-risk species in the province are provided special protection under the NL ESA that are considered to be endangered, threatened, or vulnerable. Designation under the Act follows the recommendations of the Species Status Advisory Committee on the appropriate assessment of a species and referring concerns about the status of species to COSEWIC, where the species is of national importance. While the Act doesn't apply to marine fish, it does apply to native fish that are found in both freshwater and marine environments in the province (i.e., American Eel and Banded Killifish).

NL Water Resources Act – This Act provides legislation to manage water resources in the province, with the intent of providing clean water for environmental, social, and economic well-being. Water resources management regulatory permits and licences are required for activities such as constructing and operating wastewater infrastructure and altering a body of water through infilling, dredging and debris removal.

6.2 Methods

6.2.1 Spatial Boundaries

The Project Area is the direct footprint of the Project and is consistent across VECs. The Project Area encompasses the immediate area in which Project activities and components will occur and is comprised of the following distinct areas: the Port au Port wind farm, the Codroy wind farm, the hydrogen / ammonia plant, port facilities, and the 230 kV transmission lines, as well as associated infrastructure including roads, substations, and water supply(ies). The Project Area is the potential area of direct physical disturbance associated with the construction, operation, and decommissioning, rehabilitation and closure of the Project. The Project Area includes a buffer (up to 175 m) around planned infrastructure to allow for micro siting during detailed design and mitigation to avoid ecological and culturally sensitive habitats.

The LAA encompasses the nearshore marine environments of St. George's Bay and Port au Port Bay and was selected to capture potential Project effects of marine-based activities occurring in these areas.

The RAA for the marine environment is defined as the NAFO sub-divisions 4Rcd. The boundaries of the RAA were defined in recognition of biophysical features, including sensitive areas in the region surrounding the Project Area and to account for marine-based Project activities.

The spatial boundaries used for the baseline marine environment and use study are illustrated in Figure 6.1.

6.2.2 Literature and Data Review

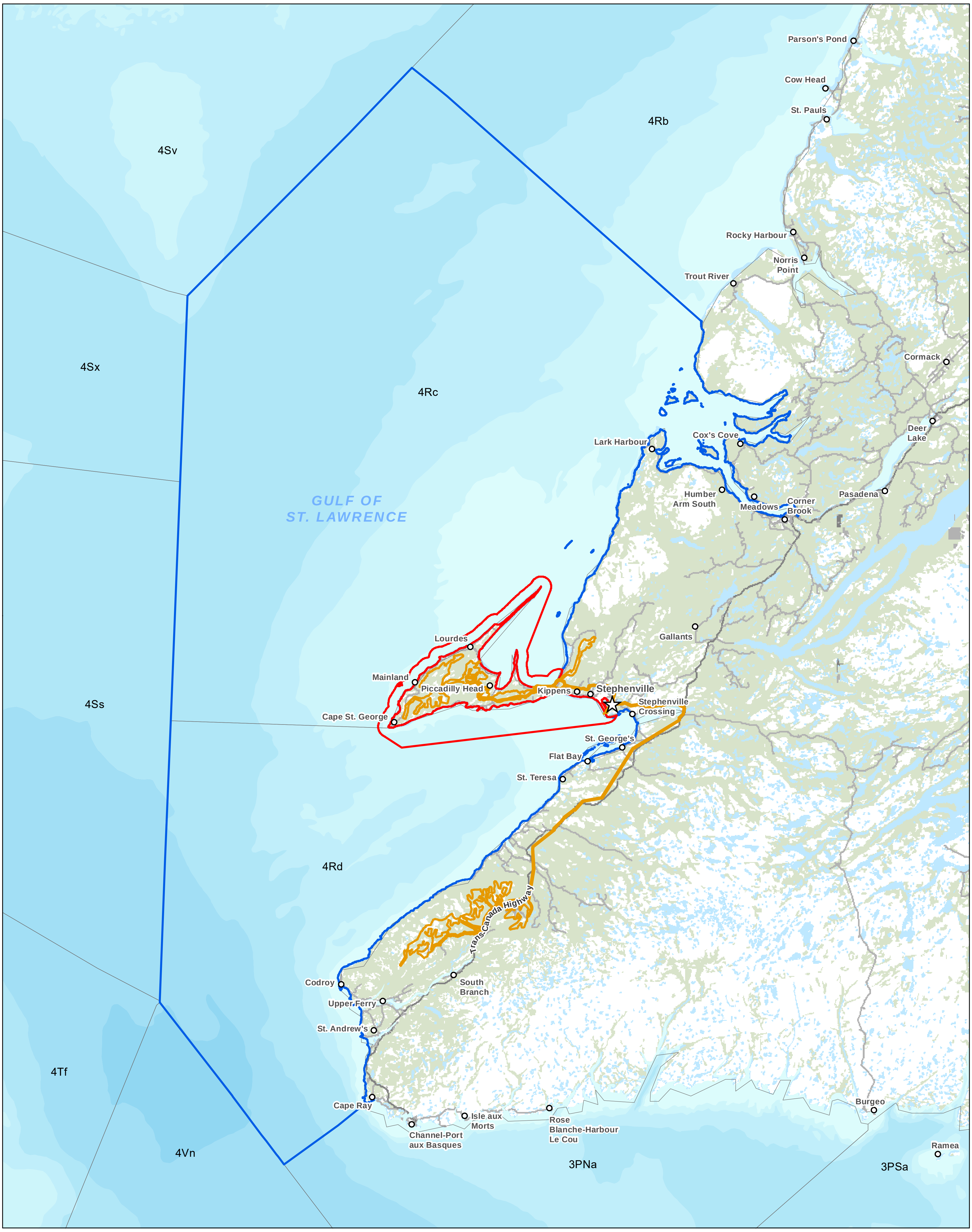
The description of the existing marine environment and use is mainly sourced from previous EAs, literature, government reports, and online databases.

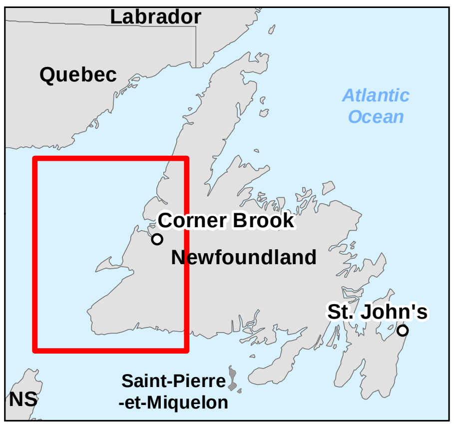
Given that most marine-related Project activities will occur in the nearshore environment, descriptions of the existing environment are focused on areas in and near the LAA where possible and applicable.

Baseline information on marine birds is included in the description of avifauna, available in the Terrestrial Baseline Study (Stantec 2023a).

In addition to descriptions of the existing marine environment, information from a Land and Resource Use (LRU) Survey was also incorporated into relevant sections of this chapter (Stantec 2023b). The LRU survey was developed to engage the public, help WEGH2 learn about land/marine and resource use activities that occur in proposed Project locations and adjacent marine waters, and to identify public perceptions around the potential risks and/or benefits of the Project. The survey was hosted online on the Surveymonkey platform and available in printed versions. The link to the online survey was posted on WEGH2’s social media site (e.g., Facebook) and was also shared with stakeholder groups and other engaged parties via email. The online LRU survey was open to the public from April 3 to April 17, 2023, and from May 17 to May 31, 2023. It was composed of 98 questions, which included multiple choice, single choice, yes/no, and open-ended question formats. Printed versions of the survey were made available for pick up at several locations from May 3, 2023, to May 17, 2023. Participants had the option of dropping off their completed surveys at the community office or mailing them into the office. The printed versions of the survey were composed of 36 questions specific to either the Port au Port or the Codroy areas. The questions were the same as those in the online survey. The results of the online and paper copies of the LRU survey were combined and analyzed as a single body of data. All versions of the LRU survey were anonymous, and no contact information was sought from the participants.

A copy of the online LRU survey questions is provided in Project Nujio'qonik GH2 - Land and Resource Use Survey Results Report (Stantec 2023b) along with a copy of the printed version of the survey for the Port au Port and Codroy Area.





🟥 Local Assessment Area
🟦 Regional Assessment
☆ Hydrogen / Ammonia Plant Location
🟧 Project Area
☐ NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
1:1,000,000

N

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Client, Province of Newfoundland and Labrador, ACCDC, Stantec
3. Background: Natural Resources Canada CanVec

Project Location
Stephenville
NL

Prepared by NW on 2023/07/20
QR by AW on 2023-07-20
IR by RK on 2023-08-01

Client/Project
121417233_035

World Energy GH2
Project Nujio'qonik

Figure No.
6.1

Title
Spatial Boundaries

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6.3 Results

6.3.1 Marine Physical Environment

The following sections provide an overview of relevant aspects of the marine physical environment in the RAA on marine geology and geomorphology, climatology, and physical oceanography.

6.3.1.1 Bathymetry, Marine Geology and Geomorphology

The Gulf of St. Lawrence's marine geological features date back millions of years and are an important component of marine habitats as they influence oceanic circulation and mixing. Erosion and sediment deposition, iceberg movement, and human activities have contributed to the current state of the seafloor.

The marine environment adjacent to the Project is situated above several marine basins, notably the Anticosti Basin and Magdalen Basin. The Anticosti Basin is a relatively shallow basin that spans the onshore and offshore area between NL and the Gaspé Peninsula (Pinet and Lavoie 2015). It is characterized by a series of sandy shoals and tidal flats that provide important habitat for a variety of marine life. Its southern boundary includes the north side of the Port au Port Peninsula. The Magdalen Basin is separated from the Anticosti Basin by the Appalachian Structural Front and encompasses areas south of the Port au Port Peninsula, including St. George's Bay (Lavoie et al. 2009). This basin is characterized by numerous submarine canyons and channels, supporting important habitat for a many marine species including cold-water corals and sponges.

St. George's Bay contains sediments with considerable thickness. Overall sediment thickness of 30 m is typical with areas with as much as 180 m of sediment overlying bedrock. Eight classes of sediment were classified using a 30 kHz echo sounder as shown on Figure 6.2 and described below (Shaw and Forbes 1990).

- ice-contact sediments – characterized by an irregular surface and a veneer of coarse gravel and boulders
- subaqueous outwash – interbedded sand and mud, possibly with pockets of homogenous mud or ice-rafted debris
- draped glaciomarine sediments – a draped glaciomarine mud, containing gravel
- postglacial mud – predominantly muddy sediment in an environment where current energy decreases
- postglacial sand – a veneer of sand overlying gravels
- postglacial fluvial delta – characterized by wedge-shaped geometry and clinoform internal reflectors
- postglacial barrier-platform – gravel and medium sand at the shore to fine sand at the break in slope to mud at the base
- postglacial spillover – gravel, rippled in many places, and partly covered by irregular sheets of sand

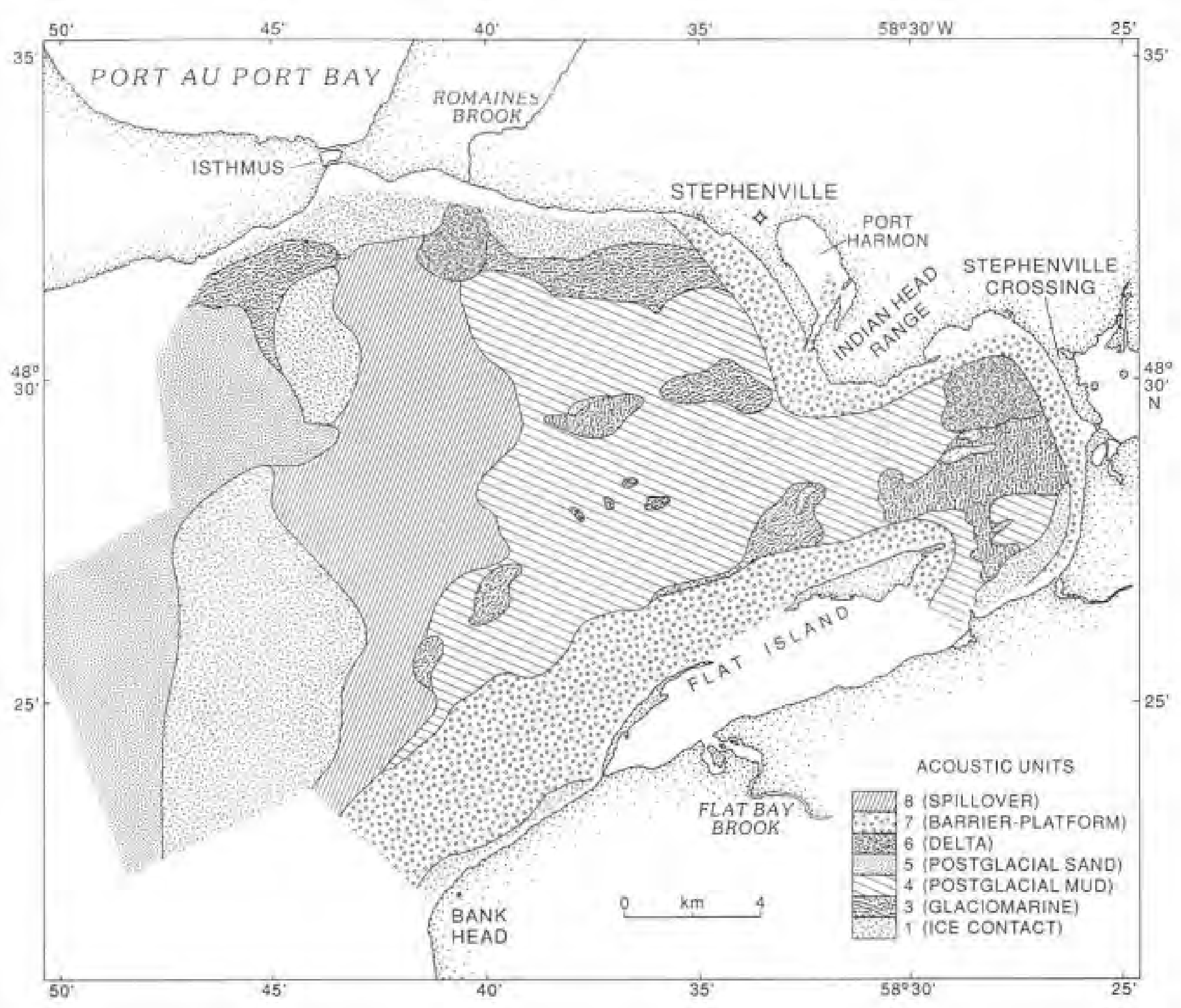

Figure 6.2 Distribution of Sediment in St. George's Bay (Shaw and Forbes 1990)

6.3.1.2 Climatology

The climate in the RAA is classified as maritime temperate and is heavily influenced by the water in the Gulf of St. Lawrence and continental air masses. Mean air temperatures in the Gulf range from approximately -7°C in February to 18°C in August (Galbraith et al. 2022). Extreme maximum temperatures of 27°C have been recorded in July, with extreme minimums (-26.7°C) recorded in January (AMEC 2014). On average, the highest amount of precipitation is recorded in December, with the lowest amounts recorded during March (Stantec 2011). The precipitation most observed in the Gulf are rain and snow, while other types such as mixed rain and snow, freezing rain, and hail occur at lower rates (AMEC 2014).

The frequency of precipitation, the number of daylight hours, and the occurrence of fog can play an important role in inhibiting the visibility of vessels transiting offshore. In the Gulf, visibility varies throughout the year where good (>10 km) and fair (2 – 10 km) conditions are experienced 85% of the time. Good visibility is most frequent during September and October, while poor (0.5 – 2 km) and very poor (<0.5 km) visibility are more common in January and July (AMEC 2014).

Throughout most of the year, the prevailing winds are northwesterly, westerly, or southwesterly. Westerly and northwesterly winds are dominant during colder months, while southwesterly and southerly winds are more frequent during warmer months. Mean hourly wind speeds range from 5.3 m/s to 10.1 m/s throughout the year with strongest winds (>25 m/s) occurring in December and January or during tropical storm events in the summer months. Wind speeds higher than 20 m/s are uncommon in the Gulf (AMEC 2014).

6.3.1.3 Physical Oceanography

The RAA has water depths ranging from several meters along the west coast of Newfoundland near the Project with increasing depths (>100 m) further offshore (Figure 6.3).

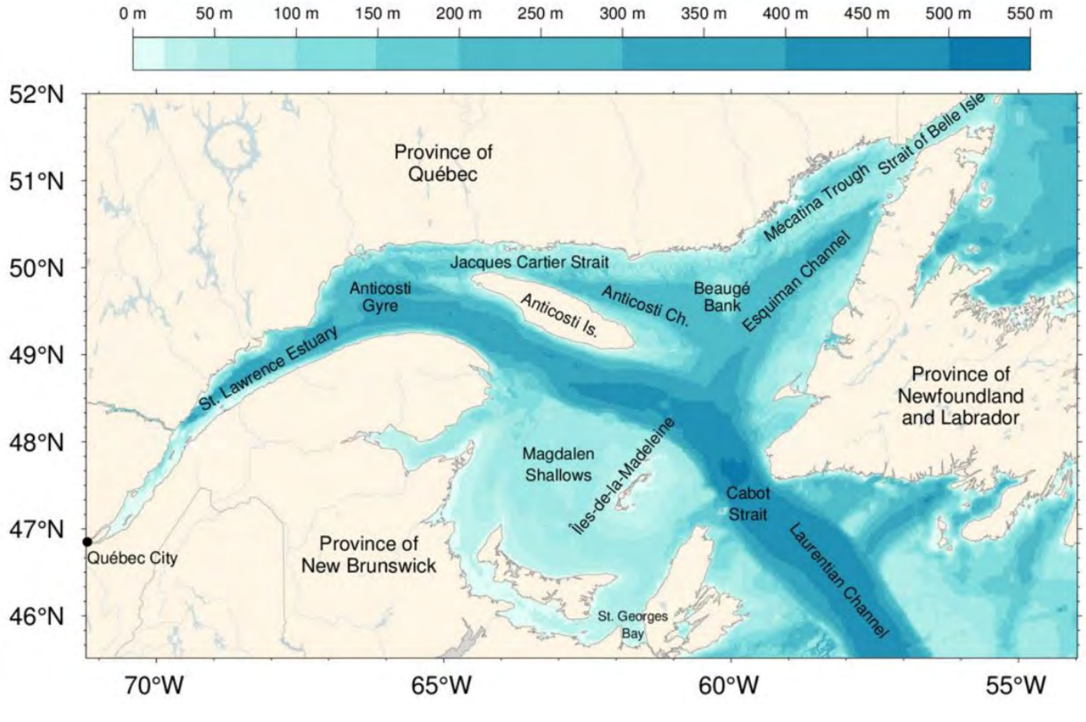

Figure 6.3 Bathymetry of the Gulf of St. Lawrence (Galbraith et al. 2022)

St. George’s Bay is characterized by a central deep basin to the north of Flat Island, this is a continuation of the St. George’s River Valley and a smaller basin to the north off Stephenville. The maximum depth of this St. George River basin is approximately 97 m, while the Stephenville Basin reaches a depth of 57 m (Figure 6.4). A sill extends from Bank Head to the Port-au-Port, this sill is typically less than 25 m deep. A generalized shallow-water area surrounds Flat Island creating a barrier island. To the north of Flat Island there is a pronounced break in slope as the shelf merges with the St. George River Basin.

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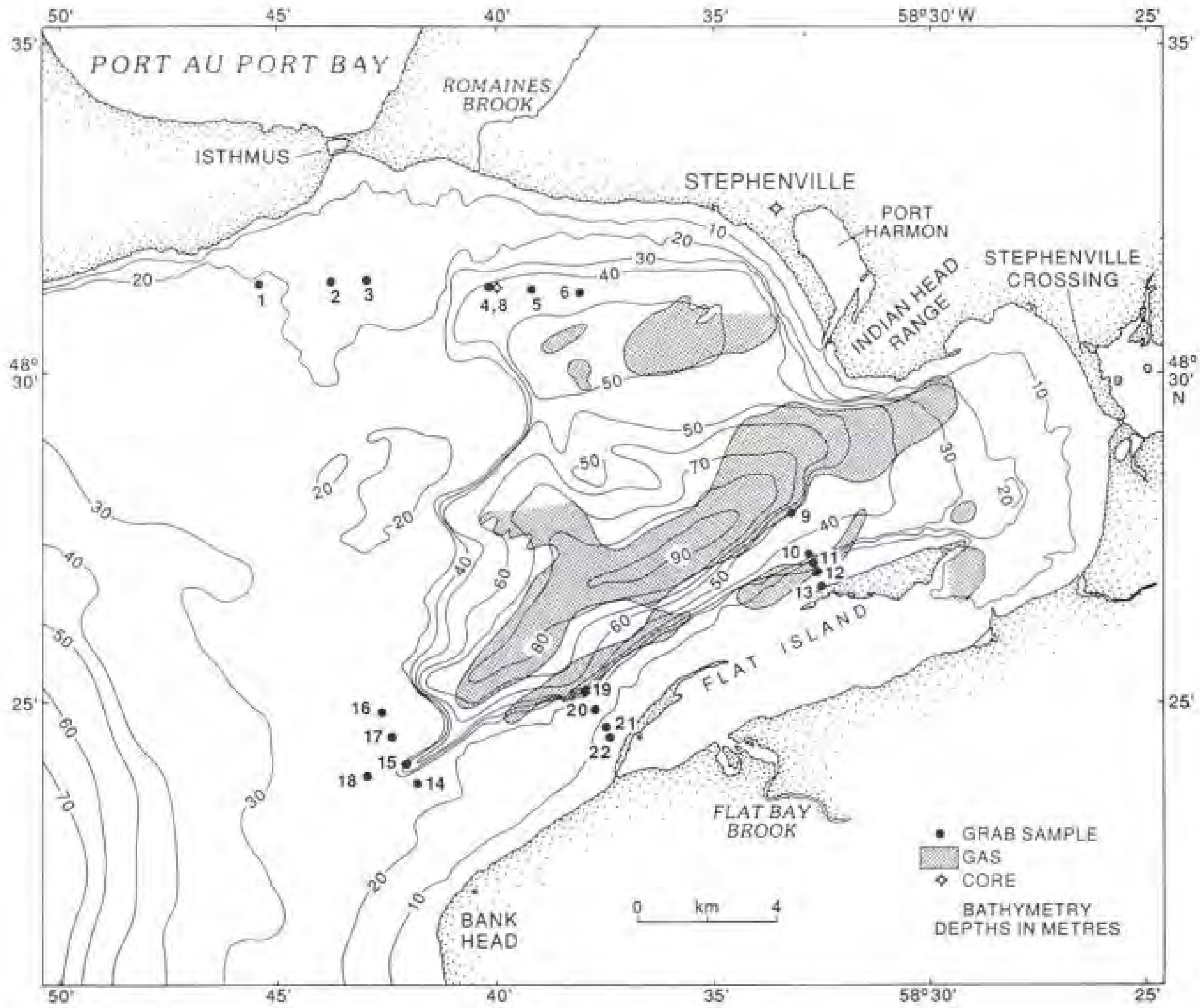


Figure 6.4 Generalized Bathymetry of St. George’s Bay (Shaw and Forbes 1990)

Ocean currents in the region are influenced by tides, regional meteorological events, freshwater runoff from the St. Lawrence River and transport from the Strait of Belle Isle and the Cabot Strait. Prominent features of the region include coastal currents, gyres, massive eddies in the estuary, and tidal fronts. Currents within the Gulf flow counterclockwise with main currents directed towards the northeast along Western Newfoundland and to the southwest along Quebec's coast in the north (AMEC 2014). Currents are strongest near the surface (0-20 m), except in winter months and along the slopes of the deep Laurentian and Esquiman channels (Galbraith et al. 2022).

The water column in the Gulf of St. Lawrence consists of three separate layers: the surface layer, the cold intermediate layer, and the deeper water layer. Stratification of the water column undergoes seasonal variability due to several factors including wind-driven mixing, sea ice formation and melting, and continental runoff, which collectively influences water temperatures and salinity (Galbraith et al. 2022).

The surface layer of the Gulf of St. Lawrence is gradually warmed throughout the spring and summer season, reaching a maximum temperature of 17°C in August and remaining above 0°C in the fall (Galbraith et al. 2022). Sea surface temperatures typically drop below 0°C in the winter months, as the surface layer thickens with the coldest temperatures observed in February and March (AMEC 2014). Ocean temperatures in the Gulf indicate an overall increase from previous years with record highs (since 1915) of 4.1°C at 150 m, 6.0 °C at 200 m, 6.7°C at 250 m and 6.9°C at 300 m in 2021. Average salinities in the deeper water layer of the Gulf range from 33 practical salinity unit (psu) at 100 m depths to 35 psu at 300 m depths (Galbraith et al. 2022).

Sea ice in the Gulf of St. Lawrence initially forms in the northern area of the Gulf and gradually expands towards Îles-de-la-Madeleine and Cabot Strait starting in December, reaching its maximum spread in March (CCG 2022). By March, passageways along the west Newfoundland coast, particularly north of the Port au Port Peninsula, are closed. Ice begins to clear in April opening shipping routes in the Gulf, including the area from the Port au Port Peninsula to the Strait of Belle Isle. Sea ice is present within the LAA along the Port au Peninsula and in St. George's Bay during these months. According to the Canadian Ice Service weekly regional ice charts for 2023, sea ice was most prevalent in early March in the LAA (CIS 2023).

Both the seasonal maximum ice volume in 2021 (11 km^2) and the January-April average volume was low compared to previous years (Galbraith et al. 2022). Eight of the 12 lowest seasonal maximum ice volumes have occurred since 2010. Record low ice volumes in the Gulf are indicative of climate-change warming trends occurring across the Atlantic (DFO 2021a).

During the melting of pack ice, icebergs originating from the Labrador coast become exposed and are occasionally driven through the Strait of Belle Isle (CCG 2022). Icebergs can also enter through the Cabot Strait but is less common. Icebergs passing through the Strait of Belle Isle and Cabot Strait are generally small and the probability of icebergs being present in or near the RAA in a given year is relatively low (AMEC 2014).

6.3.2 Marine Biological Environment

The following sections provide an overview of relevant aspects of the marine biological environment in the RAA. Specifically, plankton, marine fish, nearshore habitats, invasive species, marine mammals and sea turtles, SAR, and sensitive areas are discussed in the following sections.

6.3.2.1 Plankton

Plankton consists of small marine organisms that move passively in the marine environment where currents and turbulent mixing determine where they are distributed. Taxa in this group includes phytoplankton (microscopic marine plants), zooplankton (invertebrates), ichthyoplankton (fish larvae and eggs), bacteria, fungi, and viruses. As the foundation of most food webs, marine plankton play an important role in the marine environment (primary and secondary production). 499 species of plankton have been identified or are likely to occur in the Gulf of St. Lawrence (Dufour and Ouellet 2007).

The growth of phytoplankton in the Gulf is at its peak in the spring when nutrient concentrations, particularly nitrates, are high (Dufour et al. 2010). The west coast of Newfoundland has relatively low productivity values along the northern peninsula and Port aux Basques with areas of higher productivity occurring near Stephenville and Port au Port Peninsula (Dufour and Ouellet 2007; AMEC 2014).

In the Gulf, there are about 318 species of marine zooplankton from eight different phyla (Archambault et al 2010) and 50 species of ichthyoplankton (AMEC 2014). Zooplankton are mostly comprised of copepods, accounting for 75% of the zooplankton species richness. Icthyoplankton species of herring, capelin, snailfish, shanny, and sculpin dominate the Gulf where larvae of lobster, herring, scallop, cunner, radiating shanny, winter flounder, and capelin are most common in nearshore habitats (White and Johns 1997; AMEC 2014).

6.3.2.2 Marine Fish

A diverse assemblage of marine fish are known to occur in the Gulf of St. Lawrence, including pelagic fish, which inhabit and feed at the surface and demersal or groundfish, which inhabit and feed near the bottom. The Gulf is comprised of two broad marine habitats: deep channels and shelf areas. Deepwater species live in the channels, which also provide winter home for a large number of species that spend the summer months in the shelf areas. Shelf areas are productive in the summer and are important spawning, nursery, and adult feeding grounds for both pelagic and demersal species (AMEC 2014). Demersal fish species make up almost two-thirds of marine fish species found in the Gulf (Stantec 2011).

A wide range of shellfish species are also present in the Gulf including species of shrimp, scallop, bivalves, crab, and lobster. Shellfish congregate in shallow coastal habitats and in deeper water along the continental shelf (AMEC 2014). Several of these species are known to spawn in areas within the LAA (Table 6.4).

Species of commercial importance that occur in the Gulf include Atlantic herring, capelin, snow crab, Atlantic halibut, Greenland halibut, witch flounder, and redfish. Commercial fisheries are further discussed in Section 6.3.3. Marine fish species that are at risk are discussed in Section 6.3.2.6.

Tables 6.1 and 6.2 give an overview of key marine fish and shellfish that are known to occur in the Gulf and likely to occur in or near the LAA.

Table 6.1 Summary of Key Fish Species with the Potential to Occur in or Near the LAA

Common Name	Latin Name	Relative Level of Occurrence	Timing of Presence and Spawning
Atlantic herring	*Clupea harengus*	High	Year-round presence with spring and fall spawning
Atlantic mackerel	*Scomber scombrus*	Low	May to November (adults)
Longfin hake	*Urophycis chesteri*	High	Year-round presence and fall spawning
Marlin-spike grenadier	*Nezumia bairdi*	High	Year-round presence and fall spawning
Thorny skate	*Raja radiata*	High	Year-round presence
Witch flounder (greysole)	*Glyptocephalus cynoglossus*	High	Year-round presence
Atlantic hagfish	*Myzine glutinosa*	Moderate	Year-round presence
Atlantic halibut	*Hippoglossus hippoglossus*	Moderate	Migrate to shallow waters in summer, return for winter
Atlantic soft pout	*Melanostigma atlanticum*	Moderate	Year-round presence
Black dogfish	*Centroscyllium fabricii*	Moderate	Year-round presence
Greenland halibut	*Reinhardtius hippoglossiodes*	Moderate	Year-round presence
Lumpfish	*Cyclopterus lumpus*	Low	Migrate to shallow waters to spawn, return during fall
Pollock	*Pollachius virens*	Moderate	Migrate inshore during summer, winter offshore, fall spawning
Smooth skate	*Raja senta*	Moderate	Year-round presence
Spotted barracudina	*Notolepis rissoi*	Moderate	Year-round presence
White barracudina	*Arctozenus risso*	Moderate	Year-round presence
Atlantic argentine	*Argentina silus*	Low	Year-round presence
Northern shortfin squid	*Illex illecebrosus*	Moderate	Seasonal presence
Atlantic hookear sculpin	*Artediellus atlanticus*	Low	Migrate inshore in the spring; occupy moderately deep waters in winter
Checker eelpout	*Lycodes vahilii*	Low	Year-round presence
Capelin	*Mallotus villosus*	Low	Mature fish migrate inshore in spring to spawn
Fourbeard rockling	*Enchelyopus cimbrius*	Low	Year-round presence
Greater eelpout	*Lycodes esmarki*	Low	Year-round presence
Haddock	*Melanogrammus aeglefinus*	Low	Move to deeper water in winter; inhabit shallow banks in summer

Table 6.1 Summary of Key Fish Species with the Potential to Occur in or Near the LAA

Common Name	Latin Name	Relative Level of Occurrence	Timing of Presence and Spawning
Monkfish (goosefish)	*Lophius americanus*	Low	Year-round presence
Polar sculpin	*Coltunculus microps*	Low	Year-round presence
Sea raven	*Hemitripterus americanus*	Low	Year-round presence and fall spawning
Silver hake	*Merluccius bilinearis*	Moderate	Year-round presence
Swordfish	*Xiphius gladius*	Low (anticipated)	Migrate in summer and fall
Threebeard rockling	*Gaidropsarus ensis*	Low	Year-round presence
Windowpane flounder	*Scophthalmus aquosus*	Low	Year-round presence
Wrymouth	*Cryptacanthodes maculatus*	Low	Year-round presence
Yellowtail flounder	*Limanda ferruginea*	Low	Move from shallow to deep waters in the fall
Sources: Bourdages et al. 2022; Stantec 2017			

Table 6.2 Summary of Key Shellfish Species with the Potential to Occur in or Near the LAA

Common Name	Scientific Name	Anticipated Level of Occurrence	Distribution
Northern shrimp	*Pandalus borealis*	Low	Most abundant in waters ranging from 1 to 6°C and in soft, mud, and silt substrates. Typically found between 150-600 m in NL waters. Low abundance near the LAA; more commonly found near Anticosti Island.
American lobster	*Homarus americanus*	Low to Moderate	Found in waters ranging from -1.5 to 24°C in coastal to continental shelf habitats. Occur around the island of Newfoundland and other areas of the Atlantic, including areas in the LAA.
Sea scallop	*Placopecten magellanicus*)	Low to Moderate	Distributed in shallow coastal regions of the province on sand-gravel or gravel-pebble substrates. High abundance south of Magdalen islands with scallop beds in shallow areas of the LAA.
Snow crab	*Chionoecetes opilio*	Low to Moderate	Typically occurs between 60-400 m in waters ~5°C. Prefers mud, sand, or silt bottom substrates. Widespread distribution in the Gulf and migrate into shallow waters for breeding and molting with spawning grounds in the LAA.

Table 6.2 Summary of Key Shellfish Species with the Potential to Occur in or Near the LAA

Common Name	Scientific Name	Anticipated Level of Occurrence	Distribution
Rock crab	*Cancer irroratus*	Low to Moderate	Live in intertidal and mostly subtidal habitats and are typically found in water less than 20 m deep. High abundance around Magdalen Islands and North and northeast of Cape Breton.
Green sea urchin	*Strongylocentrotus droebachiensis*	Low to Moderate	Associated with urchin barrens and kelp bed habitats in NL. Widespread along western Newfoundland with high densities found between St. George's Bay and Port au Choix.
Sources: AMEC 2014; Bourdages et al. 2022; Stantec 2017			

6.3.2.3 Nearshore Habitat and Shellfish

Nearshore habitat in areas within the LAA (e.g., Port au Port Bay and St. George's Bay) generally consist of sand, mud, and gravelly substrate, which is relatively unique as most of Newfoundland's coastline is made of rocky substrate (South 1983). Subtidal and intertidal algal communities are highly influenced by the western Newfoundland's warm summer seawater temperatures and as a result, certain algal species are found in greater abundance here than anywhere else on the island (e.g., *Phyllophora pseudoceranoides; Cystoclonium purpureum*) (South 1983). Algal communities within the LAA are also influenced by seasonal sea ice scouring, resulting in nearshore habitats being dominated by annual species. In non-estuarine areas along the west coast of Newfoundland, algal distribution between the high-water mark and the shallow subtidal zone can be differentiated by the degree of wave exposure (Table 6.3).

Coastal areas with fine substrates can host a variety of salt tolerant higher plants and algae (South 1983), such as eelgrass (*Zostera marina)*, which have been identified in subtidal habitats along the north side of the Port au Port Peninsula and in areas between Stephenville and Port aux Basques (ECCC 2020). Eelgrass requires sunlight to grow and is typically found in shallow coastal bays in waters less than 4 m (Government of Canada 2018) but can be found at depths between 5 to 10 m in Newfoundland (LGL 2005). Eelgrass beds are classified as Ecologically Significant Areas (ESAs) due to their importance to nearshore environments; they support the physical environment (e.g., buffering shorelines, and stabilizing sediment) and the biological environment (e.g., act as nurseries and spawning grounds for several fish species). Burrowing invertebrates such as softshell clams (*Mya arenaria*), bristle worms (*polychaetes*), and sand shrimp are common in the sand surrounding eelgrass roots. Other fauna found in eelgrass habitats include hydroids, bryozoans, and serpulids that attach to seaweeds (Catto et al. 1999). Saltmarshes have also been identified in sheltered bays within St. George's Bay and Port au Port Bay (Stantec 2011). These coastal habitats support a variety of halophytic plants and organisms and are known to stabilize the shore by entrapping sediment.

Table 6.3 Generalized Algal Communities and Associated Invertebrates in Intertidal and Shallow Subtidal Areas in Western Newfoundland

Wave Exposure	**Typical Algal/Invertebrate Species**		
	HW to 5 m	**5 to 20 m**	**>20 m[1]**
Sheltered	Maritime lichens Cyanophyta *Bangia* *Atropurpurea* *Fucus vesiculosus* *Balanus balanoides* *Ascophyllum nodosum* *Mytilus edulis* *Bonnemaisonia hamifera*	*Laminaria longicruris* *Phyllophora sp.* *Agarum cribosum* *Laminaria solidungula*	*Phyllophora sp.* *Agarum cribosum* *Lithothamnium tophiforme* *Phymatolithon laevigatum* *Laminaria longicruris* *Laminaria solidungula*
Moderate Exposed	Maritime lichens *Pilayella littoralis* *Bangia atropurpurea* *Chordaria flagelliformis* *Chorda filum* *Phyllophora sp.* *Alaria esculenta* *Saccorhiza dermatodea*	*Lithothamnium glaciale* *Desmarestia sp.* *Agarum cribosum* *Laminaria longicruris* *Phyllophora sp.*	*Phyllophora sp.* *Lithothamnium glaciale*
Highly Exposed	Cyanophyta *Porphyra sp.* *Bangia atropurpurea* *Pilayella littoralis* *Chordaria flagelliformis* *Alaria esculenta* *Saccorhiza dermatodea* *Lithothamnium glaciale*	*Clathromorphum circumscriptum* *Lithothamnium glaciale* *Laminaria longicruris* *Agarum cribosum* *Phyllophora sp*	*Ptilota serrata* *Phyllophora sp.*

Source: South 1983, in LGL 2005
Note:
[1] 20-40 m for low exposure; 20-25 m for moderate and high exposure; HW denotes high water mark

Nearshore habitats along the Port au Port Peninsula and St. George's Bay host a diverse group of marine fish and benthic invertebrates. A number of important spawning locations occur within these bays for several fish and shellfish species that are considered commercially and/or ecologically important to Newfoundland (Table 6.4). Other notable fish species that do not spawn but are present in nearshore habitats within the LAA include Atlantic mackerel, redfishes, Greenland halibut, Atlantic halibut, and Atlantic salmon. Port au Port Bay and St. George's Bay are also important nursery grounds for Atlantic herring during the spring (AMEC 2014). Several capelin spawning beaches have been reported by the public at different beaches between 2011-2020 including areas on the east coast of Port au Port Bay and various locations within St. George's Bay (eCapelin 2017).

Table 6.4 Notable Fish and Shellfish Species Known to Spawn in Nearshore Habitats in the LAA

Species Name	Timing of Spawning	Known Spawning Locations
American lobster (*Homarus americanus*)	Summer-early fall	Throughout much of coastal region; Outer Port au Port to Shag Bay
Atlantic cod (*Gadus morhua*)	Spring	Deep water west-southwest of Cape St. George
Atlantic herring (*Clupea harengus harengus*)	Spring-early summer	Port au Port Bay and St. George's Bay
Capelin (*Mallotus villosus*)	Late spring-summer	East coast of Port au Port Bay and St. George's Bay
Sea scallop (*Placopecten magellanicus*)	Late summer-fall	In Port au Port Bay
Lumpfish (*Cyclopterus lumpus*);	Summer	Throughout much of coastal region
Snow crab (*Chionoecetes opilio*)	Spring-summer	Off west coast of Port au Port Peninsula and in Port au Port Bay
Witch flounder (*Glyptocephalus cynoglossus*)	Late spring-summer	St. George's Bay
Sources: AMEC 2014; eCapelin 2017; LGL 2008		

6.3.2.4 Aquatic Invasive Species

Aquatic invasive species (AIS) are fish, invertebrates, or plant species that have been introduced into a new habitat from their native range. Because they have no natural predators in their new habitat, AIS populations can spread quickly once introduced. Once established, AIS can outcompete and harm native species, as well as change their habitats, rendering them inhabitable. Many of the unintentional introductions of AIS are linked to local and international marine transport through ballast water and attachment to boat hulls (DFO 2019a).

The coffin box (*Membranipora membranacea*; a bryozoan) and European green crab are two aquatic invasive species that have been identified in areas within the LAA and are presented in Table 6.5. Distribution of AIS within the LAA are based off reports by DFO through a series of surveys between 2006-2010. Four other AIS have been identified along Newfoundland coastlines in other parts of the province through similar AIS surveys: golden star tunicate (*Botryllus schlosseri*), oyster thief (*Codium fragile ssp. fragile*), vase tunicate (*Ciona intestinalis*), and violet tunicate (*Botrylloides violaceus*) (DFO 2018 c,d,e,f). These four AIS are known to be disruptive to marine-based aquaculture operations.

Table 6.5 Aquatic Invasive Species identified in the LAA

Species Name	Distribution in LAA	Description
Coffin box[1] (*Membranipora membranacea*)	• Piccadilly: Port au Port Bay • St Georges: St. George's Bay • Three Rock Cove: Port au Port Peninsula	Bryozoan species First observed in Newfoundland and Labrador in 2002 Colonies can grow 10 cm or more in width and form white sheets that cover surfaces of rockweed, kelp, and boat hulls May permanently alter kelp beds and affect biodiversity
European green crab[2] (*Carcinus maenas*)	• Flat Island: St. George's Bay • Little Port Harmon: St. George's Bay • Mattis Point: St. George's Bay • Piccadilly: Port au Port Peninsula • Point au Mal: Port au Port Peninsula • Port Harmon: St. George's Bay • Sandy Cove: St. George's Bay • Shallop Cove: St. George's Bay • Stephenville Crossing: St. George's Bay	Crustacean species; often confused with the native rock crab (Cancer irroratus) Primarily feeds on shellfish and other crustaceans, but has been observed eating small and juvenile finfish in eelgrass beds Aggressive and territorial; known to damage eelgrass habitat Confirmed in St. George's Bay in 2008

Notes:

[1] Based on AIS survey 2006-2010 (DFO 2018a)

[2] Based on AIS Survey / Stewardship Program Areas 2006-2009 (DFO 2018b)

6.3.2.5 Marine Mammals and Sea Turtles

Approximately 19 marine mammals are expected to occur with some degree of frequency in the Gulf of St. Lawrence and potentially within the LAA. This includes 15 cetacean species (whales, dolphins, and porpoises) and four pinniped species (seals), however additional species may be sighted on rare occasions. Many marine mammals are often seen on a seasonal basis or year-round as the Gulf is considered important feeding grounds for several species (Stantec 2017). The western shelf of Newfoundland in particular, as well as the entrance to St. George's Bay in southwestern Newfoundland, have been identified as an important ecological area for the blue whale (Figure 6.5). Marine mammal species with the potential to occur in or near the LAA are presented in Table 6.6.

A summary of marine mammal observations in the RAA are presented in Figure 6.5 from the Ocean Biodiversity Information System sightings database 1913 to 2022. The dataset suggests that marine mammal sightings are relatively low, with more sightings occurring south of St. George's Bay. Within the LAA, only two marine mammal sightings have been recorded: both minke whales near the western end of Port au Port Peninsula. The most common marine mammal sighted throughout the RAA was the fin whale. While conclusions can be drawn on a regional scale, the dataset cannot be reliably used to make assumptions on species abundance or density due to a monitoring bias artifact of the survey effort. Additionally, areas with low numbers may be misleading, due to a lack or absence of survey effort.

Two sea turtle species are also expected to occur to some degree in the Gulf of St. Lawrence. The leatherback sea turtle (*Dermochelys coriacea*) and loggerhead sea turtle (*Caretta caretta*) are both known to visit the waters off the island of Newfoundland, however the leatherback sea turtle is more likely to occur. The presence of green turtles (*Chelonia mydas*) or Kemp's ridley turtles (*Lepidochelys kempii*) in or near the LAA would be extremely rare (Stantec 2017). There are no occurrences of sea turtle sightings within the RAA/LAA with existing datasets.

Marine mammal and sea turtle species that are considered at risk are further discussed in Section 6.3.2.6.

Table 6.6 Marine Mammals with the Potential to Occur in or Near the LAA

Common Name	Latin Name	Potential for Occurrence	Distribution and Seasonality
Mysticetes (Toothless or Baleen Whales)			
Minke whale	*Balaenoptera acutorostrata*	High	Widespread throughout the Gulf, although less common off the west and southwest coast of Newfoundland
Humpback whale	*Megaptera novaeangliae*	High	Aggregate in Gulf of St. Lawrence in summer to feed; most sightings in the Gulf of St. Lawrence occur in the northeast including off western Newfoundland
Blue whale[1]	*Balaenoptera musculus*	Moderate	Occur in Gulf of St. Lawrence and east of Nova Scotia in spring, summer and fall and off southern Newfoundland in winter
Fin whale[1]	*Balaenoptera physalus*	Moderate	Widely distributed in the Gulf of St. Lawrence and present year-round off western Newfoundland
North Atlantic right whale[1]	*Eubalaena glacialis*	Low	More frequently sighted in the southern Gulf of St. Lawrence; sightings in the LAA would be very rare
Sei whale	*Balaenoptera borealis*	Low	Uncommon in the Gulf of St. Lawrence and western Newfoundland; more concentrated off southern Nova Scotia and Labrador Sea
Odontocetes (Toothed Whales)			
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	High	Sighted throughout the Gulf of St. Lawrence, although most sightings in areas with steep bottom topography along the margins, most common in summer and fall
Short-beaked common dolphin	*Delphinus delphis*	High	Within the Gulf of St. Lawrence, species is found most often off western Newfoundland
Long-finned pilot whale	*Globicephala melas*	High	Widely distributed and considered common off southwestern and western Newfoundland
Harbour porpoise[1]	*Phocoena phocoena*	Moderate	Moderately abundant in the Gulf during ice-free months, including in waters off western Newfoundland
Sperm whale	*Physeter macrocephalus*	Moderate	Known to occur in deep waters off shelf edge of western Newfoundland (e.g., Cabot Strait and St. George's Bay) and occasionally along southwest and west coasts of Newfoundland

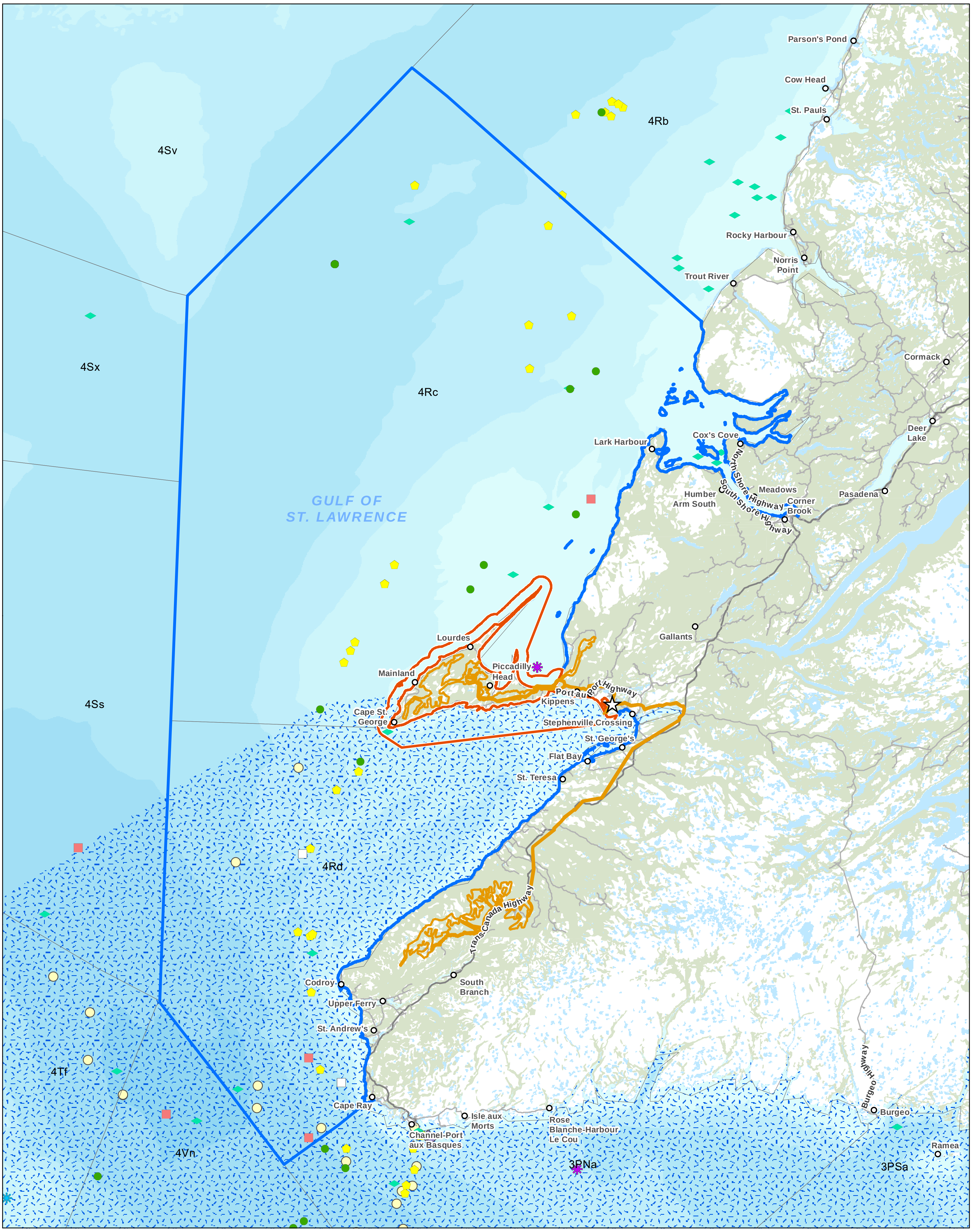
Table 6.6 Marine Mammals with the Potential to Occur in or Near the LAA

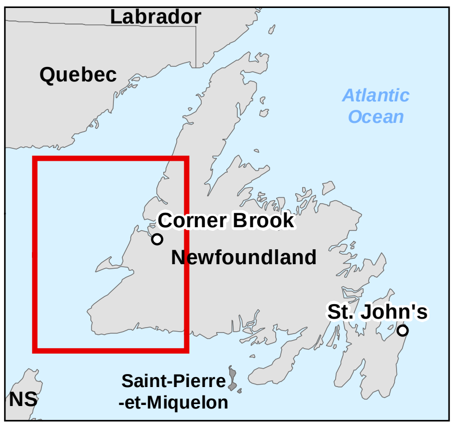
Common Name	Latin Name	Potential for Occurrence	Distribution and Seasonality
White-beaked dolphin	*Lagenorhynchus albirostris*	Low	Most sightings in Gulf are in shallow water (<100 m deep)
Killer whale[1]	*Orcinus orca*	Low	Occur throughout the Gulf of St. Lawrence with occasional sightings reported along the coast of Newfoundland and the Strait of Belle Isle.
Beluga whale[1]	*Delphinapterus leucas*	Low	Presence confined primarily to St. Lawrence Estuary and Saguenay Fjord with some uncommon sightings off western Newfoundland
Northern bottlenose whale[1]	*Hyperoodon ampullatus*	Low	Extremely uncommon in Gulf of St. Lawrence; individuals (most likely from Labrador population) have been sighted off western Newfoundland
Pinnipeds			
Harbour seal	*Phoca vitulina*	High	Occur commonly in the Gulf of St. Lawrence including off of western Newfoundland year-round; primarily coastal
Grey seal	*Halichoerus grypus*	High	Occur commonly in the Gulf of St. Lawrence including off of western Newfoundland; generally summer residents but can occur year-round
Harp seal	*Phoca groenlandica*	High	Present in the Gulf of St. Lawrence December to May
Hooded seal	*Crystophora cristata*	High	Present in the Gulf of St. Lawrence December to May

Modified from: Stantec 2017

Note:

[1] Species at Risk (Section 6.3.2.6)





Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Client, Province of Newfoundland and Labrador, ACCDC, Stantec
3. Background: 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

Mysticete Sightings (1913 - 2022)
- ◆ Minke Whale
- ✱ Blue Whale
- ⬟ Fin Whale
- ■ North Atlantic Right Whale
- ● Humpback Whale

Odontocete, Whale and Dolphin Sightings (1913 - 2022)
- ☐ Beluga Whale
- ○ Long-finned Pilot Whale
- ◆ Orca
- ✱ Sperm Whale
- ▨ Important Areas for Blue Whale

- ☆ Hydrogen / Ammonia Plant Facility (Proposed)
- ☐ Project Area
- ☐ Local Assessment Area
- ☐ Regional Assessment Area
- ☐ NAFO Unit

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(At original document size of 11x17)
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Stantec

Project Location
Stephenville
NL

Prepared by NW on 2023-04-28
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
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World Energy GH2
Project Nujio'qonik

Figure No.
6.5

Title
Marine Mammal Sightings in the RAA (Ocean Biodiversity Information Systems Sightings Database 1913-2022)

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6.3.2.6 Species at Risk

For the purposes of this baseline report, marine SAR include those listed as Extirpated, Endangered, Threatened, or Special Concern by SARA, NL ESA, or by COSEWIC. Species listed under SARA schedule 1 are legally protected under Section 32(1), which states that "no person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, and endangered species, or a threatened species". Prohibitions of NL ESA include Section 16, which states "a person shall not disturb, harass, injure, or kill an individual of a species designated as threatened, endangered or extirpated". A summary of species that have the potential to occur in or near the LAA that are considered at risk under SARA, NL ESA*,* and/or COSEWIC is presented in Table 6.7.

Overall, 31 SAR have the potential to occur in or near the LAA: 22 marine fish, seven marine mammals, and two sea turtle species. Critical habitat is also protected under SARA. Protected habitat areas were identified in the RAA for the at-risk northern and spotted wolffish (discussed in Section 6.3.2.7). There were no critical habitats identified within the LAA. Two aquatic species were identified that are protected under the NL ESA; the banded killifish and the American eel, who are both listed as vulnerable.

Table 6.7 Species at Risk with the Potential to Occur in or Near the LAA

Common Name	Species Name	COSEWIC Status	SARA Schedule Status	Potential for Occurrence[1]	Distribution and Life History Characteristics
Marine Fish					
Atlantic cod (Laurentian South population)	*Gadus morhua*	Endangered	No Status	High	Cod are a groundfish species that feed on fish and shellfish, such as herring, capelin, and crab (COSEWIC 2010a). Eggs and larvae are planktonic until they reach a size of 25-50 mm and are primarily zooplankton feeders. Adults are observed in deeper waters up to 500 m whereas juveniles are typically found in coastal waters taking refuge in nearshore habitats (e.g., eelgrass beds). They are a benthopelagic species that overwinter off northeast Cape Breton. Cod migrate into the southern Gulf in April while summer months are spent feeding and spawning before returning to deeper water off Cape Breton in November (COSEWIC 2010a). The entire population is known to use two migration routes the Cape Breton Trough and the southern slope of the Laurentian Channel and may be in proximity to the LAA during the spring and fall (Stantec 2017).
Atlantic cod (Laurentian North population)		Endangered	No Status	Moderate	
Deepwater redfish (Gulf of St. Lawrence - Laurentian Channel population)	*Sebastes mentella*	Endangered	No Status	High	A slow growing, viviparous species with a lifespan of up to 75 years. Its range extends from the Grand Banks to Baffin Bay, including the Gulf of St. Lawrence and Laurentian Channel. Larvae are found primarily in surface waters and feed mainly on fish eggs and invertebrate eggs. Juvenile redfish are pelagic for four to five months where adults are commonly found at deeper depths (350-500 m). Both juvenile and adults feed primarily on copepods, euphausiids and fish species. Adults generally inhabit areas near the bottom but are considered semi-pelagic as they venture vertically at night to follow prey (COSEWIC 2011b). Mating occurs in the fall with spawning occurring from April to July in the Gulf. Redfish are expected to occur in high densities near the LAA (AMEC 2014).
Acadian redfish (Atlantic population)	*Sebastes fasciatus*	Threatened	No Status	High	This slow growing, long-lived species is closely associated with the seafloor. Its range extends from the Gulf of Maine to the southern Labrador Sea, including the Gulf of St. Lawrence and Laurentian Channel. They are commonly found inhabiting waters of 150 to 300 m in depth. Juvenile and adult fish have a similar diet to deepwater redfish and feed mainly of copepods, euphausiids, and fish (COSEWIC 2011b). Mating occurs in the fall with spawning occurring from April to July in the Gulf. Redfish are expected to occur in high densities near the LAA (AMEC 2014).
American plaice (Maritime population)	*Hippoglossus platessoides*	Threatened	No Status	High	This population occurs primarily in the Gulf of St. Lawrence and Scotian Shelf (COSEWIC 2009b) where high densities are observed during summer in St. George's Bay up to areas near Port au Choix with lower densities in the offshore section of the Gulf (AMEC 2014). Closely associated with the seafloor and commonly found in water depths of 100 to 300 m where sandy/shell fragmented sediments are present. They overwinter in the deep waters of the Laurentian Channel and migrate to the shallow waters off the Magdalen Islands to spawn between April-June when near bottom temperatures range between 3-6°C (AMEC 2014). Larvae may be present in the water column between May and June.
American plaice (Newfoundland and Labrador population)		Threatened	No Status	Low	American plaice are a groundfish that inhabits continental shelves in the North Atlantic. The Newfoundland and Labrador population is located south of the Hudson Strait, southeast to the Grand Bank, and west to Cape Ray. They are considered a cold-water species, preferring temperatures below -0.5 to 2.5°C and are closely associated with the seafloor; commonly found in water depths of 100 to 300 m where sandy/shell fragmented sediments are present (COSEWIC 2009b).
Atlantic (striped) wolffish	*Anarhichas lupus*	Special Concern	Special Concern	Moderate	Depending on its life stage, it inhabits different habitats: the eggs are deposited on the bottom, the larvae are pelagic, and the juveniles and adults live along the continental shelf on rocky or sandy substrates (COSEWIC 2012c). They tolerate a broad temperature range of -1.5 to 13°C and occur at depths less than 150 m in the Gulf of St. Lawrence where adults are found primarily in coastal areas and on the edges of deep channels, avoiding the bottoms of deep channels (Dutil et al. 2010). Occur in moderate-high densities throughout the majority of the LAA (AMEC 2014). They undergo small migrations to spawning in shallow waters during the fall; eggs / larvae may be present on seafloor in fall to early winter (COSEWIC 2012c).
White hake (Atlantic and Northern Gulf of St. Lawrence population)	*Urophycis tenuis*	Threatened	No Status	Moderate - High	Slow-swimming cod-like fish that can grow up to approximately 135 cm in length and 22 kg in weight and are found near the bottom over fine sediment substrates such as mud, sand, and gravel. They prefer habitats with temperatures ranging from 4-8°C where larger fish occur in deeper waters compared to juveniles who frequent coastal shallow waters or shallow offshore banks (COSEWIC 2013a). The Atlantic and Northern Gulf of St. Lawrence population occur in the Scotian Shelf, Northern Gulf of St. Lawrence, and Southern Newfoundland. Peak spawning for this population occurs from early spring and summer in deep offshore waters (COSEWIC 2013a). The southern Gulf of St. Lawrence population is restricted to this region. Peak spawning for this population occurs from June to September, with peak spawning in mid-June in shallow inshore waters (COSEWIC 2013a).
White hake (Southern Gulf of St. Lawrence population)		Endangered	No Status	Moderate - High	

Table 6.7 Species at Risk with the Potential to Occur in or Near the LAA

Common Name	Species Name	COSEWIC Status	SARA Schedule Status	Potential for Occurrence[1]	Distribution and Life History Characteristics
Spotted wolffish	*Anarhichas minor*	Threatened	Threatened	Low	A bottom-dwelling predatory fish that is found in cold continental shelf waters. Most commonly found inhabiting the seafloor in water depths between 200-750 m (COSEWIC 2012b). They undertake limited movements and spawn in summer. Occur in moderate densities throughout the majority of the LAA with high densities observed off Port au Port Peninsula (AMEC 2014). A Recovery Strategy has been completed for the spotted wolffish (DFO 2020a), where two critical habitat areas for spotted wolffish are within the RAA (southwest/northwest of the LAA).
Porbeagle shark	*Lamna nasus*	Endangered	No Status	Moderate	A cold-temperate coastal and oceanic shark found on continental shelves in water between 5-10°C and depths of 1-700 m. Migrates to Newfoundland waters, including the Gulf of St. Lawrence, between summer and fall. This species is most often caught in water depths of 35 to 100 m. Mating occurs in late summer to early fall, and birthing occurs in late winter or spring. Mating may occur at the Gulf of St. Lawrence. They feed primarily on teleost fish and cephalopod species (Government of Canada 2021a).
Atlantic bluefin tuna	*Thunnus thynnus*	Endangered	No Status	Moderate	Seasonal pelagic migrants: there is a commercial and hook and a release (charter) fishery within/near the Gulf of St. Lawrence (DFO 2019b). Small schools arrive in the summer to feed and then migrate south in the fall. They can withstand a wide range of temperatures and depths (COSEWIC 2011a).
Winter skate (Gulf of St. Lawrence population)	*Leucoraja ocellata*	Endangered	No Status	Moderate	Winter skate are endemic to the Northwest Atlantic with populations in southern Gulf of St. Lawrence, and the Eastern/Western Scotian Shelf. The remainder of the Gulf of St. Lawrence is considered outside the normal range of this species (ECCC 2017). This bottom dwelling fish prefers sand and gravel bottoms and is most common at depths less than 111 m (COSEWIC 2015), however winter skate in the southern Gulf may be found in coastal warm waters at very shallow depths (30 m) in the summer (ECCC 2017). Spawning occurs in the later summer or early fall; winter skate lay egg cases and emerge as juveniles. Their diet consists primarily of rock crab and squid but also prey on other shellfish, amphipods, and small fish (COSEWIC 2015). Over the last three generations, the abundance of mature winter skate in the Gulf of St. Lawrence was estimated to have declined by 99%. Abundance of mature individuals in the southern Gulf was estimated to be 7,000 in the 2010s compared to 580,000 in the 1970s (COSEWIC 2015).
Shortfin mako (Atlantic population)	*Isurus oxyrinchus*	Endangered	No Status	Low	A pelagic species which migrates north following food stocks (e.g., mackerel, herring, tuna) and may pass through or near the LAA. Any occurrence would be temporary in nature. Highly migratory, distribution pattern is dependent on water temperature, but it can withstand substantial changes in temperature as well as food availability. Adult females are aplacental viviparous, where pupping is widespread along the continental shelf. They feed on a wide variety of species, including teleost fish, marine mammals, and cephalopods (Government of Canada 2021b).
Basking shark (Atlantic population)	*Cetorhinus maximus*	Special Concern	No Status	Low	Basking sharks are found circumglobally in temperate coastal shelf waters and coastal waters. They have been observed in Newfoundland waters including the Gulf of St. Lawrence, with large concentrations found nearshore between Port au Basques and Hermitage. Basking sharks are often associated with high concentrations of zooplankton. The Canadian population ranges from approximately 5,000 to 10,000 individuals but data is limited (COSEWIC 2009a).
Northern wolffish	*Anarhichas denticulatus*	Threatened	Threatened	Low	Northern wolffish mainly occupy water between 2-5°C and are commonly found on the seafloor at depths of 500 to 1,000 m but can also be found at shallower depths up to the surface (COSEWIC 2012a). Most abundant in deep waters off northeastern Newfoundland and on the Labrador Shelf and are rarely seen in the Gulf of St. Lawrence, which is a fringe area for northern wolffish (COSEWIC 2012a; DFO 2020a). This species is non-migratory with spawning occurring late in the year (COSEWIC 2012a). A Recovery Strategy has been completed for the northern wolffish (DFO 2020a) where one critical habitat area for northern wolffish is within the RAA (southwest of the LAA).
White shark (Atlantic population)	*Carcharodon carcharias*	Endangered	Endangered	Low	White sharks inhabit waters ranging from the sub-Arctic to tropical regions and have been observed to undergo long distance migrations. They can inhabit coastal and offshore waters, can be found at the surface to depths of at least 1,128 m, and can tolerate temperatures in the range of 1.6°C to 30.4°C (Skomal et al. 2017 *in* COSEWIC 2021). They are most often observed in Canadian waters during August and September but their existence and behavior in the North Atlantic is currently poorly understood. There have only been 85 recorded sightings of white shark in Atlantic Canada between 1874-2018, with most being in the Bay of Fundy and very few in the Gulf region (COSEWIC 2021).

Table 6.7 Species at Risk with the Potential to Occur in or Near the LAA

Common Name	Species Name	COSEWIC Status	SARA Schedule Status	Potential for Occurrence[1]	Distribution and Life History Characteristics
Atlantic salmon (Anticosti Island population)	*Salmo salar*	Endangered	No Status	Low	Atlantic salmon are anadromous; they live in freshwater rivers for their first one to two years before migrating to the sea (COSEWIC 2010b). They return to their natal river or tributary for spawning. While at sea, they feed on variety of invertebrates (e.g., euphausiids, amphipods) and fish (e.g., herring, capelin). They are prey for marine mammals, birds, and other fish species. Spawning occurs in October and November in Canadian waters (AMEC 2014). There are scheduled salmon rivers located in the Bay St. George Region near the proposed project (Section 4.3.4). Migrating juveniles from these rivers may pass through the LAA as they migrate to North Atlantic waters.
Atlantic salmon (South Newfoundland population)		Threatened	No Status	Low	
Atlantic salmon (Gaspé-Southern Gulf of St. Lawrence population)		Special Concern	No Status	Low	
Atlantic salmon (Inner St. Lawrence population)		Special Concern	No Status	Low	
Atlantic salmon (Quebec Eastern North Shore population)		Special Concern	No Status	Low	
Atlantic salmon (Quebec Western North Shore population)		Special Concern	No Status	Low	
Banded killifish[2] (Newfoundland Population)	*Fundulus diaphanous*	Special Concern	Special Concern	Low	The banded killifish is considered a freshwater resident but is salinity tolerant. It has been shown to survive normal Gulf of St. Lawrence salinities, but movement between the mainland and the Gulf are probably infrequent (AMEC 2014; COSEWIC 2014a). Only a few isolated populations exist on the island of Newfoundland, including several freshwater environments in the vicinity of the Project (Section 4.4.4). The banded killifish is also listed as vulnerable under NL ESA.
Cusk	*Brosme brosme*	Endangered	No Status	Low	A slow moving, sedentary, cod-like fish that lives in the Western Atlantic. Cusks can live up to 20 years and grow to a length greater than 100 cm. They are usually located in relatively warm water (6-10ºC) at intermediate depths (150-400 m). Commonly found between the Gulf of Maine and southern Scotian Shelf. Rare along the continental shelf off Newfoundland and Labrador. Very rare within the Gulf (COSEWIC 2012d).
Roundnose grenadier	*Coryphaenoides rupestris*	Endangered	No Status	Low	Roundnose grenadier is distributed on the Northwest Atlantic's continental slopes and is associated with the seafloor. They are a slow growing, deep-water marine fish that are mostly found inhabiting waters from 400 to 1,200 m in depth. Feeding is thought to be on a seasonal basis, primarily in the fall, feeding on a variety of species, including copepods, amphipods, squid, and small fish. Could occur at any time of the year, however unlikely as they are generally found in deeper water (COSEWIC 2008a).
American eel[2]	*Anguilla rostrata*	Threatened	No Status	Low	American eel can be found in many coastal areas and adjacent accessible freshwater habitats on the island of Newfoundland. They are diadromous, meaning they can be found in both freshwater and marine environments. Adults migrating from freshwater streams to the Sargasso Sea to spawn may pass through the LAA. Presence in the marine environment around NL would likely be temporary in nature (Wildlife Division 2010). The American eel is also listed as vulnerable under NL ESA.
Atlantic sturgeon (St. Lawrence populations)	*Ancipenser oxyrinchus*	Threatened	No Status	Low	Large-bodied, slow-growing, late-maturing anadromous fish that occurs in rivers (with access to the sea and deep channels), estuaries (with warm, partially saline water), nearshore marine environments, and shelf regions to at least 50 m depths. Spends most of its life in saltwater moving to freshwater to spawn in spring or early summer (AMEC 2014). The St. Lawrence population has an estimated 500 to 1,000 adults. Potential spawning locations occur in the St. Lawrence River and Estuary (COSEWIC 2011c). Population could pass through the LAA but would be temporary in nature. The Maritimes population has an estimated 1,000 to 2,000 adults (minimum), spawning only occurs within the lower Saint John River area (COSEWIC 2011c). Population could pass in or near the LAA but would be temporary in nature.
Atlantic sturgeon (Maritimes populations)		Threatened	No Status	Low	

Table 6.7 Species at Risk with the Potential to Occur in or Near the LAA

Common Name	Species Name	COSEWIC Status	SARA Schedule Status	Potential for Occurrence[1]	Distribution and Life History Characteristics
Striped bass (Southern Gulf of St. Lawrence population)	*Marone saxatilis*	Special Concern	No Status	Low	This population is widely distributed throughout estuaries and coastal areas within the southern Gulf of St. Lawrence, with higher concentrations outside of NL waters (Government of Canada 2021c). Striped bass spawn in freshwater and less often in brackish water in late May or early June. Development from egg to young-of-the-year corresponds to a gradual movement to salt water. Immature and adult bass feed in estuaries and coastal waters during the summer and overwinter in rivers to avoid cold ocean temperatures (COSEWIC 2004). During the summer months, migrations are associated with the availability of prey. During the fall, they will migrate upstream to prepare for overwintering in brackish and freshwater. Scientific evidence suggests that populations currently exist in only two Canadian rivers: the Shubenacadie, which flows into the Bay of Fundy; and the Miramichi River, which flows into the southern Gulf of St. Lawrence. The St. Lawrence estuary population is considered extirpated (COSEWIC 2004).
Spiny dogfish (Atlantic population)	*Squalus acanthias*	Special Concern	No Status	Low	The Atlantic population for this small shark species occurs from Labrador to Cape Hatteras and is most abundant in southwest Nova Scotia in Canada (COSEWIC 2010c). Some are observed in the Gulf of St. Lawrence and the western Grand Banks. They are observed in both coastal and offshore waters; in Newfoundland waters they show preference for water temperatures of >5°C and water depths of 100-250 m. The spiny dogfish is ovoviviparous with a reproduction cycle lasting two years. Pupping grounds for the species have not been observed. Large aggregations of mature females occur in the deep warm waters off the edge of the continental shelf or in the deep basins of the Scotian Shelf in the winter months. It is believed that pupping occurs in late winter in these locations (Campana et al. 2007 in COSEWIC 2010c).
Marine Mammals					
Blue whale (Atlantic population)	*Balaenoptera musculus*	Endangered	Endangered	Moderate	The Northwest Atlantic population of blue whales is estimated to consist of no more than 250 individuals (DFO 2020b). Blue whales winter in southern latitudes during mating and calving season. Gestation period is 10 to 11 months and two to three years between births. They migrate to western North Atlantic starting in the spring and are frequently observed in highly productive coastal waters feeding primarily on krill (AMEC 2014). Blue whales can occur in the Gulf of St. Lawrence year-round but are more likely to occur during spring, summer, and fall in the Gulf during ice-free periods. They are most likely to occur in the Gulf between August and November (Jacques Whitford 2007). The entrance to St. George's Bay Marine Mammal Significant Area (MMSA) is known to be a relatively important location for blue whales as it is one of the rare known areas where they congregate during winter (AMEC 2014). Southern Gulf (including part of the LAA) and southern Newfoundland are also considered to be important habitat areas (DFO 2020b).
Fin whale (Atlantic population)	*Balaenoptera physalus*	Special Concern	Special Concern	Moderate	This species migrates seasonally, either alone or in small groups, from low latitude winter feeding areas to high latitude summer feeding areas. They primarily feed on small schooling fishes and krill. Conception and calving usually take place in the winter, with an average of 2.7 years between births (AMEC 2014). Concentrated in the Northwest Atlantic region during the summer months, including coastal and offshore waters of the Gulf and western Newfoundland. Within the Gulf of St. Lawrence, they are most common in the north and northeast of the Gulf in the Strait of Belle Isle and in western Newfoundland in St. George's Bay (AMEC 2014). Are most common in the Gulf between July to September (COSEWIC 2019), migrating through the Laurentian Channel to winter off northern Nova Scotia.
Harbour porpoise (Northwest Atlantic population)	*Phocoena phocoena*	Special Concern	No Status	Moderate	Occurs in offshore and coastal waters of the Gulf. During the summer, they are common in coastal bays and harbours, and are commonly seen alone or in small groups. Common from July to September in the northern portion of the Gulf, with lower densities in the southern Gulf. Harbour porpoises are thought to migrate out of the Gulf in the winter to avoid ice entrapment. Every year, mature females become pregnant with gestational periods ranging from 10 to 11 months (COSEWIC 2006).
North Atlantic right whale	*Eubalaena glacialis*	Endangered	Endangered	Low	A large baleen whale that occurs in both coastal and shelf waters along the eastern seaboard of North America, including Newfoundland and Labrador (DFO 2021b). Atlantic Canadian waters are important foraging grounds for this species, who primarily feeds on copepods. Mean age at first reproduction is 10 years for female and is likely similar for males with a gestation period unknown; may be >12 months. The interval of births is between three to five years. This species is particularly vulnerable to collisions with vessels (AMEC 2014). Rare to waters off western Newfoundland but have been seen in large aggregations in the southern Gulf since 2015. More likely to occur in the summer and fall (DFO 2021b).

Table 6.7 Species at Risk with the Potential to Occur in or Near the LAA

Common Name	Species Name	COSEWIC Status	SARA Schedule Status	Potential for Occurrence[1]	Distribution and Life History Characteristics
Northern bottlenose whale (Scotian Shelf population)	*Hyperoodon ampullatus*	Endangered	Endangered	Low	A medium sized whale, with a population estimated to be approximately 150 individuals. This population inhabits deep waters (>500 m) in the continental slope off Nova Scotia and southwestern Newfoundland (Government of Canada 2021d). Females and males reach sexual maturity at eight to 13 years and seven to nine years respectively. Females give birth to a single offspring after a 12-month gestation period. It is estimated that females give birth on average every two years, but this rate may be lower in the Scotian Shelf population (COSEWIC 2011d). Rarely sighted as it is a pelagic, deep-water species, except that it is common to 'The Gully' off southeastern Nova Scotia, and in the Labrador Sea. Could occur rarely, and in low numbers, in the Gulf where it may feed in deep waters.
Northern bottlenose whale (Davis Strait-Baffin Bay-Labrador Sea Population		Special Concern	No Status	Low	Confined to the waters of the northern Atlantic Ocean, with populations off the Davis Strait / northern Labrador (COSEWIC 2011d). More survey effort is needed to fully describe the distribution and abundance of northern bottlenose whales in Canada, particularly in the northern part of its distribution and around Newfoundland. Similar to the Scotian Shelf population but tend to be larger in size and may breed earlier in the year (Government of Canada 2021e).
Beluga whale (St. Lawrence Estuary population)	*Delphinapterus leucas*	Endangered	Endangered	Low	This population spends the summer in the St. Lawrence estuary and migrates eastward into the northwestern Gulf of St. Lawrence in the fall and winter (COSEWIC 2014b). Mating occurs from late winter to early spring and a gestation period of 13-14.5 months with an average interval between calving of 3.25 years (AMEC 2014). Small numbers of solitary belugas have been sighted occasionally in nearshore waters in Newfoundland, most likely juveniles (COSEWIC 2014b).
Killer whale (Northwest Atlantic/ Eastern Arctic population)	*Orcinus orca*	Special Concern	No Status	Low	Can be found in all of Canada's oceans; however, the exact extent of their range and distribution in the northwest Atlantic is uncertain. Killer whales were once considered common in the Gulf of St. Lawrence, but they are now only sighted on rare occasions. The majority of sightings occur near the coast of Newfoundland and in the Strait of Belle Isle (COSEWIC 2008b). Males acquire sexual maturity around the age of 13 and females around the age of 14 to 15 years. Calving season runs from fall through spring, with an average calving interval of about five years. They often travel in close-knit matrilineal groups (AMEC 2014).
Sea Turtles					
Leatherback sea turtle (Atlantic population)	*Dermochelys coriacea*	Endangered	Endangered	Moderate	A highly migratory species with a large global range and is found in the Atlantic, Pacific and Indian oceans. Leatherbacks in Atlantic Canada are widely distributed inhabiting, coastal and offshore waters, and the Gulf of St. Lawrence (depth range of 2-5,033 m) between April-December. They are often sighted near the surface foraging on jellyfish (COSEWIC 2012e). They are most abundant between July and October, along the Scotian Shelf and slope, in the southern Gulf of St. Lawrence and along the southern coast of Newfoundland During the winter, they migrate to tropical ocean beaches where they mate and nest. Nesting is the only time that these turtles go ashore, with females laying on average six clutches per season (COSEWIC 2012e).
Loggerhead sea turtle	*Caretta caretta*	Endangered	Endangered	Low	This species is highly migratory and are widely distributed in the Atlantic, Pacific, and Indian Oceans. The Northwest Atlantic subpopulation nests in subtropical/tropical locations in northeastern United States waters and Mexico; they lay four clutches per season and will go two to three years between breeding seasons (AMEC 2014). In Atlantic Canada, they are thought to reside in the warm offshore waters (>20°C) near the Gulf Stream where they mainly feed on jellyfish. They are most prominent in the offshore parts of the Gulf and western Newfoundland in the spring, summer and fall months. Little is known about population sizes or trends for loggerhead sea turtles in Canadian waters but most likely do not inhabit waters that are less than 15°C (COSEWIC 2010d). Sightings near the LAA are expected to be rare (AMEC 2014; COSEWIC 2010d).

Adapted from: Stantec 2017

Notes:

[1] High - area overlaps with known concentrations of species (i.e., occurs frequently and in abundance relative to other areas); Moderate - species not concentrated in area but may occur regularly in low abundance or during migration; Low - species occurs infrequently and in low abundance relative to other areas (i.e., based on habitat association and distribution)

[2] Also listed as *vulnerable* under the Newfoundland and Labrador *Endangered Species Regulation*

6.3.2.7 Sensitive Areas

The marine RAA/LAA is in the Estuary and Gulf of St. Lawrence Marine Bioregion, which is one of the largest and most productive estuary/marine ecosystems worldwide (Government of Canada 2023). There are several sensitive areas within this bioregion that are close to or within LAA boundaries: Ecologically and Biologically Significant Areas (EBSAs), Significant Benthic Areas (SiBAs), SAR Critical Habitat for northern and spotted wolffish, DFO Shellfish Harvesting Closures, Special Marine Areas (SMAs), and Important Areas for Blue Whales. SMAs were identified by The Canadian Parks and Wilderness Society (CPAWS) using information from academic, official, and community literature as well as input from governments, indigenous groups, academics, non-governmental organizations, and community members (CPAWS 2018). Two marine refuges are present outside of the LAA but are within RAA boundaries; the Shoal Point Lobster Closure and the Bay of Islands Salmon Migration Closure, which are approximately 76 km and 45 km from the Project, respectively.

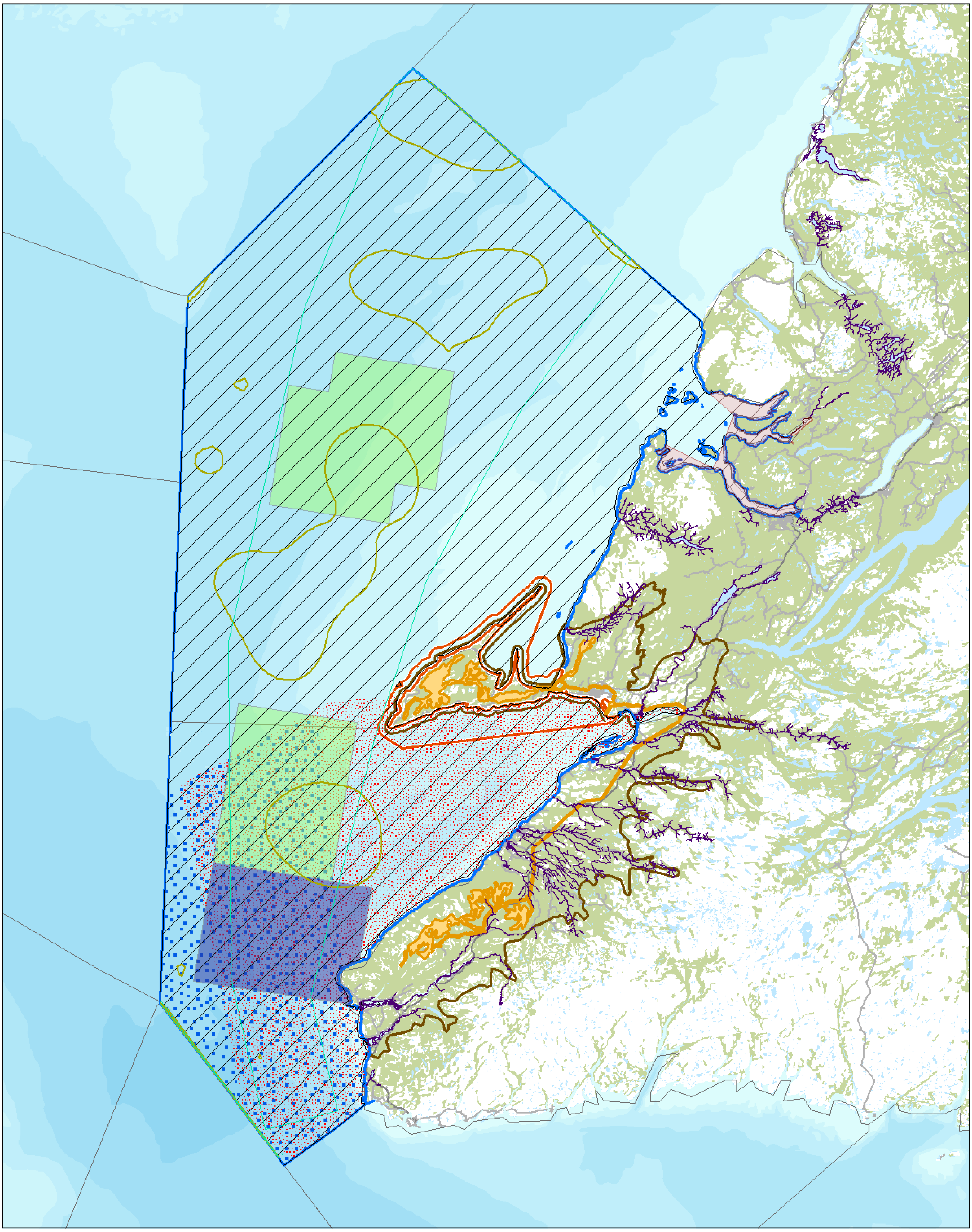
Details on the location and importance of sensitive areas in or near the LAA are presented in Table 6.8. Several of these nearshore sensitive areas overlap with potential Project activities near the Port au Port Peninsula and St. George's Bay. Baseline information on marine sensitive areas within the RAA is further discussed in the description of areas of conservation concern, available in the Terrestrial Baseline Study (Stantec 2023a).

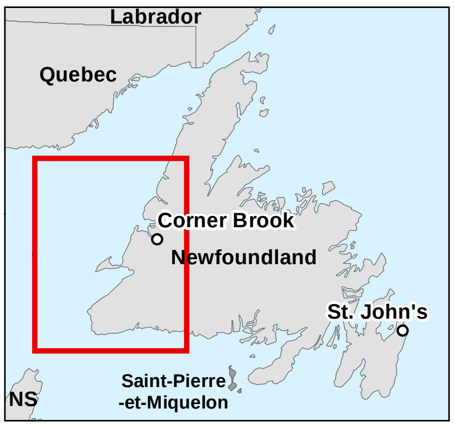
Table 6.8 Details on Sensitive Areas in or near the LAA

Sensitive Area	Location Description	Importance of Area
EBSAs		
West Coast of Newfoundland	• Covers 18,424 km^2 along the west coast of Newfoundland • Excludes the majority of St. George's Bay and Port au Port Bay	• Identified for having relatively higher ecological or biological significance than surrounding areas and are protected through DFO's *Ocean Act* • Significant spawning area for the Northern Gulf cod stock • Significant quantities of fish larvae, particularly herring and capelin near Port au Port Peninsula • High congregations of juvenile northern Gulf cod, redfish, American plaice, and Atlantic wolffish • Overwintering areas and migration corridors for several fish species • Feeding area for marine mammals
SiBAs		
Significant Benthic Areas	• Several SiBAs are outside of the LAA; 3,364 km^2 total • Closest SiBA to the Project is 15.1 km from the LAA	• SiBAs are regional habitats that contain important cold-water corals and/or sponge dominated communities, which are vulnerable to proposed or ongoing fishing activities
SAR Critical Habitats		
Northern Wolffish	• One critical habitat area is close to the Project (35.6 km from the LAA; 1,172 km^2)	• Critical habitat is established as part of the Northern Wolffish Recovery Strategy

Table 6.8 Details on Sensitive Areas in or near the LAA

Sensitive Area	Location Description	Importance of Area
Spotted Wolffish	• Two critical habitat areas are close to the Project (5.4 km to the west of the LAA; 2,625 km² total)	• Critical habitat is established as part of the Spotted Wolffish Recovery Strategy
Harvesting Closures		
Bivalve Shellfish	• Port au Port Bay, Two Guts Pond, West Bay shoreline, Seal Cove, Rothesay Bay, and St. George's River	• Areas are closed for shellfish harvesting of species of bivalve molluscs due to poor water quality conditions or nearby pollution source
SMAs		
Boswarlos	• Located at the bottom of East Bay in Port au Port Bay on the northern sheltered coast of Port au Port Peninsula • Coastal area includes rocky ledges, low cliffs, cobbles, boulders, bedrock slabs and outcrops, with large sand gravel beaches	• Extensive eelgrass bed habitat which provides habitat for several shorebirds and songbirds • Shallow areas contain abundant scallop beds
Sandy Point	• Large 1,000 ha sand pit that extends 2 km into St. George's Bay; located near the southern boundary of the LAA • Marine and coastal habitats include tidal sandy flats, salt marshes, eelgrass beds, beaches and sand dunes	• Largest spartina salt marsh and one of the largest eelgrass beds in the province • High numbers of migrating shorebirds in the summer • Important area for piping plover (15-20% of provinces population) • Only known location in the province for Willet (on Flat Island) • To some extent, the site is protected by ENGOs
St. George's Bay – Port au Port	• Large, sheltered bay with a triangular-shaped peninsula • Bay contains glacio-marine mud and deposits of sand and gravel, with some rocky ledges • Coastal area includes sandy shorelines and mud flats	• St. George's Bay contains many eelgrass beds and maritime New England type salt marshes that provide important habitat for birds and other animals • Several rivers in the area are important for Atlantic salmon • St. George's Bay contains submarine fans that have not been seen anywhere else in the region • Important spawning grounds for herring
Marine Mammal Sensitive Areas		
Important Area for Blue Whale	• The shelf waters south and southwest of Newfoundland (Figure 6.5)	• Considered important foraging/feeding and socializing areas for blue whales • Other identified areas in the North Atlantic: lower St. Lawrence Estuary, northwestern Gulf of St. Lawrence, the Mecatina Trough area, including the head of the Esquiman Channel, and the continental shelf of the Grand Banks, Newfoundland, and Nova Scotia • Habitats were identified using information on blue whale distribution and where krill aggregations occur
Sources: AMEC 2014; CPAWS 2018; DFO 2009,2020a,c; Lesage et al. 2018		





🟥 Marine Refuges (Coastal Sites)

▢ Ecological and Biologically Significant Areas

▢ Significant Benthic Areas

▨ Federal Marine Bioregions

— Scheduled Salmon Rivers (2023-24)

Wolffish SAR Critical Habitat

🟪 Northern Wolffish

🟩 Spotted Wolffish

Important Areas for Blue Whale

▨ Feeding area

▨ Migration area

🟧 Project Area

▢ Local Assessment Area (Marine)

▢ Regional Assessment Area (Marine)

▢ Regional Assessment Area (Terrestrial)

0 20 40 km

(At original document size of 11x17)
1:1,000,000

N

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, Province of Newfoundland and Labrador, Fisheries and Oceans Canada, Stantec
3. Background: Natural Resources Canada CanVec

Stantec

Project Location
Stephenville,
NL

Prepared by NW on 2023-04-28
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
121417233_058a

World Energy GH2
Project Nujio'qonik

Figure No.
6.6

Title
Sensitive Areas within the RAA

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6.3.3 Marine Commercial Fisheries

6.3.3.1 Overview

Commercial fishing vessels from Québec and the four Atlantic provinces operate in the Gulf and are managed through DFO regional offices. Licenses and quotas are set by DFO for individual species management areas and NAFO divisions and subdivisions. Commercial fishing is considered an important economic contributor for communities of western Newfoundland, including those located in proximity to the Project. Weather and ice conditions, availability of resources, fisheries licencing and management, and harvesting plans and preferences influence the timing of fishing activity in the Gulf (AMEC 2014).

Commercial fishery data sets that overlapped with the RAA (NAFO sub-divisions 4Rcd) were acquired from several sources. Fish harvest data for the RAA was acquired from the Economic Analysis and Statistics DFO (2023) dataset and are presented in Tables 6.9 and 6.10. Harvest data are provided by weight and value by species between 2011 and 2020. 4Rcd covers an area substantively more expansive than the LAA. However, general information on trends associated with the fishery for this division could provide insight and knowledge for the general region in which the Project will occur.

Commercial fisheries data was also obtained through the publicly available online Canada Marine Planning Atlas (Government of Canada 2023) to give a visual representation of where fishing occurs within the RAA. This data is presented in Figures 6.7 to 6.9 and 6.11 to 6.19. These figures illustrate the distribution and composite landings (kg) for several commercially important fish and shellfish species within 4Rcd between 2009 and 2018 for Atlantic herring, Atlantic mackerel, capelin, snow crab, witch flounder, Greenland halibut, redfish, Atlantic cod, and Atlantic halibut. The total weight (kg) of composite landings within 4Rcd between this time frame are summarized in Table 6.11 per species. The combined distribution and composite landings of these selected species are illustrated in Figure 6.7 and the use of fixed and mobile gear types are illustrated in Figures 6.8 and 6.9, respectively.

While the Canada Marine Planning Atlas and Economic Analysis and Statistics DFO information provided commercial fisheries data within the RAA / LAA, several data gaps were identified. These included the exclusion of commercially fished species (i.e., lobster within the Canada Marine Planning Atlas) and privacy screening within the datasets. To supplement the information that is publicly available, a data request was submitted to DFO. However, data were not provided due to confidentiality reasons.

Table 6.9 Fish Harvests by Weight (kg) – NAFO 4Rcd (2011-2020)

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
American Plaice	37,490	51,006	26,620	308	129	8,124	40,374	-	2,341	-	166,392
Capelin	5,912,739	5,507,840	-	-	1,308,877	581,869	199,830	2,556,846	3,519,735	2,245,423	21,833,159
Catfish (Striped /Wolffish)	3,152	165	-	-	-	-	43	258	-	-	3,618
Cod, Atlantic	213,507	166,710	247,534	148,284	139,273	151,812	30,657	195,330	66,116	83,498	1,442,721
Crab, Atlantic Rock	60,408	NA	NA	-	NA	NA	NA	-	NA	-	60,408
Crab, Queen/Snow	348,365	479,296	543,581	540,579	495,007	430,524	13,999,426	169,399	180,338	166,554	17,353,069
Cusk	-	-	-	NA	NA	NA	NA	NA	-	-	-
Eels	-	14,356	-	-	-	-	12,201	4,519	NA	NA	31,076
Greysole/Witch	-	-	-	-	-	-	19,832	-	-	-	19,832
Groundfish, Unspecified	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Haddock	-	-	-	-	-	-	570	-	-	-	570
Hake, White	3,734	4,048	864	123	60	6,318	42,019	36	287	3,753	61,242
Halibut – Atlantic	50,944	74,263	71,364	80,295	83,111	72,443	-	96,203	77,065	92,460	698,148
Heads, Groundfish	NA	825	NA	NA	NA	NA	NA	NA	-	NA	825
Herring, Atlantic	11,220,139	7,564,442	8,801,881	2,175,504	618,009	2,103,890	887,925	1,055,237	-	203,655	34,630,682
Lobster	471,899	500,525	520,386	553,710	686,284	722,309	769,732	1,031,571	900,847	1,388,218	7,545,481
Lumpfish	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Mackerel	1,562,517	-	-	1,200,220	262,737	1,240,884	598,114	-	NA	NA	4,864,472
Monkfish (American Angler)	473	-	-	-	-	-	19,766	-	1,270	-	21,509
Pollock	-	148	-	-	-	-	13,973	-	-	-	14,121
Redfish	2,208	8,939	1,117	-	-	4,436	3,497,272	-	-	147,288	3,661,260
Roe, Lumpfish	-	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Scallop, Sea	47,420	66,462	-	-	-	-	-	-	-	-	113,882
Sculpin	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Shark, Mako	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-
Shark, Porbeagle	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Shark, Unspecified	-	NA	NA	NA	NA	-	NA	NA	NA	NA	-
Shrimp, *Pandalus borealis*	-	58,640	-	-	NA	NA	2,243,041	-	NA	NA	2,301,681
Skate	937	-	-	NA	-	-	-	390	-	-	1,327
Smelts	NA	NA	-	NA	NA	NA	NA	NA	NA	NA	-
Squid, Illex/Shortfin	NA	-	NA	NA	NA	NA	NA	NA	-	-	-
Turbot/Greenland Halibut	306,547	251,054	8,006	936	72	50,717	906,470	-	-	-	1,523,802

Table 6.9 Fish Harvests by Weight (kg) – NAFO 4Rcd (2011-2020)

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Whelk	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-
Winter Flounder	176	-	NA	-	NA	NA	-	NA	NA	NA	176
Yellowtail Flounder	NA	NA	NA	-	-	NA	NA	NA	-	-	-
Total	**20,242,655**	**14,748,719**	**10,221,353**	**4,699,959**	**3,593,559**	**5,373,326**	**23,281,245**	**5,109,789**	**4,747,999**	**4,330,849**	**96,349,453**

Source: Economic Analysis and Statistics DFO 2023

Notes:

NA = no data available

"-" = no landings that year or is suppressed to meet confidentiality requirements specified within the *Statistics Act* and DFO policies.

Table 6.10 Fish Harvests by Value ($) – NAFO 4Rcd (2011 – 2020)

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
American Plaice	25,958	42,921	17,070	202	70	4,864	26,555	-	1,804	-	119,445
Capelin	1,055,865	1,177,844	-	-	366,473	214,228	62,533	958,269	3,259,074	1,381,138	8,475,424
Catfish (Striped /Wolffish)	1,369	58	-	-	-	-	9	69	-	-	1,505
Cod, Atlantic	249,007	188,910	303,594	207,713	161,933	196,434	47,818	283,306	90,241	121,273	1,850,227
Crab, Atlantic Rock	43,794	NA	NA	-	NA	NA	NA	-	NA	-	43,794
Crab, Queen/Snow	1,649,874	2,060,074	2,356,063	2,788,652	2,695,532	2,826,858	157,262,176	1,799,490	1,381,011	1,273,344	176,093,075
Cusk	-	-	-	NA	NA	NA	NA	NA	-	-	-
Eels	-	84,382	-	-	-	-	69,698	27,149	NA	NA	181,229
Greysole/Witch	-	-	-	-	-	-	25,392	-	-	-	25,392
Groundfish, Unspecified	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Haddock	-	-	-	-	-	-	595	-	-	-	595
Hake, White	3,058	2,978	616	110	62	6,289	39,543	34	219	4,516	57,425
Halibut – Atlantic	363,758	609,166	612,716	718,475	927,906	803,577	-	980,866	793,164	800,161	6,609,789
Heads, Groundfish	NA	1,442	NA	NA	NA	NA	NA	NA	-	NA	1,442
Herring, Atlantic	2,943,608	2,501,513	2,425,943	479,617	153,960	630,806	317,122	356,638	-	70,939	9,880,147
Lobster	4,079,419	4,472,811	4,175,331	4,580,300	8,011,302	9,032,029	11,946,014	14,074,265	8,910,959	13,779,360	83,061,789
Lumpfish	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Mackerel	1,543,222	-	-	653,570	123,956	730,427	394,265	-	NA	NA	3,445,440
Monkfish (American Angler)	275	-	-	-	-	-	25,720	-	1,401	-	27,397
Pollock	-	102	-	-	-	-	12,275	-	-	-	12,377
Redfish	1,574	8,590	938	-	-	2,981	3,194,201	-	-	161,286	3,369,570
Roe, Lumpfish	-	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Scallop, Sea	88,165	131,783	-	-	-	-	-	-	-	-	219,948
Sculpin	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Shark, Mako	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-
Shark, Porbeagle	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	-
Shark, Unspecified	-	NA	NA	NA	NA	-	NA	NA	NA	NA	-
Shrimp, *Pandalus borealis*	-	101,881	-	-	NA	NA	5,412,878	-	NA	NA	5,514,759
Skate	230	-	-	NA	-	-	-	100	-	-	329
Smelts	NA	NA	-	NA	NA	NA	NA	NA	NA	NA	-
Squid, Illex/Shortfin	NA	-	NA	NA	NA	NA	NA	NA	-	-	-
Turbot/Greenland Halibut	740,539	682,604	24,022	2,938	276	192,182	3,406,420	-	-	-	5,048,980

Table 6.10 Fish Harvests by Value ($) – NAFO 4Rcd (2011 – 2020)

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Whelk	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-
Winter Flounder	77	-	NA	-	NA	NA	-	NA	NA	NA	77
Yellowtail Flounder	NA	NA	NA	-	-	NA	NA	NA	-	-	-
Total	**12,789,792**	**12,067,059**	**9,916,294**	**9,431,577**	**12,441,470**	**14,640,676**	**182,243,213**	**18,480,186**	**14,437,873**	**17,592,017**	**304,040,157**

Source: Economic Analysis and Statistics DFO 2023

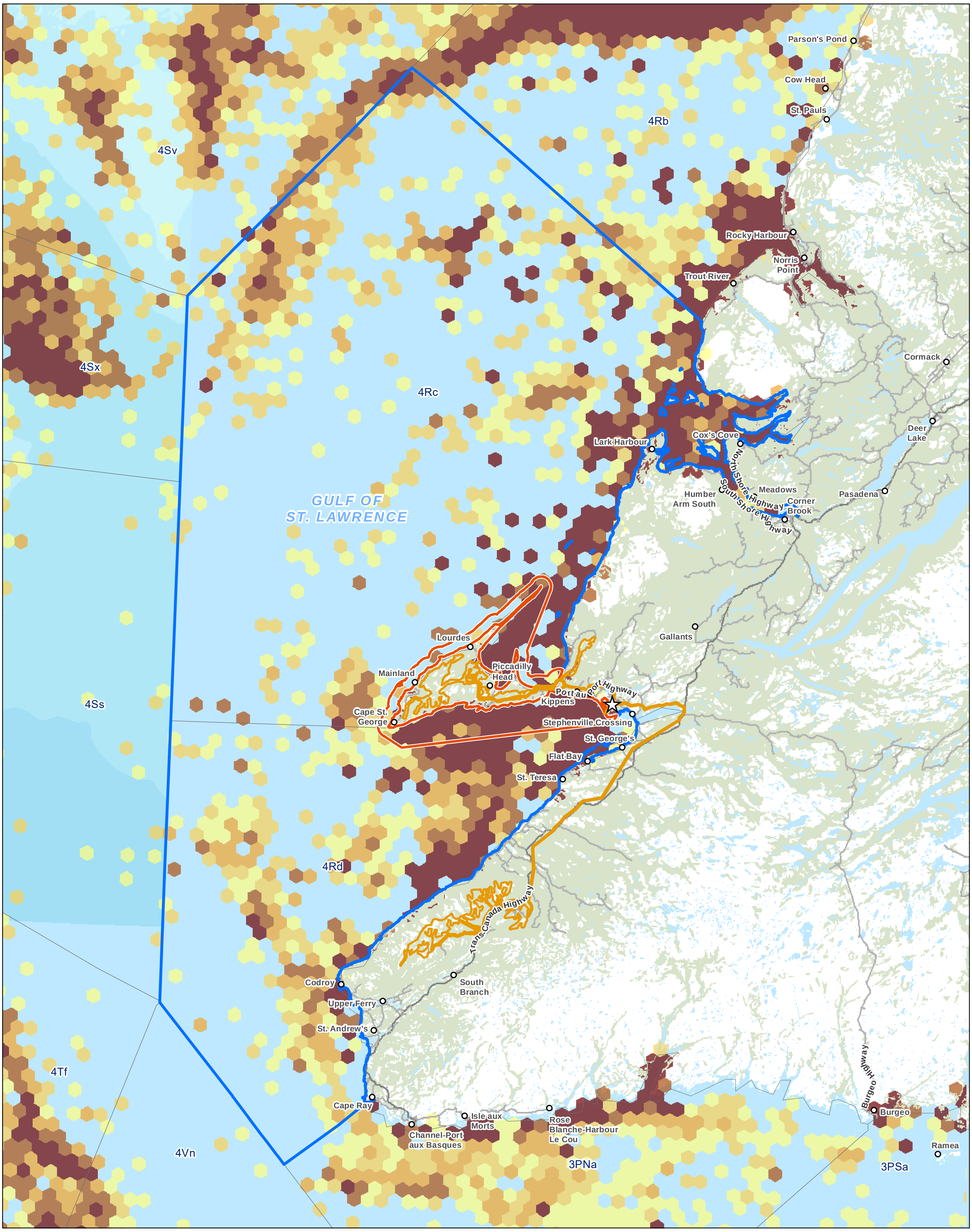
Notes:

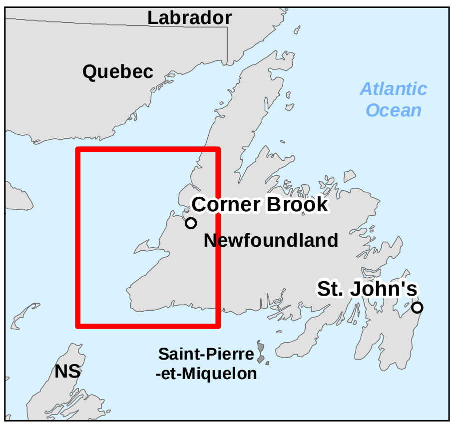
NA = no data available
"-" = no landings that year or is suppressed to meet confidentiality requirements specified within the *Statistics Act* and DFO policies.

Table 6.11 Total Weight (kg) of Composite Landings within 4Rcd for Selected Species Between 2009-2018 Atlas (Government of Canada 2023)

Species	Total Weight (kg)
Atlantic Herring	47,310,338
Atlantic Mackerel	26,516,900
Capelin	16,731,142
Snow Crab	2,263,440
Witch Flounder	1,998,079
Greenland Halibut	869,427
Redfish	635,587
Atlantic Cod	420,446
Atlantic Halibut	128,766

Additionally, data derived from the vessel monitoring system and commercial logbook data sources were used to illustrate the cumulative fishing effort intensity (all fisheries) between 2005 and 2019 within 4Rcd (Government of Canada 2022; Figure 6.10).





Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 1500
- 🟨 1500 - 5000
- 🟧 5000 - 15 000
- 🟫 15 000 - 45 000
- 🟥 > 45 000

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- 🟧 Project Area
- 🟥 Local Assessment Area
- 🟦 Regional Assessment Area
- ☐ NAFO Unit

0 20 40 km

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Figure No.
6.7

Title
Commercial Fishing of All Species, 2009-2018

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: CanVec; NRCAN

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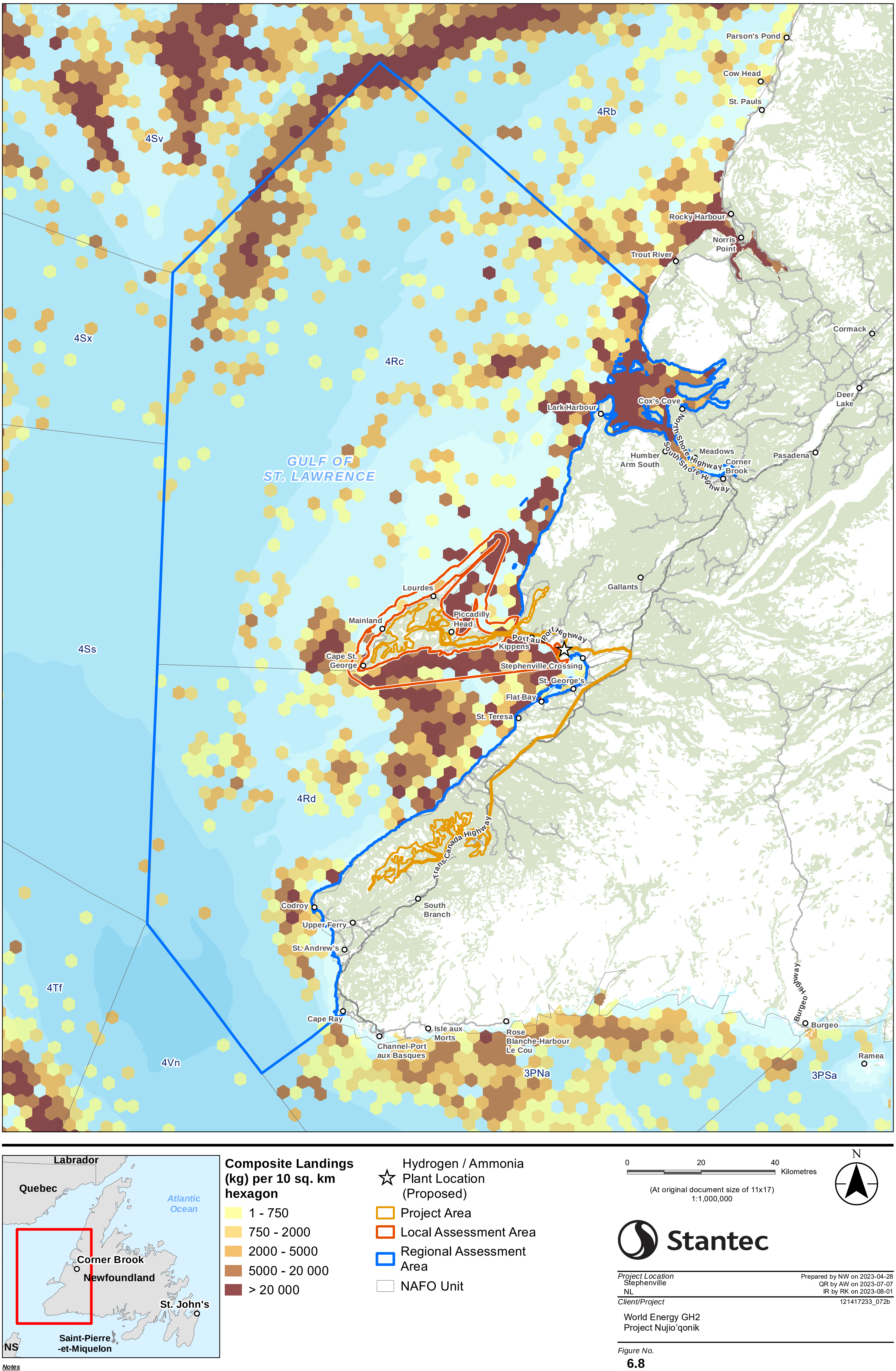

Composite Landings (kg) per 10 sq. km hexagon

- 1 - 750
- 750 - 2000
- 2000 - 5000
- 5000 - 20 000
- > 20 000

☆ Hydrogen / Ammonia Plant Location (Proposed)

- Project Area
- Local Assessment Area
- Regional Assessment Area
- NAFO Unit

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Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

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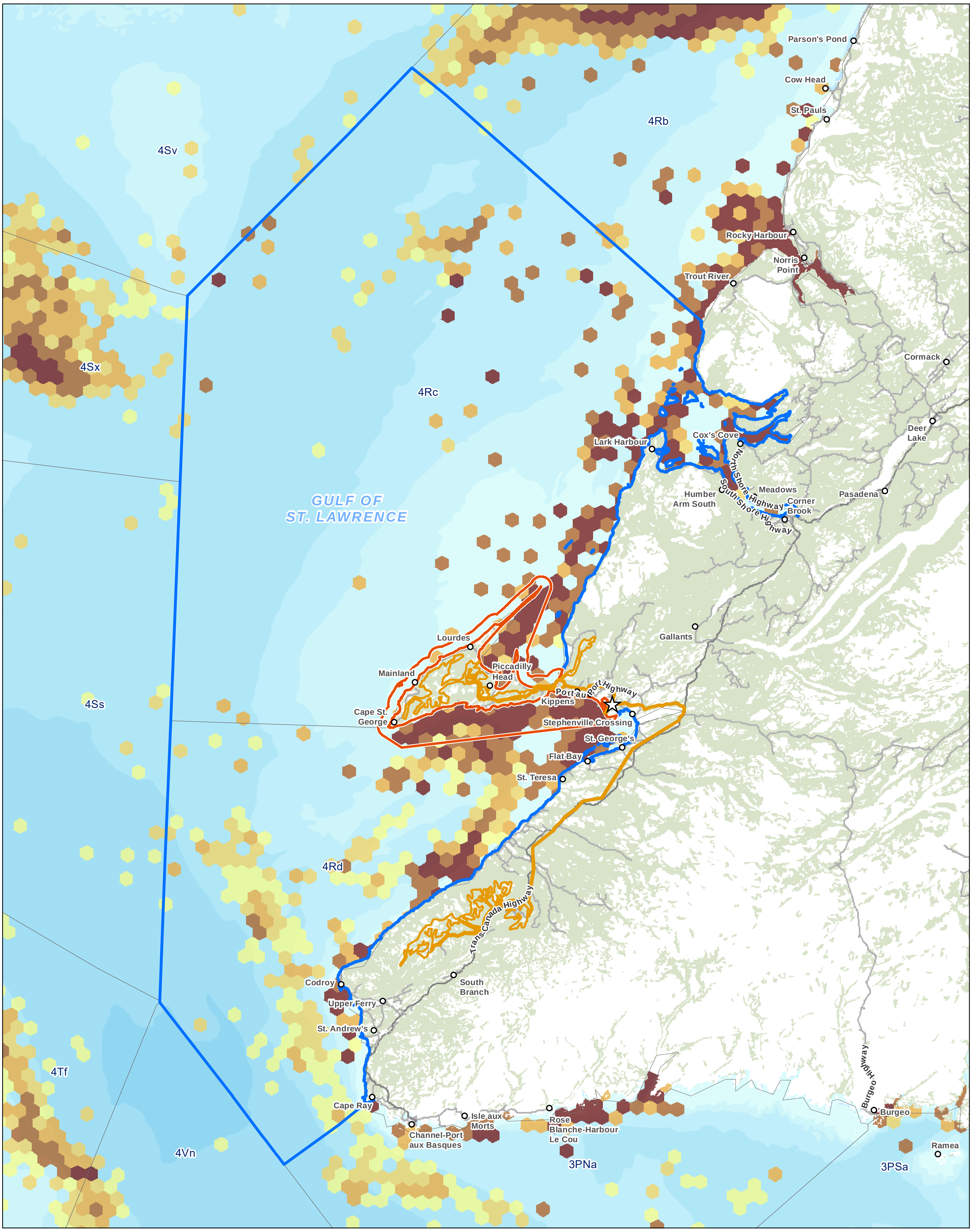
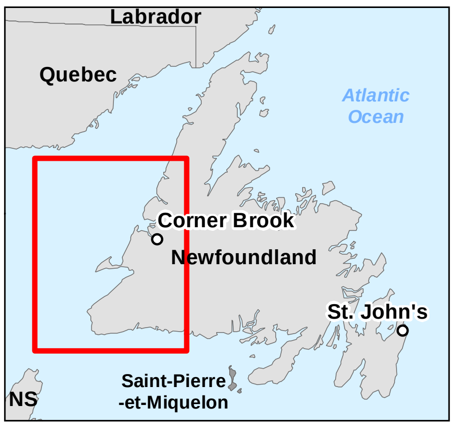
Figure No.
6.8

Title
Commercial Fishing of Fixed Gear Type, 2009-2018





Composite Landings (kg) per 10 sq. km hexagon

🟨	1 - 3750
🟨	3750 - 14 000
🟧	14 000 - 45 000
🟫	45 000 - 162 500
🟥	> 162 500

☆	Hydrogen / Ammonia Plant Location (Proposed)
☐	Project Area
☐	Local Assessment Area
☐	Regional Assessment Area
☐	NAFO Unit

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Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador;
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Figure No.
6.9

Title
Commercial Fishing of Mobile Gear Type, 2009-2018

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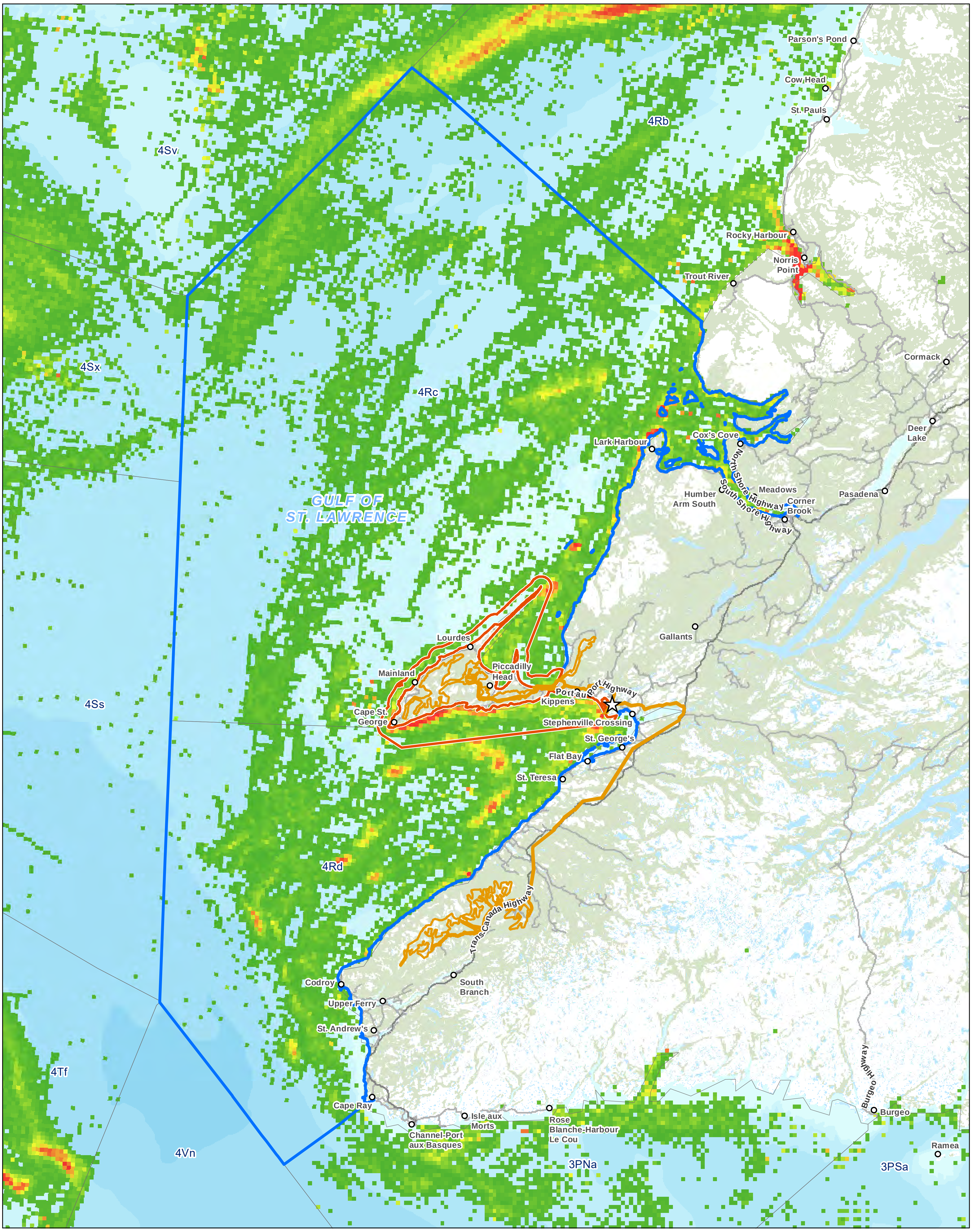

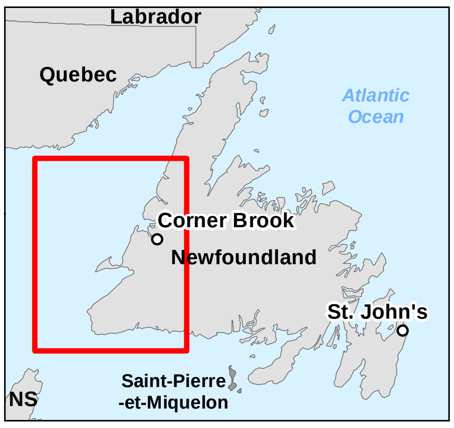

Cumulative Fishing Activity Intensity 2005-2019

Lowest Intensity

Highest Intensity

☆ Hydrogen / Ammonia Plant Location (Proposed)

▢ Project Area

▢ Local Assessment Area

▢ Regional Assessment Area

▢ NAFO Unit

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Figure No.
6.10

Title
Cumulative Fishing Effort Intensity within 4Rcd (2005-2019)

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador; NRCan CanVec
3. Background: NRCan CanVec

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6.3.3.2 Atlantic Herring

The 4R herring fishery on the west coast of Newfoundland has been around for 150 years, leading to the establishment of communities in Port au Port, Bay of Islands, and Bonne Bay (DFO 2021d). The fishery is divided into spring and fall spawning areas, with commercial fleets targeting spawning concentrations. St. George's Bay is a major spawning area for spring spawning herring. The season usually begins in spring and continues until December, depending on weather, sea ice conditions, and industry recommendations to DFO. The fixed gear herring fishery is competitive and uses gill nets, traps, bar seines, and tuck seines. The mobile gear fleet is composed of <65' and >65' purse seine vessels. The 4R herring fishery is considered the most stable herring fishery in Atlantic Canada over the past 50 years (DFO 2021d).

For the 2023-2024 season, the annual total allowable catch (TAC) for 4R is maintained at 20,000 metric tonnes (t). However, to protect and rebuild spring spawning grounds, the commercial fishery inside the 50-fathom contour is limited to 2,000 t prior to July 1 (DFO 2022a). According to the Canada Marine Planning Atlas, Atlantic herring had the highest total weight (kg) of composite landings within 4Rcd between 2009 and 2018 (Table 6.9; Figure 6.11).

6.3.3.3 Atlantic Mackerel

Atlantic mackerel is a transboundary marine fish species found in both the Northeast and Northwest Atlantic Oceans (DFO 2022b). The Northwest Atlantic population is composed of two spawning groups: southern (U.S.) and northern (Canadian). During June and July, the northern group spawns in the southern Gulf of St. Lawrence followed by a migration into U.S. waters to mix with the southern spawning group during late fall and winter. The northern spawning group supports commercial, bait, recreational, and Indigenous FSC fisheries in Canada, including in NAFO subregion 4Rcd.

The commercial mackerel fishery within the Gulf and surrounding areas, occurs mainly inshore with most landings occurring between June and October (DFO 2022b). Fishing gear used includes gillnets, jiggers, handlines, seines, traps, and weirs.

Newfoundland has seen a large increase in landings since the 1990s, with an average of 40,498 t from 2000 to 2010. This was followed by a large drop in landings in 2015 that was determined to be in part due to overfishing, the age structure collapsing, and fishing mortality (DFO 2022b). As a result, DFO has stopped the commercial and bait fisheries for Atlantic mackerel throughout Atlantic Canada and Quebec to allow the stock to rebuild, with an update expected following the Atlantic mackerel stock assessment in 2023 (DFO 2022c). Prior to the moratorium, mackerel landings within 4Rcd were relatively high between 2009 and 2018, compared to other commercially fished species available in the Canada Marine Planning Atlas database (Table 6.9; Figure 6.12).

6.3.3.4 Capelin

The commercial capelin fishery in 4RST dates back over 100 years ago where capelin was historically used for several purposes including agriculture fertilizer, bait, and for human and animal consumption (DFO 2021e). Today, the 4RST capelin fishery is managed through a single TAC for both mobile gear and fixed gear fisheries. Mobile gear fleet is made up of <65' and >65' purse seine vessels, with the latter being a more competitive fishery. The fixed gear fishery, which occurs in specific areas or bays, uses traps and tuck seines. The number of capelin landings in 4RST has varied over the past decade or more, from a peak of 12,300 t in 2011 to roughly 1,965 t in 2017. Overall, higher landings are reported in the NL region compared to Quebec-based and Gulf-based fish harvesters (DFO 2021e).

For the 2023 fishing season, the TAC for 4R was set at 8,805.37 t between mobile and fixed fisheries (DFO 2023a). The season opening dates vary by area and fleet and are determined based on industry recommendations to DFO. According to the data available in the Canada Marine Planning Atlas database, Capelin were third highest in total composite landings (kg) between 2009 and 2018 in 4Rcd (Table 6.9; Figure 6.13).

6.3.3.5 Snow Crab

The 4R snow crab fishery first began as a small-scale operation in Bay St. George and Bay of Islands in the late 1980s, with substantial landings taking place in the early 1990s (DFO 2019c). Today, the snow crab fishery in the province is primarily a commercial fishery with some FSC fishing. Fleets of conical baited traps with a mesh size of 65mm is used to allow undersized crab to escape. The snow crab fishing season typically runs between early April until mid-June to late July in Newfoundland, with variances among fishing areas and fleets (DFO 2019c).

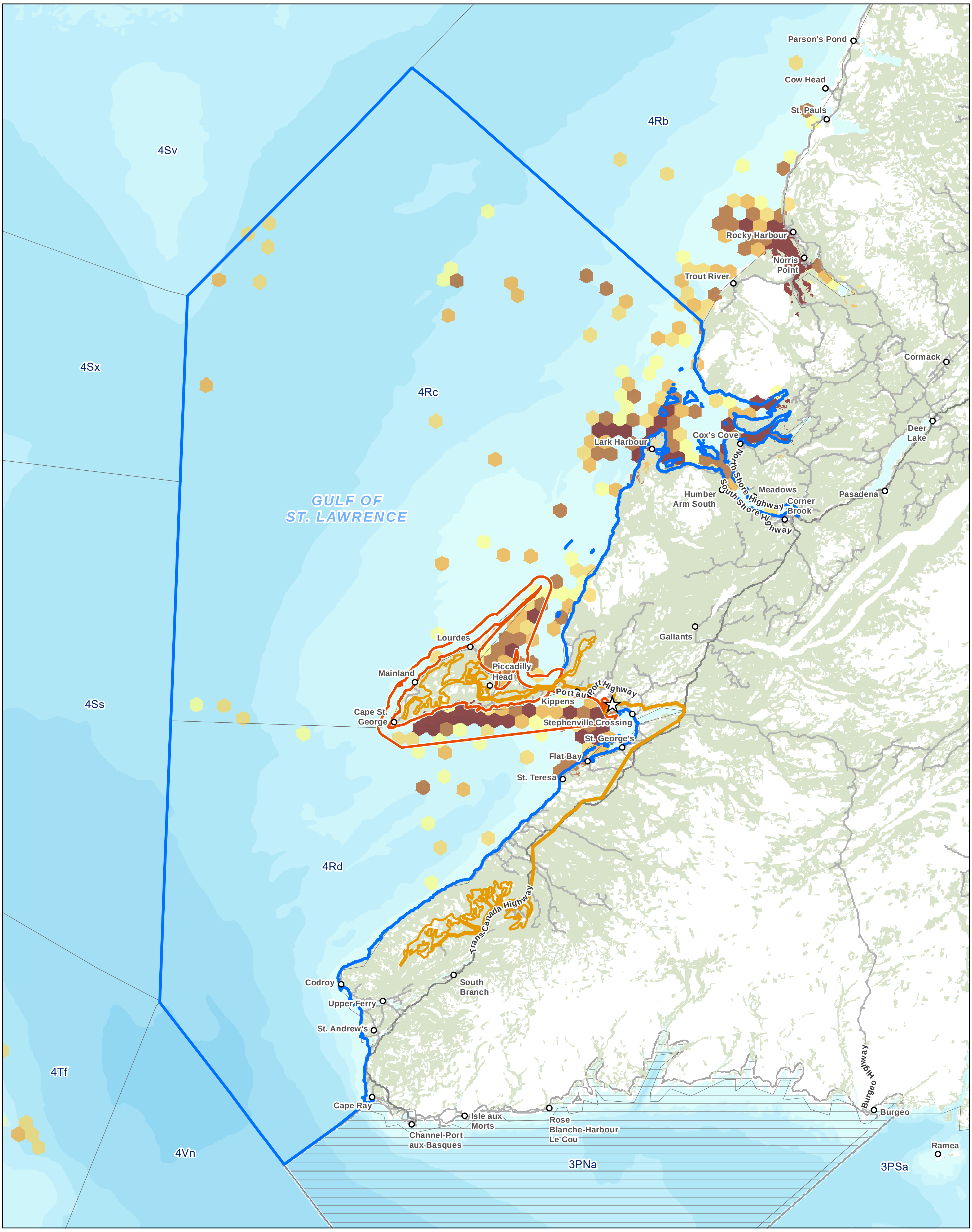
In 2023, the fishing season dates for 4R3Pn were set between April 10 and June 15 (DFO 2023b) and extended to June 30 for fishing grounds close to the Project (DFO 2023c). The TAC for the province was set at 54,727 t with 613 t being allocated to 4R3Pn for inshore and commercial quotas (DFO 2023b). Total composite landings within 4Rcd for snow crab were around 2.2 million (kg) between 2009 and 2018 (Table 6.9; Figure 6.14).

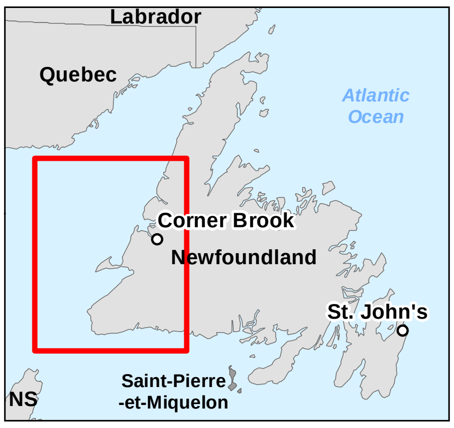
6.3.3.6 Groundfish

The groundfish fishery within the Gulf of St. Lawrence involves 10 groundfish stocks (DFO 2017). Several of these stocks are found within NAFO division 4R: Atlantic cod (Northern Gulf stock), Atlantic halibut, Greenland halibut (turbot), witch flounder, and redfish (deepwater and Acadian redfish species).

Historically, the groundfish fishery in Atlantic Canada has experienced major declines in stocks, most notably the cod fishery which resulted in a moratorium on the Northern cod fishery in 1992 (DFO 2017). This was followed by several closures of major stocks for several groundfish, including cod and haddock. Gulf stocks have continued to see declines in recent years, leading to reductions in TAC levels for groundfish species and fisheries moratoria including the Southern Gulf cod fishery in 2009 and the Northern Gulf cod fishery in 2022 (DFO 2017; 2022e). Several Gulf stocks have also been designated as a SAR under COSEWIC including both species of redfish, Northern and Southern Gulf cod stocks, and American Plaice (Table 6.7).

Groundfish fisheries in the Gulf use either mobile gear (otter trawls and Danish/Scottish seines) or fixed gear (gillnets, longlines, and handlines), where mobile gear is banned for fishing cod within the RAA. TACs and fishing season dates can vary by species, fishing area, and gear types (DFO 2017). To help protect cod spawning activity within 4Rcd (St. George's Bay and Port au Port Bay), groundfish fishing is closed from April 1 to June 23 each year (DFO 2023d). Groundfish fishing activity between 2009 and 2018 is illustrated in Figures 6.15-6.19. Based on data from the Canada Marine Planning Atlas, groundfish fisheries are historically lower in composite landings (kg) compared to Atlantic herring, Atlantic mackerel, capelin, and snow crab (Table 6.9).





Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 30 000
- 🟨 30 000 - 75 000
- 🟧 75 000 - 170 000
- 🟫 170 000 - 425 000
- 🟥 > 425 000
- ▭ Privacy Screened Area

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- ▭ Project Area
- ▭ Local Assessment Area
- ▭ Regional Assessment Area
- ▭ NAFO Unit

0 20 40 Kilometres

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Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

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Figure No.
6.11

Title
Commercial Fishing of Atlantic Herring, 2009-2018

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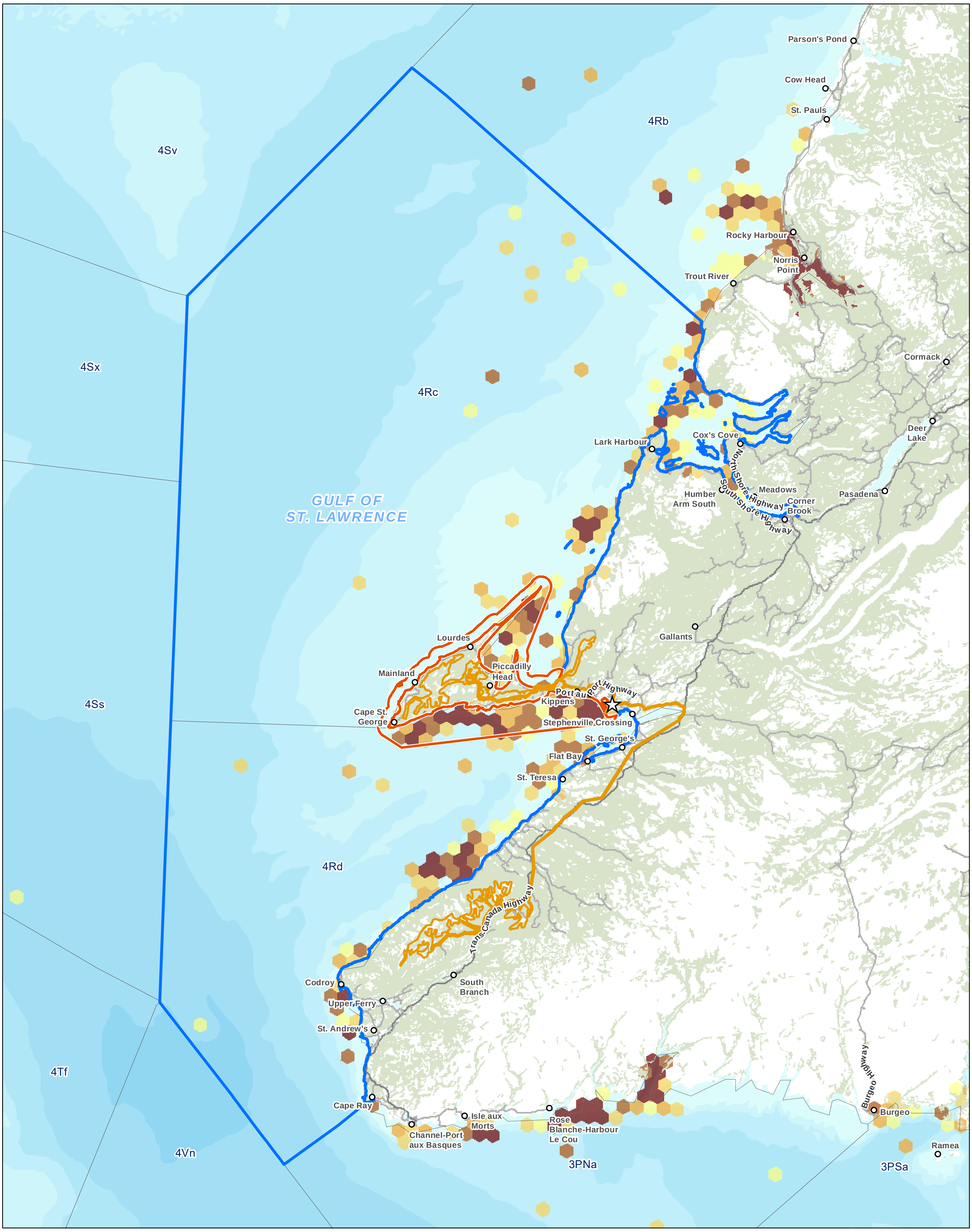

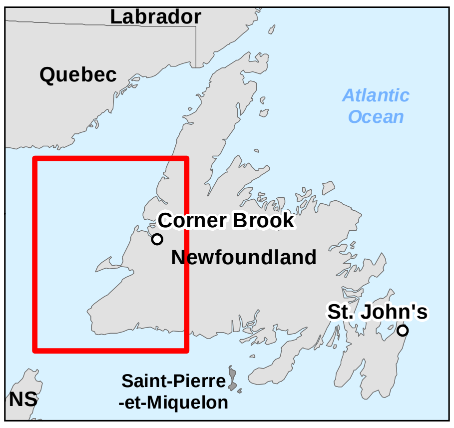

Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 27 500
- 🟨 27 500 - 57 500
- 🟧 57 500 - 120 000
- 🟫 120 000 - 240 000
- 🟥 > 240 000

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- ☐ Project Area
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0 20 40 Kilometres

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Figure No.
6.12

Title
Commercial Fishing of Mackerel, 2009-2018

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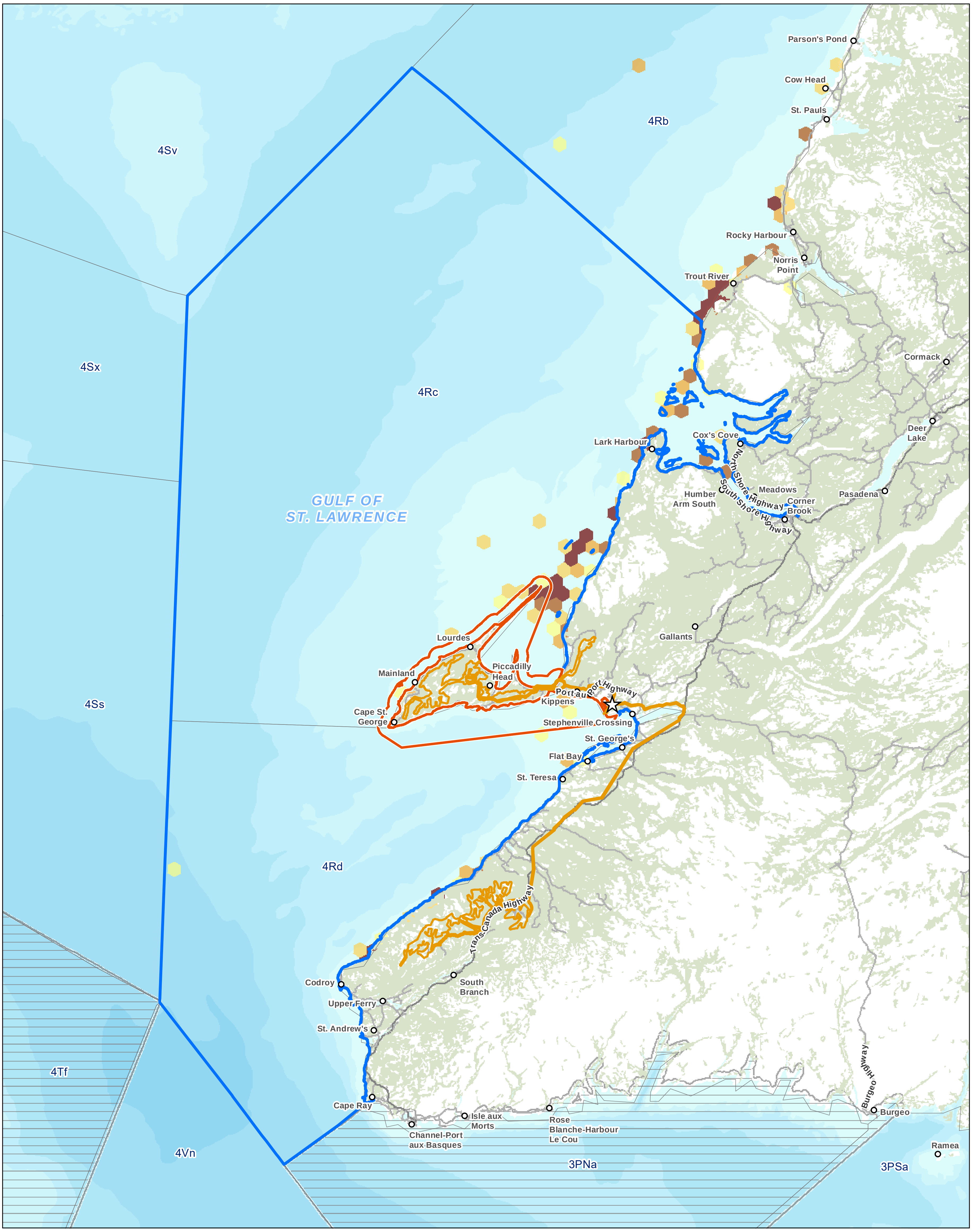

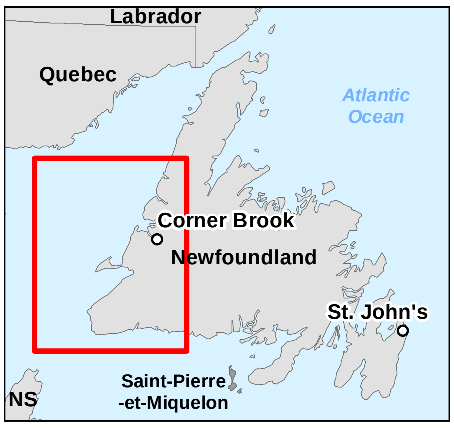

Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 30 000
- 🟨 30 000 - 60 000
- 🟧 60 000 - 120 000
- 🟫 120 000 - 300 000
- 🟥 > 300 000
- ▨ Privacy Screened Area

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- 🟧 Project Area
- 🟥 Local Assessment Area
- 🟦 Regional Assessment Area
- ☐ NAFO Unit

0 20 40 Kilometres

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Notes
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3. Background: NRCan; CanVec

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Figure No.
6.13

Title
Commercial Fishing of Capelin, 2009-2018

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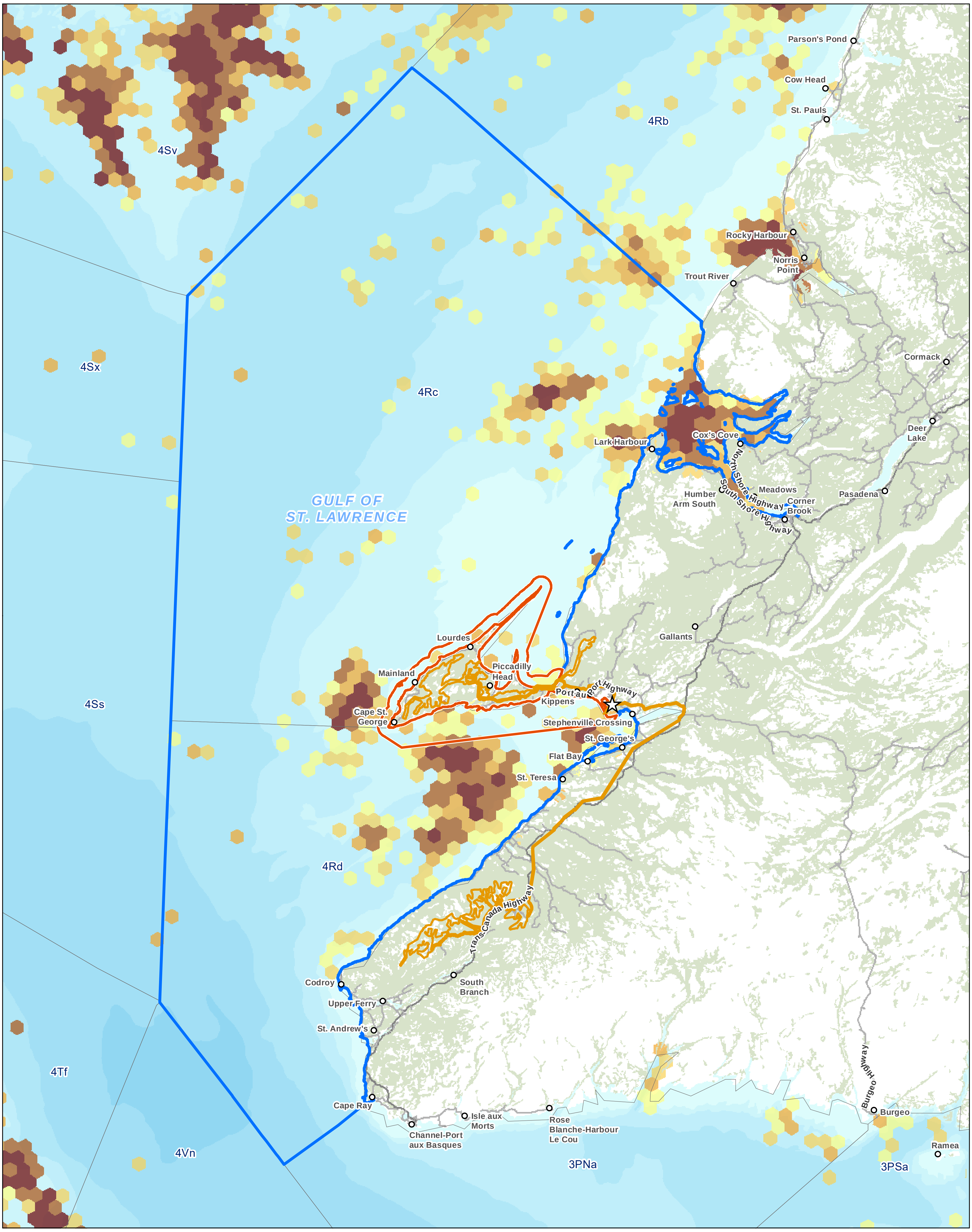

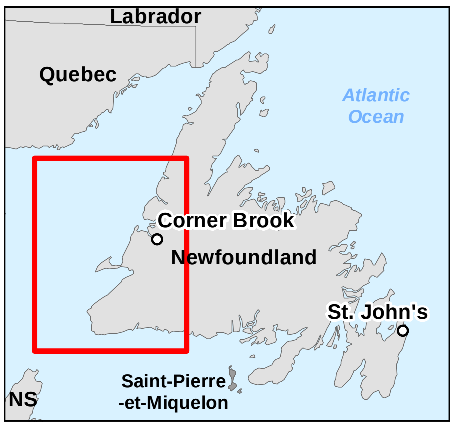

Composite Landings (kg) per 10 sq km. hexagon

- 🟨 1 - 600
- 🟨 601 - 2000
- 🟧 2000 - 5000
- 🟫 5000 - 20 000
- 🟥 > 20 000

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- 🟧 Project Area
- 🟥 Local Assessment Area
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- ☐ NAFO Unit

0 20 40 Kilometres

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Figure No.
6.14

Title
Commercial Fishing of Queen Snow Crab, 2009-2018

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

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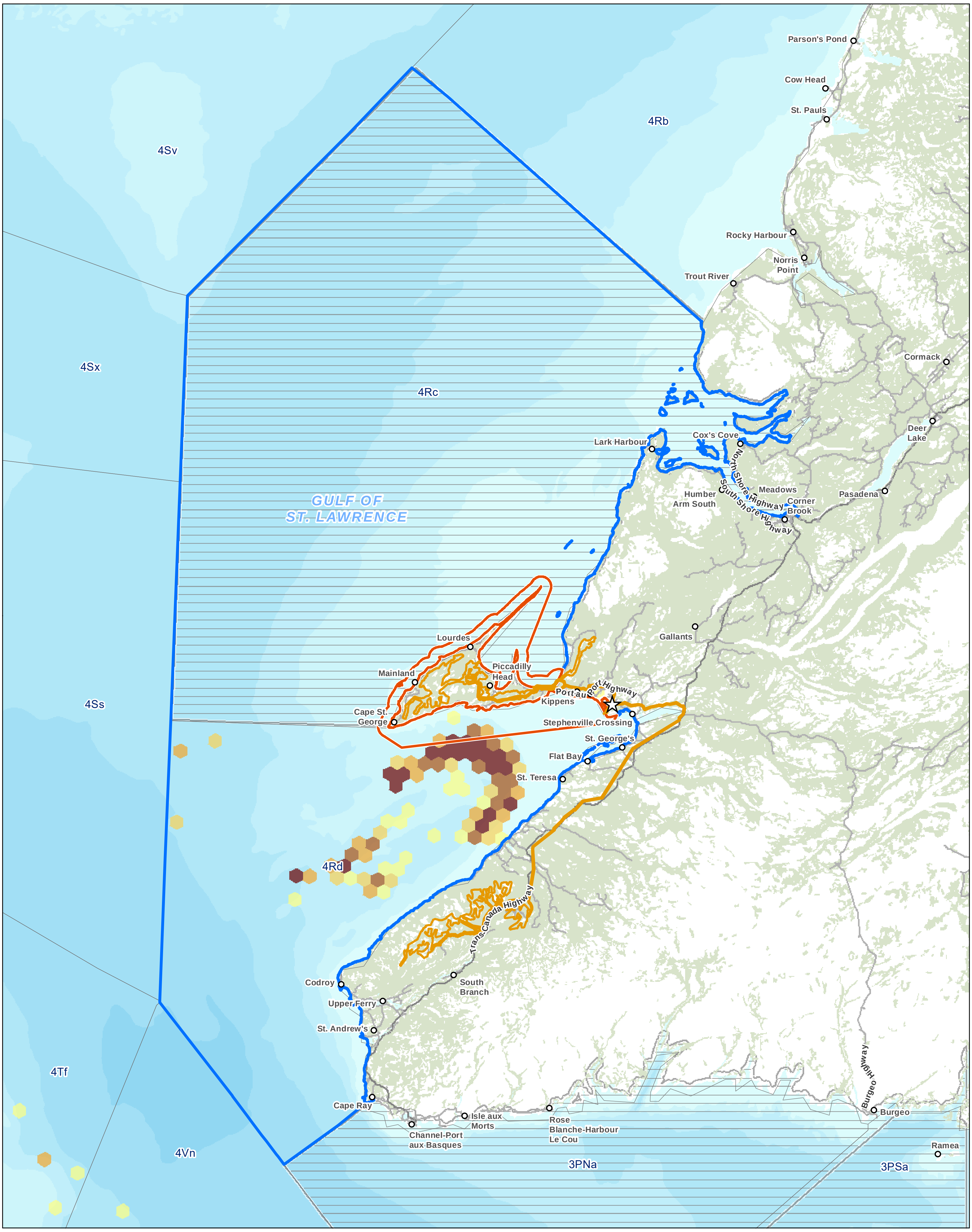

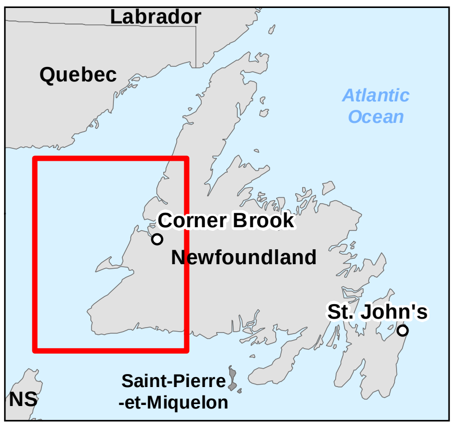

Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 800
- 🟨 800 - 3000
- 🟧 3000 - 9500
- 🟫 9500 - 30 000
- 🟥 > 30 000
- ▭ Privacy Screened Area

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- 🟧 Project Area
- 🟥 Local Assessment Area
- 🟦 Regional Assessment Area
- ☐ NAFO Unit

0 20 40 Kilometres

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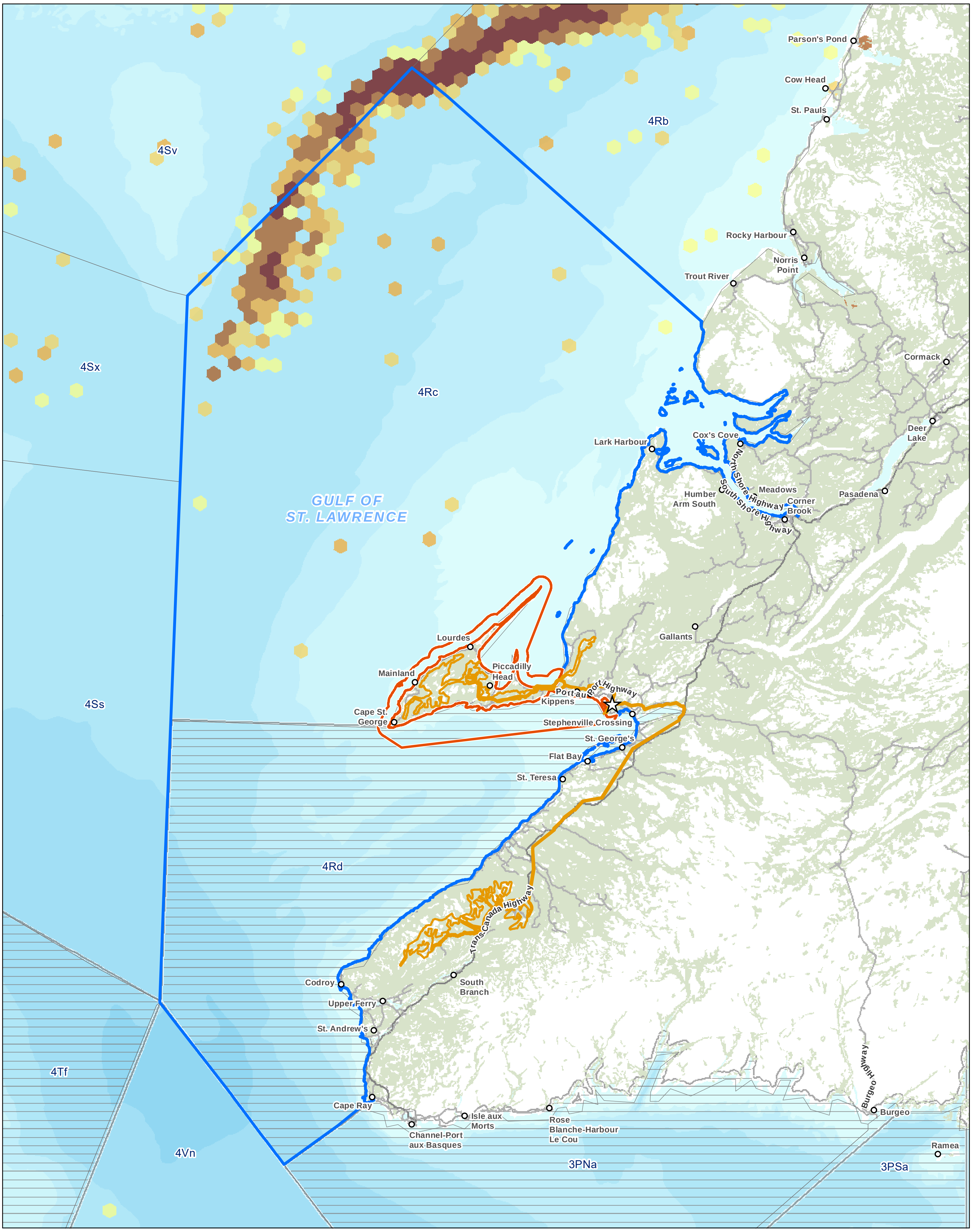
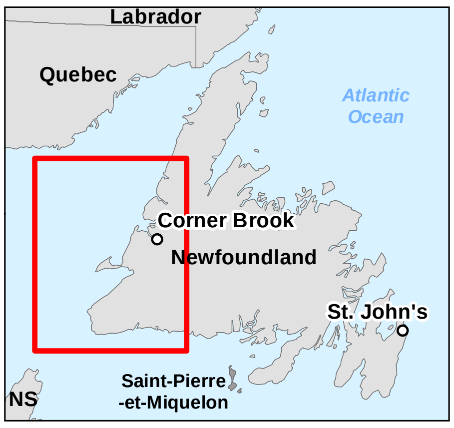
Figure No.
6.15

Title
Commercial Fishing of Witch Flounder, 2009-2018

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Marine\121417233_072j_Marine_Comm_Fish_Witch_Flounder_REVA.mxd Revised: 2023-08-02 By: schubbs





Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 1200
- 🟨 1200 - 3000
- 🟧 3000 - 8000
- 🟫 8000 - 20 000
- 🟥 > 20 000
- ▭ Privacy Screened Area

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- 🟧 Project Area
- 🟥 Local Assessment Area
- 🟦 Regional Assessment Area
- ☐ NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
1:1,000,000

N

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

Project Location
Stephenville
NL

Prepared by NW on 2023-04-28
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
121417233_072I

World Energy GH2
Project Nujio'qonik

Figure No.
6.16

Title
Commercial Fishing of Greenland Halibut, 2009-2018

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Marine\121417233_072I_Marine_Comm_Fish_Greenland_Halibut_REVA.mxd Revised: 2023-08-02 By: schubbs

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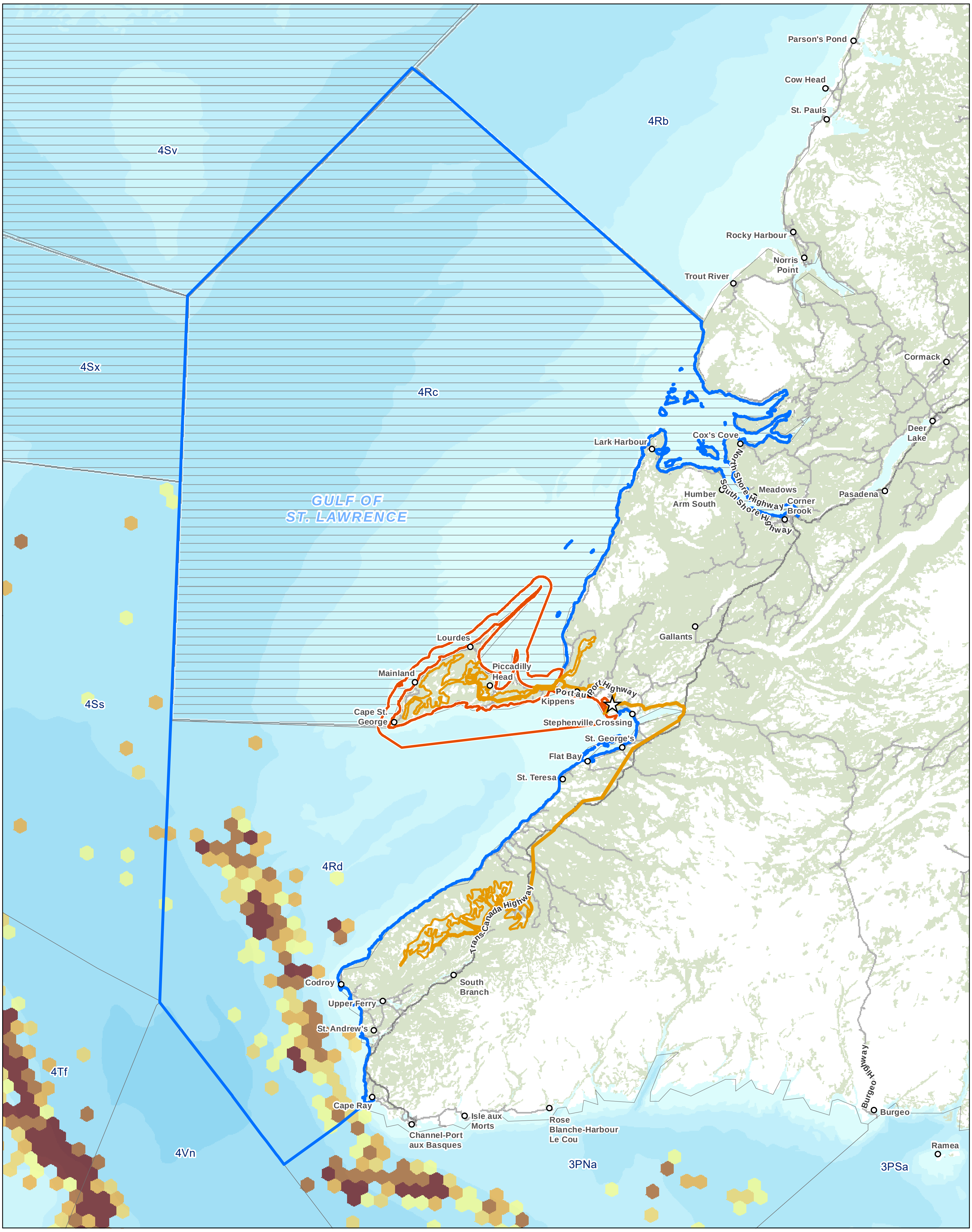

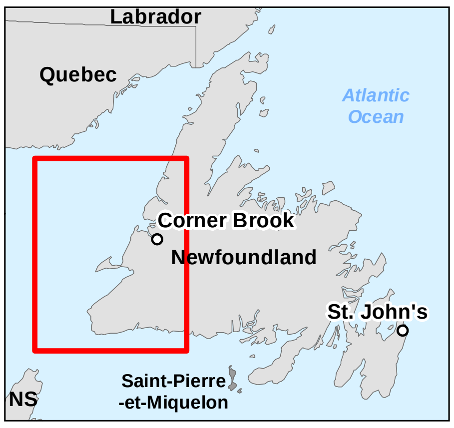

Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 750
- 🟨 750 - 2500
- 🟧 2500 - 5500
- 🟫 5500 - 14 000
- 🟥 > 14 000
- □ Privacy Screened Area

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- □ Project Area
- □ Local Assessment Area
- □ Regional Assessment Area
- □ NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
1:1,000,000

N

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Project Location
Stephenville
NL

Prepared by NW on 2023-04-28
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
121417233_072m

World Energy GH2
Project Nujio'qonik

Figure No.
6.17

Title
Commercial Fishing of Redfish, 2009-2018

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

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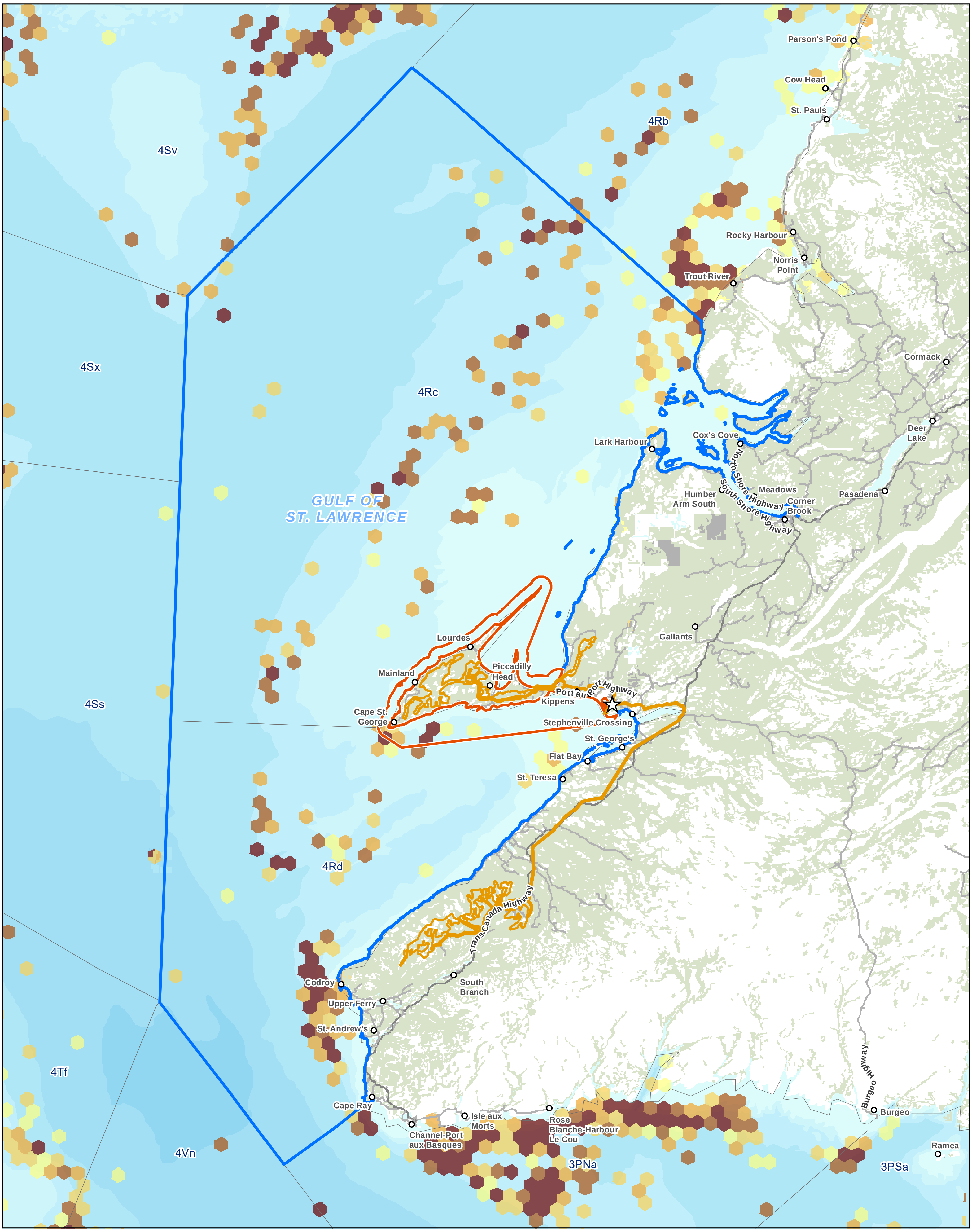

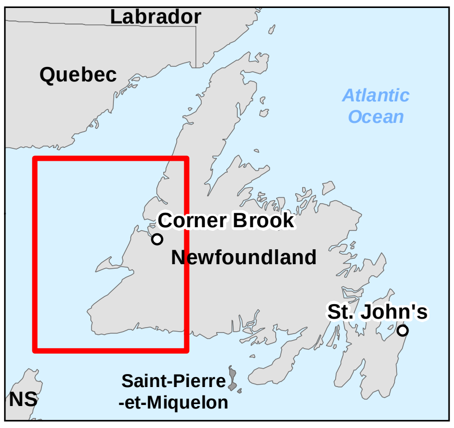

Composite Landings (kg) per 10 sq. km hexagon

- 🟨 1 - 350
- 🟨 351 - 1000
- 🟧 1001 - 2000
- 🟫 2001 - 3500
- 🟥 > 3500

- ☆ Hydrogen / Ammonia Plant Location (Proposed)
- ☐ Project Area
- ☐ Local Assessment Area
- ☐ Regional Assessment Area
- ☐ NAFO Unit

0 20 40
Kilometres

(At original document size of 11x17)
1:1,000,000

N

Stantec

Project Location
Stephenville
NL

Prepared by NW on 2023-04-28
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IR by RK on 2023-08-01

Client/Project
121417233_072f

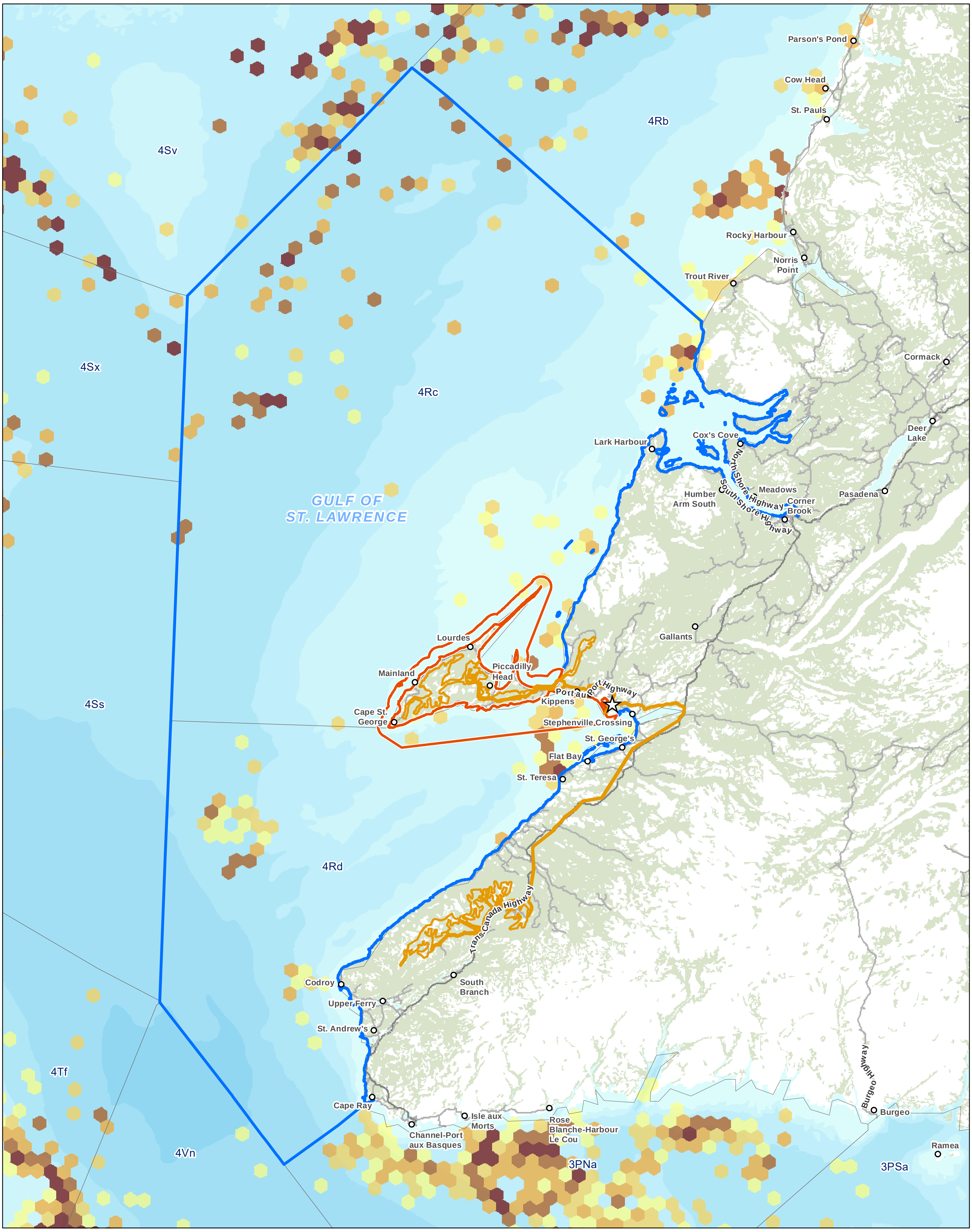
World Energy GH2
Project Nujio'qonik

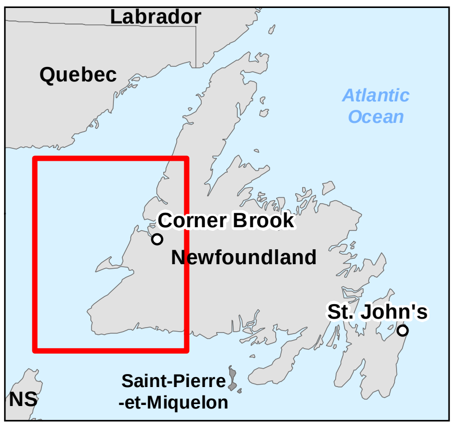
Figure No.
6.18

Title
Commercial Fishing of Atlantic Cod, 2009-2018

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Marine\121417233_072f_Marine_Comm_Fish_Atlantic_Cod_REVB.mxd Revised: 2023-08-02 By: schubbs





Composite Landings (kg) per 10 sq. km hexagon

- 1 - 350
- 351 - 750
- 751 - 1500
- 1501 - 3000
- > 3000

☆ Hydrogen / Ammonia Plant Location (Proposed)

- Project Area
- Local Assessment Area
- Regional Assessment Area
- NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
1:1,000,000

N

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Fisheries and Oceans Canada Statistical Services; WorldEnergy GH2; Province of Newfoundland and Labrador
3. Background: NRCan; CanVec

Stantec

Project Location
Stephenville
NL

Prepared by NW on 2023-04-28
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
121417233_072g

World Energy GH2
Project Nujio'qonik

Figure No.
6.19

Title
Commercial Fishing of Atlantic Halibut, 2009-2018

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\Marine\121417233_072g_Marine_Comm_Fish_Atlantic_Halibut_REVB.mxd Revised: 2023-08-02 By: schubbs

6.3.4 Marine Recreational Fisheries

Marine recreational fisheries exist for groundfish species through the annual NL recreational groundfish fishery. This is regulated by DFO through the *Fisheries Act* and is only permitted in designated NAFO Divisions, including in the RAA (NAFO Subdivision 4Rcd). Residents, non-residents, and tour boat operators are permitted to participate. Recreational fishers are prohibited from keeping sharks, Atlantic halibut, spotted wolffish, and northern wolffish. Permittable fishing gear is limited to angling gear, handlines with a maximum of three hooks, and traditional jiggers that are modified with one hook. Fishing is only allowed from one hour before sunrise to one hour after sunset for safety concerns (DFO 2022d).

In 2022, the recreational groundfish fishery season was opened for a total of 39 days on specified dates in the summer and fall months (DFO 2022d). The 2022 recreational groundfish fishery season started on July 2, 2022, and ended on October 2, 2022. Licences or tags were not required and individual retention limits were set at five groundfish per day (including cod) with maximum boat limit of 15 groundfish (with three or more people). Tour boat operators were also able to apply for a licence to seek an increased trip limit.

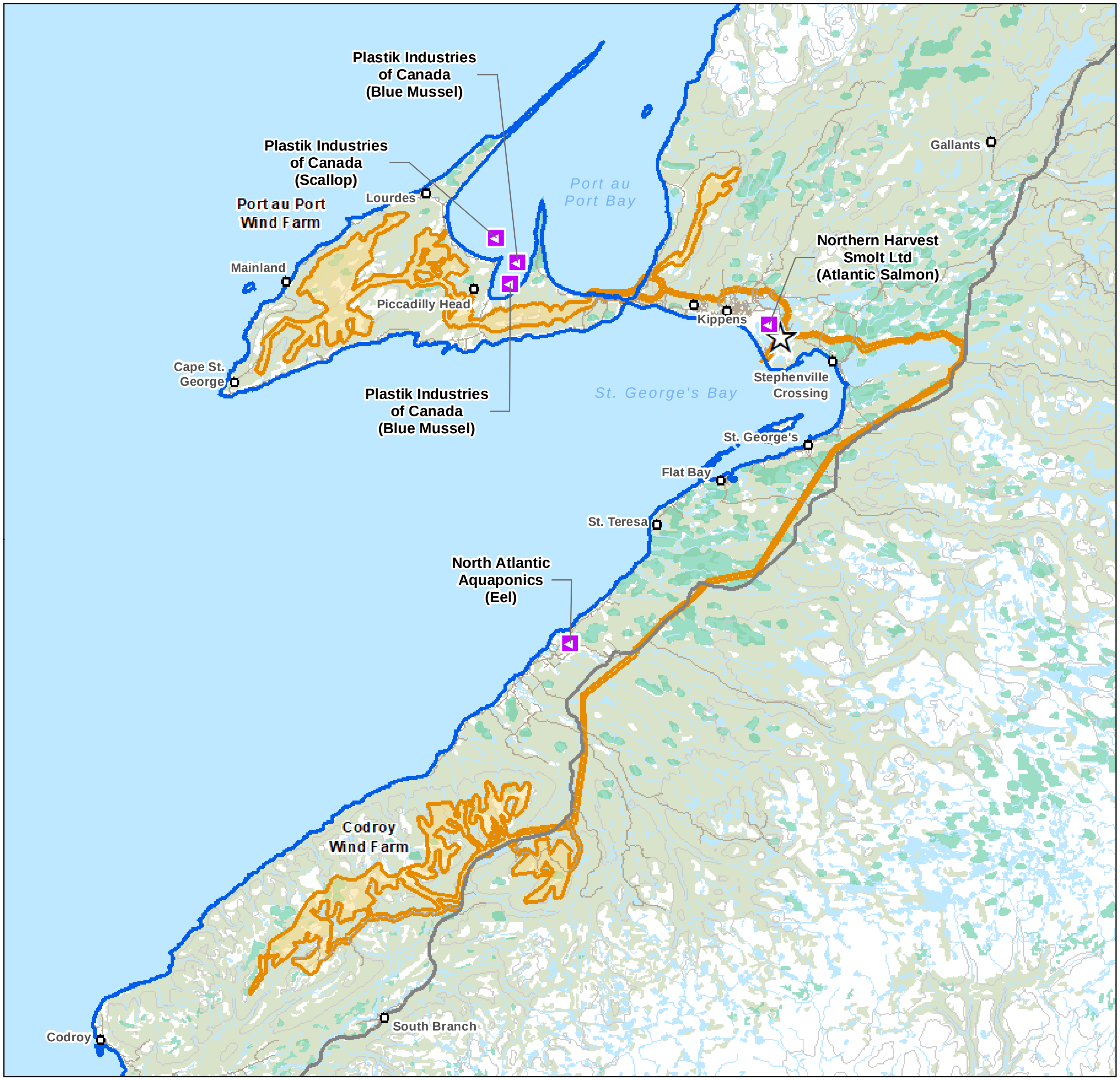
6.3.4.1 LRU Survey Results

The LRU survey included questions about marine fish and aquatic harvesting and consumption in or around Port au Port Bay, Bay St. George (a.k.a. St. George's Bay), and within or near the Port of Stephenville. Relevant survey results are summarized in Appendix F.

6.3.5 Aquaculture

6.3.5.1 Overview of Facilities

Aquaculture activity in western Newfoundland waters is limited compared to other parts of the Island. Three marine-based aquaculture farms are situated in Piccadilly Bay along the coast of Port au Port Peninsula (Figure 6.20). The three sites harvest shellfish (one sea scallop and two blue mussel) and are owned by the same company, Plastik Industries of Canada Ltd.



Stantec

◀ Aquaculture Site

□ Regional Assessment Area

Proposed Project Features

□ Project Area

☆ Hydrogen / Ammonia Plant Location

Other Features

— Trans-Canada Highway

— Road

— Contour (100 m)

— Watercourse

▨ Waterbody

▨ Forested Area

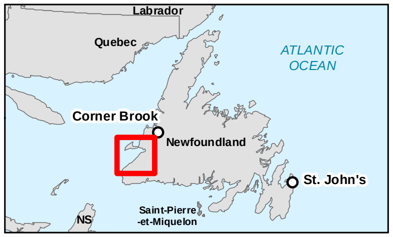
N

0 10 20 km

(At original document size of 8.5x11)
1:600,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2, NRCan CanVec, OpenStreetMap
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-07-24
QR by AW on 2023-08-01
IR by RK on 2023-08-01

Client/Project
World Energy GH2
Project Nujio'qonik

121417233_048b

Figure No.
6.20

Title
Existing Aquaculture Facilities in the Vicinity of the Project

One land-based hatchery exists close to the Project in the community of Stephenville (Figure 6.20). The Indian Head facility owned by Northern Harvest Smolt Ltd. provides smolt for the Northern Harvest Sea Farms saltwater farms, with a capacity of 4.5 million fish annually from egg incubation through to smolt (Mowi Canada East 2023). In 2018, this facility registered an undertaking with the provincial government to improve efficiency of the existing facility, expansion of the hatchery, and new supporting infrastructure such as freshwater and saltwater supply and effluent treatment and discharge (Edwards and Associates Limited and Mel-Mor Science 2018). The company is currently preparing an Environmental Preview Report as part of the provincial EA process for the facility upgrades. The hatchery is located on the same road as the proposed hydrogen / ammonia plant. Table 6.12 provides details on the existing land- and marine-based aquaculture facilities in the vicinity of the Project.

Table 6.12 Existing Aquaculture Facilities in the Vicinity of the Project

Land- or Marine-based	Type	Company	Site Location	Species
Land	Hatchery	Northern Harvest Smolt Ltd.	Stephenville, NL	Atlantic salmon (smolt)
Marine	Shellfish Farm	Plastik Industries of Canada Ltd.	Piccadilly Bay, NL #1	Sea scallop
Marine	Shellfish Farm	Plastik Industries of Canada Ltd.	Piccadilly Bay, NL #2	Blue mussel
Marine	Shellfish Farm	Plastik Industries of Canada Ltd.	Piccadilly Bay, NL #3	Blue mussel
Source: NLDFFA 2021				

Both land- and marine-based aquaculture facilities do not overlap with proposed Project infrastructure or Project activities. Table 6.13 lists the proximity of proposed wind turbines and the Stephenville production facility to existing aquaculture facilities.

Table 6.13 Proximity of Project Infrastructure to Aquaculture Facilities

Type	Site Location	Distance to Stephenville Production Facility (km)	Distance to nearest Port au Port Turbine (km)	Distance to nearest Codroy Turbine (km)
Smolt Hatchery	Stephenville, NL	1.5	10.8	51.8
Scallop Farm	Piccadilly Bay, NL #1	29.8	4.2	54.3
Blue Mussel Farm	Piccadilly Bay, NL #2	27.0	4.5	52.0
Blue Mussel Farm	Piccadilly Bay, NL #3	27.2	2.4	49.8

6.3.5.2 Water Usage

The Indian Head smolt hatchery acquired its Water Use Licence (Permit # WUL-18-9929) for a commercial aquaculture hatchery in 2018 (NLDMAE 2018), which is an expansion of their existing permit, WUL-15-8305. A non-exclusive water right to withdraw water from freshwater wells near Stephenville (48’32’55.02’’N, 58’31’5.59’’W) and saltwater wells near St. George’s Bay (48’32’13.36’’N, 58’33’53.11’’W) was granted to Northern Harvest Smolt Ltd (Figure 2.16) to supply water to the facility. This permit is due to expire in September 2023. The maximum estimated annual water withdrawal allowed from each water source was originally set at 3,442,680 m^3. However, an amendment to Permit # WUL-18-9299 in 2019 updated the maximum estimated annual withdrawal to 4,493,880 m^3 and 2,102,400 m^3 for freshwater wells and saltwater wells, respectively (NLDMAE 2019).

A potable water pipeline connected to the Stephenville’s groundwater supply system runs along the south side of the paved road along the northern edge of the hatchery site. This is used for drinking water and fire protection at the facility (Edwards and Associates Limited and Mel-Mor Science 2018).

6.3.6 Other Ocean Users

6.3.6.1 Hunting

Seals

Commercial seal harvesting has been practiced in Atlantic Canada for over 200 years and is still an important economic and cultural practice in NL and the Gulf of St. Lawrence (DFO 2011). Historically, seals were commercially hunted primarily for seal oil but has since expanded into a bigger industry for seal products such as leather, handicrafts, seal oil, and meat. The seal harvest is managed by DFO and is regulated by *Marine Mammal Regulations* and through licencing conditions. Two seal species are harvested in the Gulf; the harvest season for harp seals is from November 15 to May 15 whereas the timing of the grey seal harvest is controlled by condition of licence. The Project is adjacent to Sealing Area #10 (DFO 2011).

Migratory Birds

Bird hunting occurs in coastal areas in western Newfoundland, which is permitted under the *Migratory Birds Hunting Regulations* (ECCC 2023). ECCC provides annual hunting regulations, including season dates and bag limits per location and species within the province. Various species of waterfowl and murres/turrs can be hunted, which are an important source of food in traditional diets (AMEC 2014). The Project is adjacent to two bird hunting zones; Southwestern Newfoundland Coastal Zone – bounded by a line drawn due west from Cape St. Gregory, and from there southward along the coast, ending in a boundary line drawn due west through Cape Ray and Murre Zone No. 3 – includes the Southwestern Newfoundland Coastal Zone plus southern Newfoundland and a part of the eastern Avalon. Details on the migratory bird hunting near the Project are outlined in Table 6.14.

Table 6.14 Waterfowl and Murre Hunting Near the Project (2022-2023)

Species	Management Areas	Open Season	Daily Bag Limit	Daily Possession Limit
Long-tailed ducks, eiders, and scoters, combined	Southwestern Newfoundland Coastal Zone	Nov. 25 to Mar. 10	6	12
Common and red-breasted mergansers, combined	Southwestern Newfoundland Coastal Zone	Oct. 10 to Mar. 10	6	12
Ducks (other than harlequin ducks, common and red-breasted mergansers, long-tailed ducks, eiders, and scoters) combined	Southwestern Newfoundland Coastal Zone	Sept. 17 to Dec. 31	6 (not more than 1 may be Barrow’s goldeneye) from September 17 to November 29	18 (not more than 1 may be Barrow’s Goldeneye)
			6 (not more than 1 may be Barrow’s goldeneye and not more than 4 may be American Black Ducks) from November 30 to December 31	
All geese, combined	Southwestern Newfoundland Coastal Zone	Sept. 17 to Dec. 31	5	10
Snipe	Southwestern Newfoundland Coastal Zone	Sept. 17 to Dec. 31	10	20
Murre (Turr)	Murre Zone No. 3	Nov. 25 to Mar. 10	20	40

Source: ECCC 2023

6.3.6.2 Marine Shipping and Transportation

Marine shipping and transport in the Gulf of St. Lawrence is a vital part of the economy of Canada’s eastern provinces. The Gulf is an important shipping channel that connects the Atlantic Ocean to areas such as the St. Lawrence River, the Great Lakes and western Newfoundland. Small to medium-sized vessels have traditionally transported goods and people between coastal communities within the Gulf but today, marine shipping is the main method of transit, primarily confined to ports with the necessary facilities and services for bigger vessels (AMEC 2014).

The Project and adjacent waters are closest to the major shipping lane between the Cabot Strait and the St. Lawrence River (Figure 6.21). Most traffic entering the Gulf enters through the Cabot Strait but other vessel traffic originating from the Atlantic Ocean may enter through the Strait of Belle Isle and the Strait of Canso (Stantec 2011). The Strait of Belle Isle is the most direct route from European ports but receives less international marine traffic due to sea ice blocking passage in the winter and spring months (AMEC 2014).

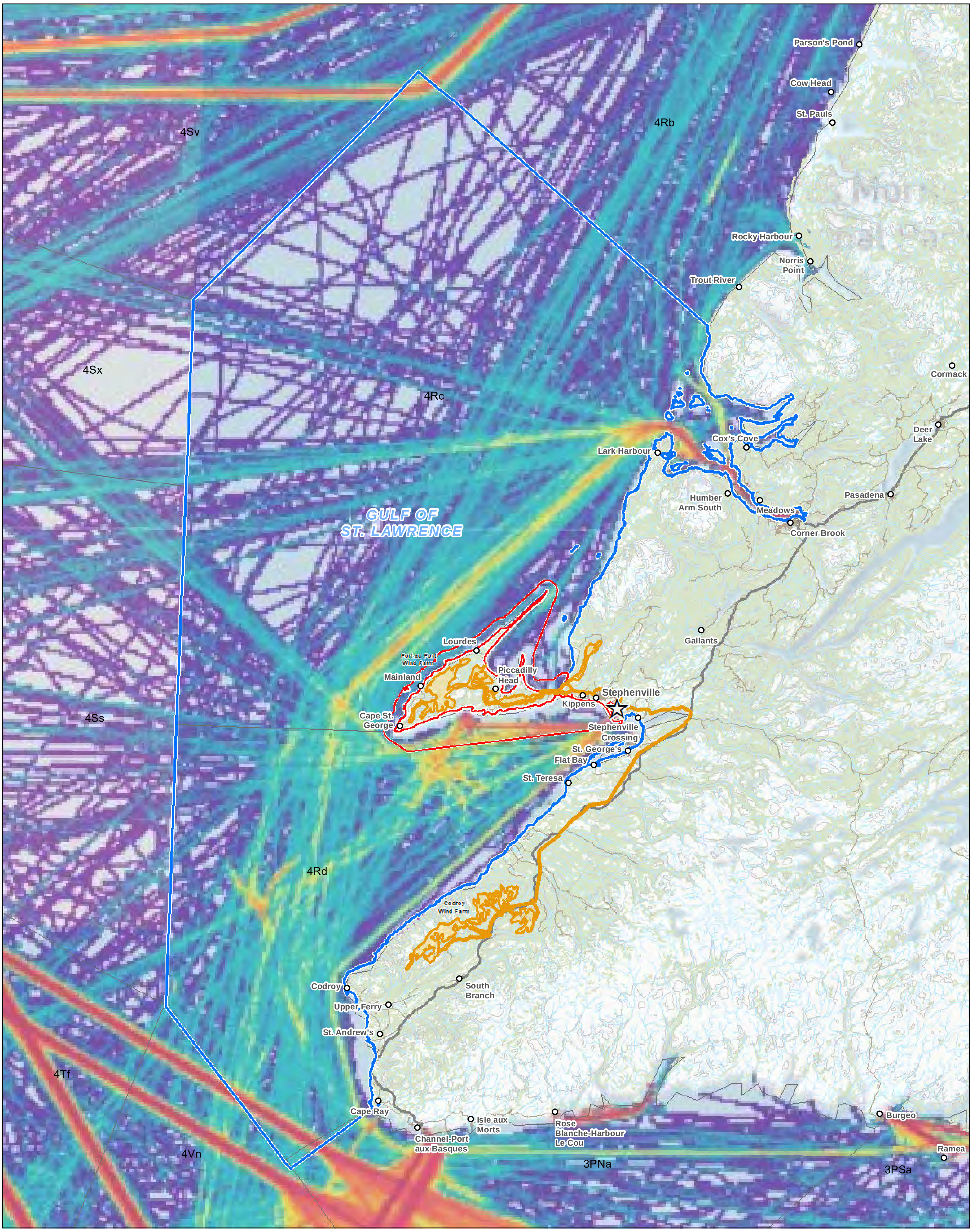
Major ports within the RAA include Corner Brook and Stephenville (Figure 6.8). Since Project shipping and transporting activities will be mainly limited to the Port of Stephenville, the Port of Corner Brook will not be discussed herein. The Port of Stephenville, also known as Port Harmon, is situated in St. George's Bay and is a deep-water port that is accessible year-round. The port was developed by the US Corps of Engineers in the early 1950s. It served as a military base during World War II and later as the shipping point for the former Abitibi-Consolidated paper mill in Stephenville which ceased operation in 2005. Today, the port of Stephenville is a privatized, multi-purpose facility that serves a variety of industries, including fishing and aquaculture (AMEC 2014; Port of Stephenville n.d.).

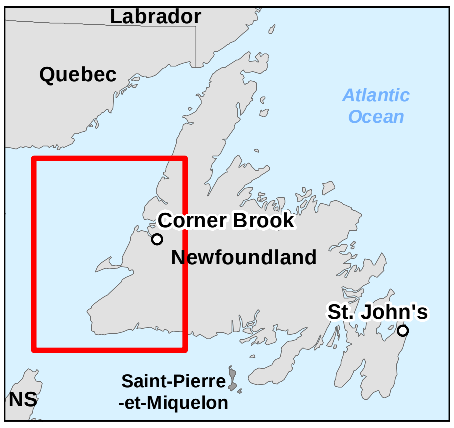
Under the *Pilotage Act*, the Port of Stephenville is a designated compulsory pilotage area in which vessels must have a licenced pilot or pilotage certificate holder on board for certain vessels entering and leaving the port. A full list of vessels that are subject to compulsory pilotage within compulsory areas is available on the Atlantic Pilotage Authority website (Atlantic Pilotage Authority n.d.).

Vessel traffic in the Port of Stephenville includes (D. Merkel, pers. comm, 2023):

- Coast Guard Vessels
- Year-round use by fishing vessels, including offloading of catch such as crab, shrimp, and lobster
- 7 to 10 boats annually for Northern Harvest Smolt operations (once geared up on fish)
- Large Bulk Carrier with salt once per year
- 2 to 3 loads of scrap metal (every second year)
- As required, asphalt barges supporting local infrastructure contracts
- Vessels delivering cargo to support local construction
- Adhoc use for vessel layups and repair

A medium-sized port exists within St. George's Bay in Lower Cove, which is situated on the south coast of the Port au Port Peninsula (Figure 6.8). This port is used as an export terminal for the adjacent Atlantic Minerals' Lower Cove chemical-grade limestone and dolomite quarry. Products are shipped year-round in their natural state to global markets (Atlantic Minerals Limited n.d.).





Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N

2. Data Sources: Client, Province of Newfoundland and Labrador, Stantec, marinetraffic.com

3. Background: Natural Resources Canada CanVec

🟥 Local Assessment Area

🟦 Regional Assessment Area

Proposed Project Features

🟧 Project Area

☆ Hydrogen / Ammonia Plant Location

Other Features

☐ NAFO Unit

— Trans-Canada Highway

— Road

— Contour (100 m)

— Watercourse

🟦 Waterbody

🟩 Forested Area

Vessel Density

666K+
1K+
250
56
21
15
10
5
1
(routes / 9.78km² / year)

0 20 40
km

(At original document size of 11x17)
1:1,000,000

N

Project Location
Port au Port Peninsula
NL

Prepared by AC on 2023/05/18
QR by AW on 2023/08/01
IR by RK on 2023-08-01

Client/Project
121417233_053l

World Energy GH2
Project Nujio'qonik

Figure No.

6.21

Title

Marine Traffic Density in the Regional Assessment Area

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6.3.6.3 Other Marine Vessel Traffic

Apart from commercial shipping and transportation and fishing vessels, western Newfoundland waters are frequently traversed by other types of vessels for activities including scientific research, military, and marine tourism.

Scientific Research and Surveys

DFO routinely conducts various long-term monitoring studies in the Gulf of St. Lawrence to gather information on the marine environment, including: 1) Northern Gulf Multi-Species Survey; 2) Southern Gulf Multi-Species Survey; 3) Fixed and Mobile Gear Sentinel Surveys; 4) Snow Crab Survey; and 5) Herring Acoustic Surveys (Stantec 2017).

Military Use

The federal Department of National Defence (DND) is responsible for several military and civilian organizations and agencies, including the defence and protection of Canada's marine jurisdiction. The Royal Navy and Air Force operate surveillance and monitoring operations throughout Atlantic Canadian waters, and DND may operate aircraft or marine patrols in the region. Navy vessels also provide support to DFO in conducting fishery patrols in Atlantic Canada, and civilian security operations are conducted by the Canadian Coast Guard (AMEC 2014).

Marine Tourism

Marine tourism is a thriving industry for the province due to its scenic coastlines and rich marine ecosystems. According to the NL tourism website, there are no marine tourism businesses operating within the LAA. However, there are several located north of the Project within the Bay of Islands area as well as other parts of western Newfoundland. These businesses offer activities such as whale watching boat tours and sea kayaking (NL Tourism n.d.).

6.3.6.4 Unexploded Ordnances and Shipwrecks

Several locations in and around Newfoundland were used historically for military activities such as training and weapons testing during conflicts such as World War I and World War II (DND 2021). These sites are now considered unexploded ordnances (UXO) legacy sites as UXOs may still exist, posing a risk to the public. These sites were originally owned, leased, or used by DND but are no longer included in their inventory. DND's UXO and Legacy Sites Program was established in 2005 to identify and catalogue sites, assesses risks, and works to reduce UXO risk through property controls, assessment surveys, UXO clearance operations, and public education (DND 2021).

Six UXO legacy sites have been identified along the coast near proposed marine-related project activities in the LAA (Table 6.15).

There are no shipwrecks documented within the LAA.

Table 6.15 UXO Legacy Sites in the LAA

Legacy Site	Site Name
NL900-083	Jerry's Nose (near Lower Cove, Port au Port Peninsula)
NL900-151	West Bay (Port au Port Peninsula)
NL900-098	Port au Port
NL900-148	Stephenville- Harmon AF Base Guns sites
NL900-149	Stephenville- Pinetree Site
NL900-147	Stephenville- CAS Ernest Harmon Air Force Base
Source: AMEC 2014	

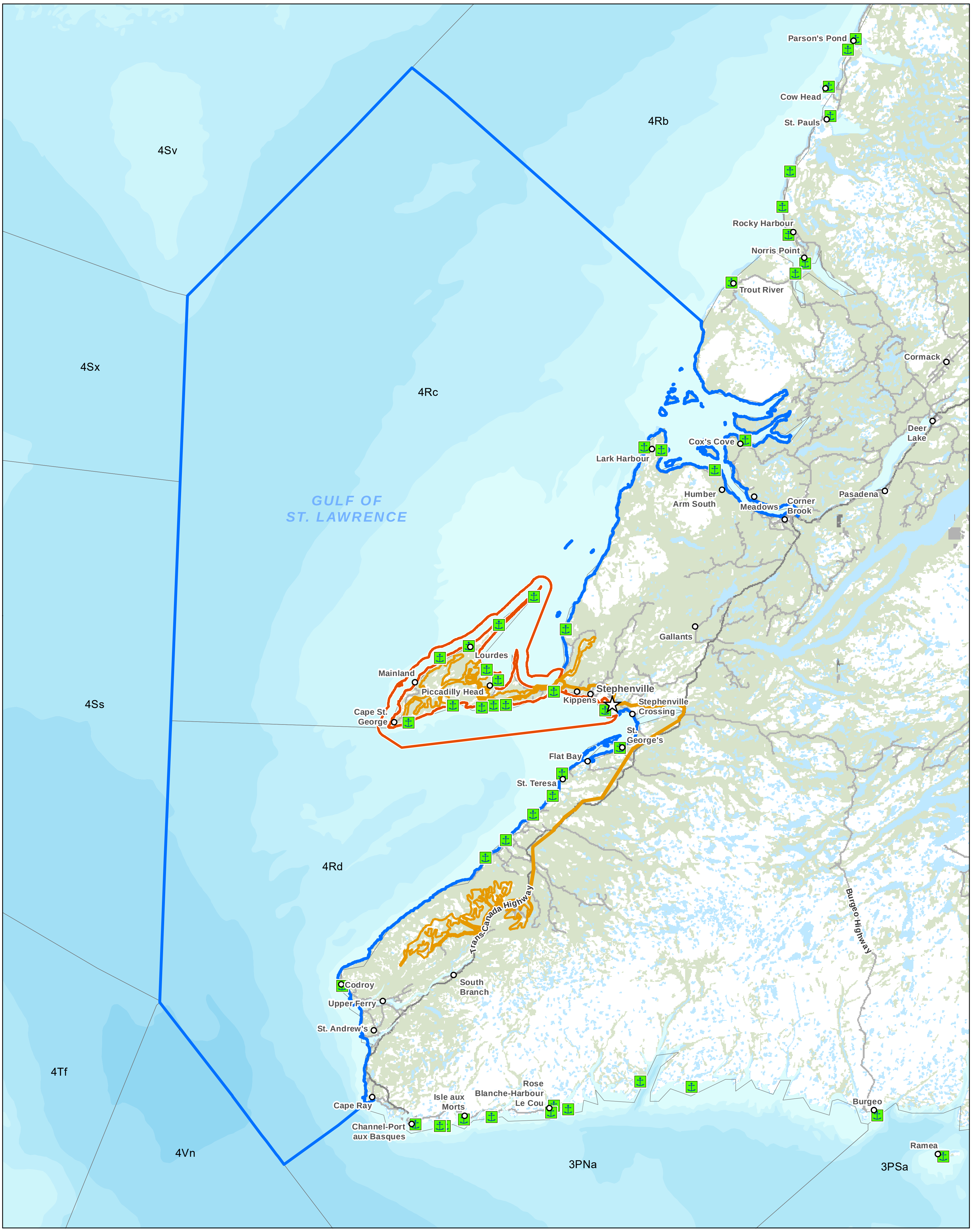
6.3.6.5 Small Craft Harbours

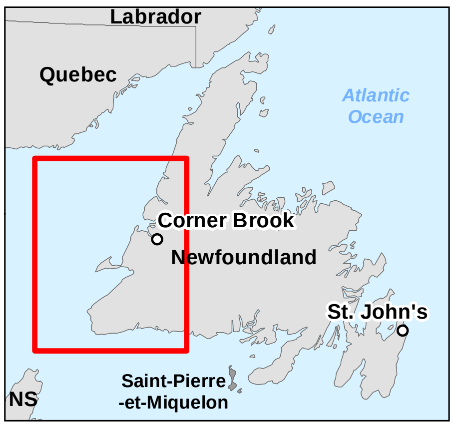
DFO oversees the nationwide program known as Small Craft Harbours. Annually, more than 5,000 volunteers support the program in Canada who help upkeep harbours that are important to the fishing industry. Small craft harbours are designated as either core fishing harbours (critical to fishing/aquaculture industries, managed by harbour authorities), non-core fishing harbours (support fishing and aquaculture industries, not managed by harbour authorities), and recreational harbours (support recreational community). Harbour authorities are responsible for managing day-to-day operations of core fishing harbours and represent the interests of users and communities who use the harbours (DFO 2021c).

Thirteen core fishing harbours were identified in the LAA. Locations are provided in Table 6.16. Ten core fishing harbours and two non-core fishing habours exist outside of the LAA, within RAA boundaries (Figure 6.22).

Table 6.16 Small Craft Harbours in the LAA

Small Craft Harbour Type	Location
Core Fishing	Cape St. George
Core Fishing	Mainland
Core Fishing	Lourdes
Core Fishing	Black Duck Brook
Core Fishing	Blue Beach
Core Fishing	West Bay Centre
Core Fishing	Piccadilly
Core Fishing	Gravels (Port au Port)
Core Fishing	Port Harmon
Core Fishing	Sheaves Cove
Core Fishing	Ship Cove (St. George's Bay)
Core Fishing	Abrahams Cove
Core Fishing	Campbells Creek
Source: DFO 2021c	





🟩 Small Craft Harbour

☆ Hydrogen / Ammonia Plant Facility (Proposed)

🟧 Project Area

🟥 Local Assessment Area

🟦 Regional Assessment Area

☐ NAFO Unit

0 20 40 Kilometres

(At original document size of 11x17)
1:1,000,000

N

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Client, Province of Newfoundland and Labrador, ACCDC, Stantec
3. Background: Natural Resources Canada CanVec

Project Location
Port au Port Peninsula
NL

Prepared by AC on 2023-05-18
QR by AW on 2023-07-07
IR by RK on 2023-08-01

Client/Project
121417233_053h

World Energy GH2
Project Nujio'qonik

Figure No.
6.22

Title
Small Craft Harbours

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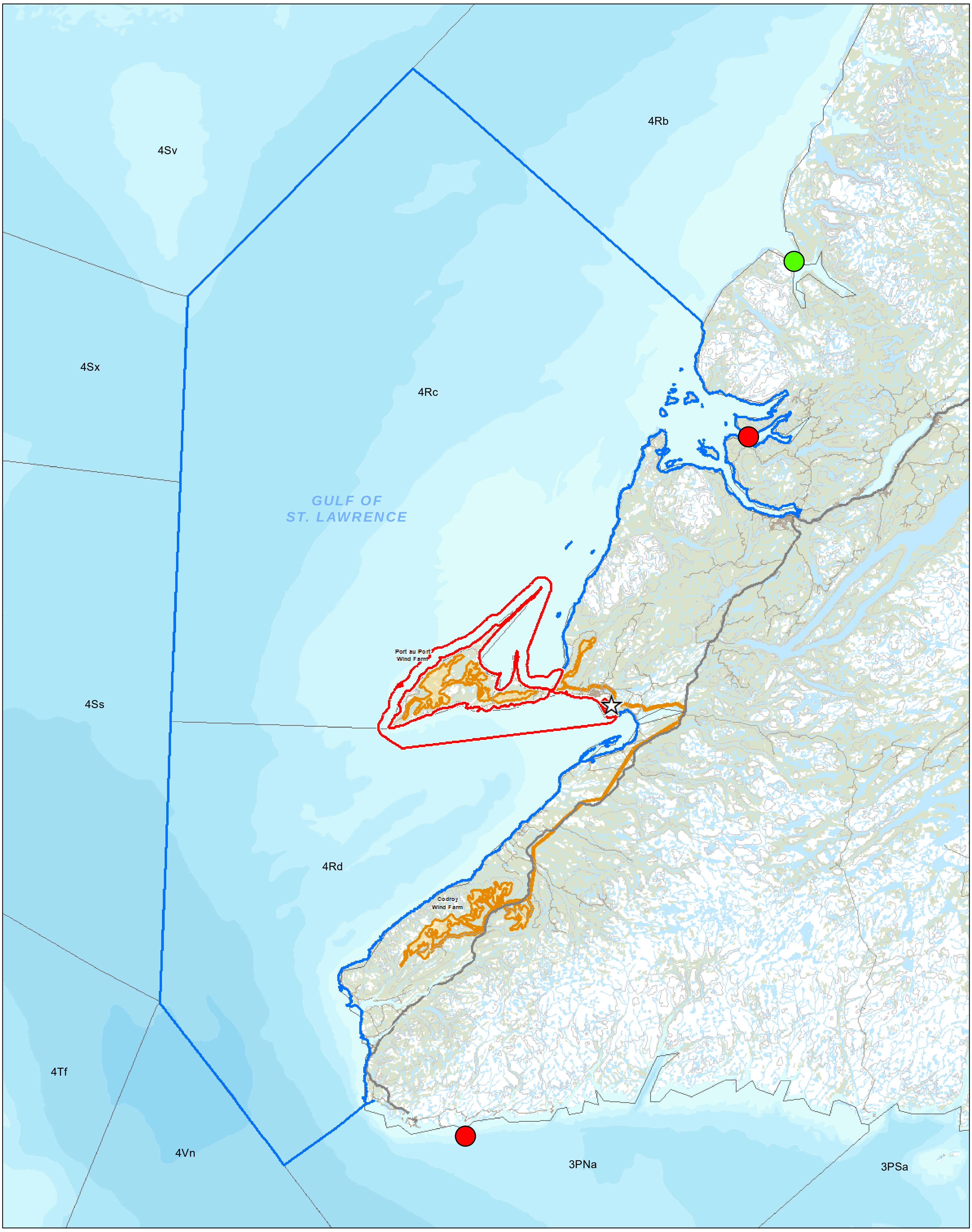
6.3.6.6 Disposal at Sea Sites

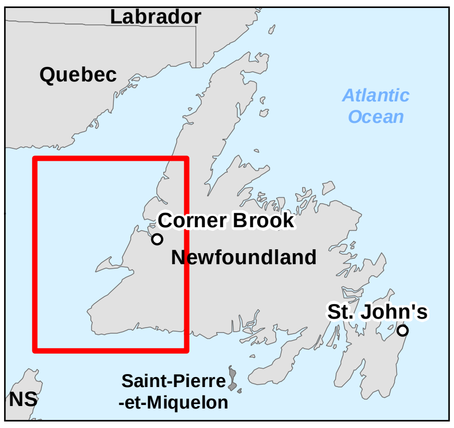
Under the *Canadian Environmental Protection Act, 1999*, a substance may not be disposed of at sea in Canadian territorial waters, by Canadian ships in international waters, or in waters under the control of a foreign government unless a permit has been granted by ECCC's Disposal at Sea Program. Permits for disposal at sea can be acquired for the substances under schedule 5 of the *Canadian Environmental Protection Act* at approved disposal sites. These substances are dredged material, industrial fish processing waste, ships, aircraft, platforms or other structures, inert, inorganic geological matter, uncontaminated organic matter of natural origin, and bulky substances (Government of Canada 2019).

There is one inactive disposal at sea site within the RAA and one inactive and one active site outside of the RAA boundaries (Figure 6.23). There are no active disposal at sea sites within the RAA.

6.3.6.7 Petroleum Activity

Western Newfoundland is considered an area of low activity for the petroleum industry (C-NLOPB 2023). There is currently only one active exploration licence (EL-1070) in western Newfoundland, with Shoal Point Energy Ltd. being the licence representative. It is located within the LAA off the north coast of the Port au Port Peninsula.





Disposal at Sea Sites

- 🟢 Active
- 🔴 Inactive
- 🟥 Local Assessment Area
- 🟦 Regional Assessment Area

Proposed Project Features

- 🟧 Project Area
- ☆ Hydrogen / Ammonia Plant Location

Other Features

- ☐ NAFO Unit
- — Trans-Canada Highway
- — Road
- — Contour (100 m)
- — Watercourse
- 🟦 Waterbody
- 🟩 Forested Area

0 20 40 km

(At original document size of 11x17)
1:1,000,000

N

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Client, Province of Newfoundland and Labrador, ACCDC, Stantec
3. Background: Natural Resources Canada CanVec

Project Location
Port au Port Peninsula
NL

Prepared by AC on 2023/05/18
QR by AW on 2023/08/01
IR by RK on 2023-08-01

Client/Project
121417233_053g

World Energy GH2
Project Nujio'qonik

Figure No.
6.23

Title
Disposal at Sea Sites

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Appendix A

Community Water Resources Reports

PROJECT NUJIO’QONIK
Aquatic Environment Baseline Study
August 2023

Source Water Quality for Public Water Supplies
Nutrients and Metals

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Community Name: **Piccadilly Slant-Abraham's Cov**
Service Area: **Abraham's Cove**
Source Name: **#2 Well - Abraham's Cove**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Sep 12, 2022	0.190	2.7	2.200	0.230	0.078	0.037	0.00000	0.000	0.049	0.00005	0.00000	0.009	0.000	0.001	9.400	0.009	.0000	0.000	0.000	0.0004	0.009
Sep 25, 2020	0.000	3.3	3.390	0.328	0.078	0.040	0.00000	0.000	0.060	0.00000	0.00000	0.006	0.000	0.000	7.000	0.000	.0000	0.000	0.000	0.0000	0.000
Sep 14, 2020	0.000	1.4	0.210	0.000	0.004	0.000	0.00000	0.000	0.140	0.00000	0.00000	0.011	0.000	0.009	16.000	0.000	.0000	0.000	0.000	0.0000	0.040
Aug 15, 2017	0.250	2.6	2.200	0.480	0.090	0.009	0.00000	0.000	0.056	0.00003	0.00000	0.059	0.000	0.001	10.000	0.000	.0000	0.000	0.000	0.0005	0.012
Jun 01, 2011	0.000	4.0	1.200	0.130	0.090	0.030	0.00000	0.000	0.030	0.00000	0.00100	0.004	0.000	0.000	6.000	0.020	.0000	0.000	0.000	0.0000	0.000
Jun 22, 2010	0.000	4.0	0.790	0.120	0.050	0.030	0.00000	0.000	0.040	0.00000	0.00100	0.004	0.030	0.001	8.000	0.020	.0000	0.000	0.000	0.0000	0.000
Jun 02, 2008	0.000	2.3	2.700	0.200	0.100	0.030	0.00000	0.000	0.036	0.00000	0.00000	0.003	0.000	0.001	7.000	0.012	.0000	0.000	0.000	0.0002	0.006
Sep 11, 2007	0.100	3.0	2.200	0.400	0.200	0.020	0.00000	0.000	0.034	0.00000	0.00000	0.006	0.000	0.001	7.700	0.008	.0000	0.000	0.000	0.0002	0.007

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Feb 05, 2007	0.000	2.9	1.370	0.120	0.050	0.010	0.00000	0.000	0.030	0.00000	0.00200	0.003	0.000	0.001	6.000	0.000	).0000	0.000	0.000	0.0000	0.000
Sep 18, 2006	0.000	4.6	1.920	0.440	0.060	0.030	0.00000	0.000	0.040	0.00000	0.00100	0.004	0.000	0.002	7.000	0.000	).0000	0.000	0.000	0.0000	0.000
Jan 16, 2006	0.000	3.0	0.790	0.420	0.080	0.170	0.00000	0.000	0.030	0.00000	0.00200	0.005	0.520	0.006	7.000	0.170	).0000	0.000	0.000	0.0000	0.000
Sep 20, 2005	0.020	5.1	2.260	0.340	0.100	0.040	0.00000	0.000	0.040	0.00000	0.00200	0.004	0.000	0.001	7.000	0.000	).0000	0.000	0.000	0.0000	0.000
Nov 08, 2004	0.050	2.9	1.780	0.330	0.090	0.020	0.00000	0.000	0.050	0.00000	0.00000	0.003	0.030	0.002	10.000	0.020	).0000	0.000	0.000	0.0000	0.000
Jun 16, 2004	0.050	3.8	2.150	0.910	0.230	0.070	0.00000	0.000	0.030	0.00000	0.00200	0.004	0.130	0.009	6.000	0.210	).0000	0.000	0.000	0.0000	0.000
Nov 19, 2003	0.090	3.3	2.510	0.390	0.210	0.090	0.00050	0.001	0.040	0.00005	0.00400	0.003	0.030	0.001	6.000	0.020	).0000	0.003	0.001	0.0005	0.005
Apr 29, 2003	0.010	1.6	1.720	0.240	0.080	0.050	0.00050	0.001	0.050	0.00005	0.00050	0.013	0.030	0.003	9.000	0.031	).0000	0.003	0.001	0.0005	0.003

Service Area: **Piccadilly Slant**

Source Name: **#1 Well - Piccadilly Slant**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Mar 03, 2022	0.000	1.2	0.230	0.000	0.000	0.000	0.00000	0.000	0.110	0.00004	0.00000	0.007	0.000	0.007	15.000	0.000	).0000	0.000	0.000	0.0008	0.033

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Nov 16, 2021	0.000	1.5	0.220	0.000	0.000	0.000	0.00000	0.000	0.110	0.00003	0.00000	0.002	0.000	0.007	15.000	0.000	0.0000	0.000	0.000	0.0008	0.028
Sep 14, 2020	0.000	4.0	2.310	0.000	0.061	0.030	0.00000	0.000	0.050	0.00000	0.00000	0.029	0.040	0.001	7.000	0.030	0.0000	0.000	0.000	0.0000	0.010
Aug 15, 2017	0.000	1.0	0.200	0.100	0.006	0.081	0.00000	0.000	0.120	0.00003	0.00000	0.009	0.000	0.004	16.000	0.000	0.0000	0.000	0.000	0.0008	0.037
Jun 01, 2011	0.000	1.3	0.170	0.120	0.040	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.004	0.000	0.006	16.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Jun 22, 2010	0.000	1.3	0.180	0.000	0.000	0.000	0.00000	0.000	0.100	0.00000	0.00000	0.002	0.000	0.005	16.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Jun 02, 2008	0.000	0.0	0.170	0.100	0.000	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.007	0.000	0.005	17.000	0.000	0.0000	0.000	0.000	0.0010	0.028
Sep 11, 2007	0.000	0.8	0.210	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.005	0.000	0.005	17.000	0.000	0.0000	0.000	0.000	0.0009	0.026
Feb 05, 2007	0.000	1.2	0.150	0.180	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00100	0.005	0.000	0.004	15.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Sep 18, 2006	0.000	1.1	0.200	0.110	0.000	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.002	0.000	0.004	15.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Jan 16, 2006	0.000	1.1	0.190	0.110	0.000	0.000	0.00000	0.000	0.100	0.00000	0.00000	0.002	0.000	0.006	15.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Sep 20, 2005	0.000	0.0	0.160	0.130	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.002	0.000	0.005	16.000	0.000	0.0000	0.000	0.000	0.0000	0.020

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Nov 08, 2004	0.030	0.7	0.170	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.005	0.000	0.005	16.000	0.000	).0000	0.000	0.000	0.0000	0.020
Jun 16, 2004	0.000	0.8	0.150	0.200	0.020	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.003	0.000	0.005	16.000	0.000	).0000	0.000	0.000	0.0000	0.020
Nov 19, 2003	0.010	0.8	0.140	0.025	0.005	0.080	0.00050	0.001	0.110	0.00005	0.00300	0.012	0.020	0.005	16.000	0.010	).0000	0.003	0.001	0.0010	0.030
Apr 29, 2003	0.010	0.9	0.250	0.060	0.005	0.030	0.00050	0.001	0.100	0.00005	0.00050	0.004	0.020	0.008	15.000	0.016	).0000	0.003	0.001	0.0005	0.011

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sep 16, 2020	0.000	0.6	0.110	0.000	0.004	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.008	0.160	0.000	4.000	0.040	).0000	0.000	0.000	0.0000	0.020
Sep 16, 2020	0.000	1.4	0.620	0.000	0.005	0.020	0.00000	0.000	0.010	0.00000	0.00000	0.007	0.350	0.000	4.000	0.000	).0000	0.000	0.000	0.0000	0.010
Sep 16, 2020	0.000	1.3	0.000	0.000	0.007	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.006	0.180	0.001	6.000	0.020	).0000	0.000	0.000	0.0000	0.020
Aug 16, 2017	0.000	1.0	0.070	0.000	0.007	0.000	0.00000	0.000	0.009	0.00000	0.00000	0.014	0.350	0.002	4.500	0.051	).0000	0.000	0.000	0.0000	0.110
Aug 16, 2017	0.000	1.0	0.750	0.000	0.006	0.008	0.00000	0.000	0.012	0.00000	0.00500	0.140	0.096	0.022	4.300	0.000	).0000	0.000	0.000	0.0000	0.100

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Aug 16, 2017	0.000	1.2	0.000	0.000	0.012	0.011	0.00000	0.000	0.016	0.00000	0.00000	0.004	0.340	0.005	5.000	0.036	0.0000	0.000	0.000	0.0000	0.053
May 19, 2011	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00100	0.001	0.070	0.001	3.000	0.010	0.0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	1.5	0.000	0.160	0.000	0.050	0.00000	0.000	0.060	0.00000	0.00200	0.004	0.440	0.002	9.000	0.100	0.0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	2.8	0.290	0.000	0.000	0.020	0.00000	0.000	0.000	0.00000	0.00000	0.003	0.040	0.000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2011	0.000	1.3	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.000	0.590	0.002	5.000	0.060	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.001	0.050	0.000	6.000	0.050	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	1.2	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.002	0.470	0.002	2.000	0.030	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.001	0.040	0.000	3.000	0.010	0.0000	0.000	0.000	0.0000	0.020
May 20, 2010	0.000	0.8	0.290	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.004	0.190	0.002	3.000	0.000	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department

Quality Assurance / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.

LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects of contaminants

Contaminant and Aesthetic Exceedances

Nitrate(ite) - The maximum acceptable concentration for nitrate(ite) in drinking water is 10 mg/L expressed as nitrate-nitrogen. Nitrate and nitrite are naturally occurring ions that are widespread in the environment. High levels of this contaminant can cause adverse health effects for some people.

Arsenic - The interim maximum acceptable concentration for arsenic in drinking water is 0.01 mg/L. Arsenic is introduced into water through the dissolution of minerals and ores, from industrial effluents and via atmospheric deposition. High levels of this contaminant can cause adverse health effects for some people.

Barium - The maximum acceptable concentration for barium in drinking water is 2.0 mg/L. Barium is not found free in nature but occurs as in a number of compounds. High levels of this contaminant can cause adverse health effects for some people.

Cadmium - The maximum acceptable concentration for cadmium in drinking water is 0.007 mg/L. Cadmium that is present as an impurity in galvanized pipes, a constituent of solders used in fitting water heaters or incorporated into stabilizers in black polyethylene pipes may contaminate water supplies during their distribution. High levels of this contaminant can cause adverse health effects for some people.

Chromium - The maximum acceptable concentration for chromium in drinking water is 0.05 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Lead - The maximum acceptable concentration for lead in drinking water is 0.005 mg/l. Lead is present in tap water as a result of dissolution from natural sources or from the distribution systems and plumbing containing lead in pipes, solder or service connections. High levels of this contaminant can cause adverse health effects for some people.

Mercury - The maximum acceptable concentration for mercury in drinking water is 0.001 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Selenium - The maximum acceptable concentration for selenium in drinking water is 0.01 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Uranium - The interim maximum acceptable concentration for uranium in drinking water is 0.02 mg/L. Uranium may enter drinking water from naturally occurring deposits or as a result of human activity, such as mill tailings and phosphate fertilizers. High levels of this contaminant can cause adverse health effects for some people.

Antimony - The interim maximum acceptable concentration (IMAC) for antimony in drinking water is 0.006 mg/L. It is a naturally occurring metal that is introduced into water through the natural weathering of rocks, runoff from soils, effluents from mining and manufacturing operations, industrial and municipal leachate discharges and from household piping and possibly non-leaded solders. High levels of this contaminant can cause adverse health effects for some people.

Copper - The maximum acceptable concentration for copper in drinking water is 2.0 mg/L and the aesthetic objective for copper in drinking water is 1.0 mg/L. Copper is widely distributed in nature and is found frequently in surface water and in some groundwater. Usually, copper in tap water is the result of dissolution of copper piping within the distribution system. The aesthetic objective was set to ensure palatability and to minimize staining of laundry and plumbing fixtures. Copper is an essential element in human metabolism and copper deficiency results in a variety of clinical disorders. At extremely high doses copper intake can result in adverse health effects. High levels of copper in tap water may result in blue-green staining on some fixtures.

Iron - The aesthetic objective for iron in drinking water is 0.3 mg/L. Usually, iron in tap water is the result of high iron content in the raw water and dissolution of iron piping within the distribution system. Iron is an essential element in nutrition. High levels of iron in tap water can cause staining of laundry and plumbing fixtures, unpleasant taste, colour and promote biological growths in the distribution system.

Manganese - The maximum acceptable concentration for manganese in drinking water is 0.12 mg/L and the aesthetic objective for manganese in drinking water is 0.02 mg/L. Usually, manganese in drinking water is the result of high amounts of manganese in the source water supply's bedrock Levels above the maximum acceptable concentration can cause adverse health effects for some people. Levels above the aesthetic objective may cause staining of plumbing and laundry and undesirable tastes in beverages.

Zinc - The aesthetic objective for zinc in drinking water is 5.0 mg/L. Zinc in water can be naturally occurring or due to zinc in plumbing materials. Zinc is an essential element for human nutrition. Long term ingestion of zinc has not resulted in adverse effects. Water with zinc concentrations higher than the aesthetic objective has an astringent taste and may be opalescent and develop a greasy film on boiling.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ = Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Source Water Quality for Public Water Supplies
Nutrients and Metals

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Community Name: **Port au Port West-Aguathuna-F**

Service Area: **Felix Cove**

Source Name: **#4-Goose Pond Road Well**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Sep 15, 2020	0.000	0.9	0.140	0.000	0.000	0.000	0.00000	0.000	0.150	0.00000	0.00000	0.003	0.000	0.000	21.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Aug 15, 2017	0.000	1.3	0.140	0.000	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.000	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0005	0.014
Jun 01, 2011	0.000	1.2	0.140	0.260	0.000	0.000	0.00000	0.000	0.140	0.00000	0.00200	0.002	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Jun 22, 2010	0.000	1.3	0.170	0.000	0.010	0.000	0.00000	0.000	0.140	0.00000	0.00000	0.001	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Jun 05, 2008	0.000	0.7	0.150	0.000	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.003	0.000	0.001	20.000	0.000	0.0000	0.000	0.000	0.0005	0.027
Sep 19, 2006	0.000	0.9	0.130	0.090	0.010	0.000	0.00000	0.000	0.150	0.00000	0.00000	0.001	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Jan 17, 2006	0.000	0.7	0.120	0.000	0.000	0.000	0.00000	0.000	0.140	0.00000	0.00000	0.005	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.020
Nov 09, 2004	0.030	0.6	0.150	0.000	0.020	0.000	0.00000	0.000	0.130	0.00000	0.00500	0.002	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 16, 2004	0.000	0.9	0.120	0.290	0.020	0.000	0.00000	0.000	0.140	0.00000	0.00100	0.007	0.000	0.000	19.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Nov 19, 2003	0.030	1.2	0.140	0.025	0.010	0.005	0.00050	0.001	0.140	0.00005	0.00300	0.010	0.005	0.001	19.000	0.005	0.0000	0.003	0.001	0.0005	0.010
Apr 30, 2003	0.010	1.0	0.130	0.025	0.030	0.010	0.00050	0.001	0.130	0.00005	0.00050	0.004	0.005	0.001	20.000	0.006	0.0000	0.003	0.001	0.0005	0.003

Source Name: **#5 Ocean View Drive Well**

Sep 15, 2020	0.000	0.9	0.180	0.000	0.005	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.009	0.000	0.003	24.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Aug 15, 2017	0.000	1.1	0.370	0.000	0.000	0.000	0.00000	0.000	0.059	0.00000	0.00000	0.000	0.000	0.001	25.000	0.000	0.0000	0.000	0.000	0.0004	0.009
Jun 01, 2011	0.000	1.2	0.950	0.280	0.000	0.000	0.00000	0.000	0.070	0.00000	0.00200	0.003	0.000	0.003	25.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jul 05, 2010	0.000	1.4	0.580	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00100	0.005	0.000	0.000	24.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jun 05, 2008	0.000	0.8	0.920	0.000	0.000	0.000	0.00000	0.000	0.062	0.00000	0.00000	0.003	0.000	0.003	24.000	0.002	0.0000	0.000	0.000	0.0004	0.015
Sep 11, 2007	0.000	0.7	0.790	0.500	0.000	0.000	0.00000	0.000	0.064	0.00000	0.00000	0.002	0.000	0.001	25.000	0.000	0.0000	0.000	0.000	0.0004	0.018
Sep 19, 2006	0.000	0.9	0.660	0.120	0.020	0.000	0.00000	0.000	0.070	0.00000	0.00100	0.002	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0000	0.010

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jan 17, 2006	0.000	0.9	1.240	0.060	0.030	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.003	0.030	0.003	22.000	0.000	).0000	0.000	0.000	0.0000	0.010
Nov 09, 2004	0.030	0.0	0.220	0.070	0.020	0.000	0.00000	0.000	0.050	0.00000	0.00400	0.004	0.000	0.000	33.000	0.000	).0000	0.000	0.003	0.0000	0.010
Jun 16, 2004	0.020	0.8	0.720	0.400	0.030	0.000	0.00000	0.000	0.060	0.00000	0.00200	0.006	0.020	0.003	29.000	0.000	).0000	0.000	0.003	0.0000	0.020
Nov 19, 2003	0.060		1.160	0.180	0.040	0.090	0.00050	0.001	0.070	0.00020	0.00400	0.115	0.020	0.005	24.000	0.010	).0000	0.003	0.001	0.0005	0.080
Apr 30, 2003	0.010	0.6	0.630	0.080	0.030	0.100	0.00050	0.001	0.060	0.00005	0.00050	0.009	0.060	0.001	31.000	0.051	).0000	0.003	0.003	0.0010	0.012

Service Area: **Port au Port West, Aguathuna**

Source Name: **#1 & #3 & #6 FatherJoy's Well**

Sep 15, 2020	0.000	1.4	0.000	0.121	0.005	0.000	0.00000	0.003	0.200	0.00000	0.00000	0.008	0.030	0.000	21.000	0.020	).0000	0.000	0.000	0.0000	0.000
Sep 15, 2020	0.000	0.8	0.000	0.000	0.003	0.000	0.00000	0.001	0.130	0.00000	0.00000	0.006	0.000	0.000	19.000	0.000	).0001	0.000	0.000	0.0020	0.000
Aug 15, 2017	0.000	3.4	0.077	0.000	0.000	0.009	0.00000	0.000	0.120	0.00004	0.00000	0.003	0.000	0.017	12.000	0.007	).0000	0.000	0.000	0.0007	0.036
Aug 15, 2017	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.001	0.110	0.00000	0.00000	0.002	0.000	0.000	19.000	0.000	).0000	0.000	0.000	0.0019	0.006

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Aug 15, 2017	0.000	1.5	0.000	0.000	0.004	0.000	0.00000	0.003	0.180	0.00000	0.00000	0.000	0.000	0.000	22.000	0.015	.0000	0.000	0.000	0.0011	0.007
Jun 01, 2011	0.000	0.7	0.180	0.250	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00200	0.002	0.000	0.000	19.000	0.000	.0000	0.000	0.000	0.0020	0.000
Jun 01, 2011	0.000	1.4	0.000	0.210	0.000	0.000	0.00000	0.000	0.170	0.00000	0.00200	0.001	0.000	0.000	20.000	0.010	.0000	0.000	0.000	0.0010	0.010
Jun 01, 2011	0.000	3.2	0.000	0.250	0.000	0.010	0.00000	0.000	0.110	0.00000	0.00100	0.003	0.000	0.023	11.000	0.000	.0000	0.000	0.000	0.0000	0.030
Jul 15, 2010	0.000	1.6	0.000	0.000	0.000	0.000	0.00000	0.003	0.180	0.00000	0.00200	0.002	0.000	0.000	19.000	0.000	.0000	0.000	0.000	0.0010	0.000
Jul 05, 2010	0.000	3.0	0.000	0.180	0.000	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.005	0.000	0.026	12.000	0.000	.0000	0.000	0.000	0.0000	0.030
Jun 23, 2010	0.000	1.8	0.000	0.000	0.020	0.240	0.00000	0.017	0.190	0.00000	0.00300	0.071	1.520	0.008	20.000	0.220	.0000	0.000	0.000	0.0010	0.000
Jun 22, 2010	0.000	3.6	0.120	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.003	0.000	0.028	10.000	0.000	.0000	0.000	0.000	0.0000	0.030
Jun 22, 2010	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.001	0.110	0.00000	0.00100	0.003	0.000	0.000	18.000	0.000	.0000	0.000	0.000	0.0020	0.000
Jun 05, 2008	0.000	0.5	0.000	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.002	0.000	0.000	18.000	0.000	.0000	0.000	0.000	0.0019	0.018
Jun 05, 2008	0.000	1.3	0.000	0.000	0.000	0.000	0.00000	0.004	0.170	0.00000	0.00000	0.040	0.130	0.002	20.000	0.014	.0000	0.000	0.000	0.0013	0.026

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Feb 05, 2007	0.020	1.4	0.000	0.130	0.010	0.000	0.00000	0.003	0.170	0.00000	0.00200	0.001	0.000	0.000	20.000	0.010	0.0000	0.000	0.000	0.0010	0.000
Feb 05, 2007	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.001	0.110	0.00000	0.00200	0.003	0.000	0.000	17.000	0.000	0.0000	0.000	0.001	0.0010	0.000
Sep 19, 2006	0.000	1.4	0.000	0.080	0.030	0.000	0.00000	0.003	0.180	0.00000	0.00200	0.001	0.000	0.000	19.000	0.010	0.0000	0.000	0.001	0.0010	0.000
Sep 19, 2006	0.000	0.5	0.000	0.000	0.050	0.000	0.00000	0.001	0.110	0.00000	0.00100	0.002	0.000	0.000	17.000	0.000	0.0000	0.000	0.000	0.0020	0.000
Jan 17, 2006	0.000	0.0	0.000	0.000	0.090	0.000	0.00000	0.003	0.180	0.00000	0.00100	0.002	0.050	0.000	20.000	0.010	0.0000	0.000	0.000	0.0010	0.000
Jan 17, 2006	0.020	1.8	0.000	0.000	0.020	0.000	0.00000	0.001	0.090	0.00000	0.00000	0.002	0.000	0.000	16.000	0.000	0.0000	0.000	0.002	0.0010	0.000
Sep 20, 2005	0.000	0.0	0.000	0.180	0.020	0.000	0.00000	0.002	0.110	0.00000	0.00100	0.002	0.000	0.000	17.000	0.000	0.0000	0.000	0.001	0.0020	0.000
Sep 20, 2005	0.000	0.9	0.000	0.130	0.000	0.000	0.00000	0.003	0.170	0.00000	0.00200	0.002	0.000	0.000	19.000	0.010	0.0000	0.000	0.001	0.0010	0.000
Nov 09, 2004	0.000	4.2	0.000	0.070	0.000	0.010	0.00000	0.000	0.090	0.00000	0.00200	0.008	0.140	0.000	13.000	0.000	0.0000	0.000	0.000	0.0010	0.020
Nov 09, 2004	0.030	1.2	0.000	0.080	0.050	0.000	0.00000	0.003	0.180	0.00000	0.00500	0.007	0.020	0.003	21.000	0.020	0.0000	0.000	0.000	0.0010	0.000
Jun 16, 2004	0.130	1.1	0.000	0.420	0.030	0.000	0.00000	0.003	0.190	0.00000	0.00200	0.008	0.060	0.000	19.000	0.020	0.0000	0.000	0.001	0.0010	0.010

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 16, 2004	0.000	0.9	0.000	0.330	0.020	0.000	0.00000	0.001	0.110	0.00000	0.00200	0.105	0.080	0.003	18.000	0.000	0.0000	0.000	0.002	0.0020	0.050
Nov 19, 2003	0.010	0.6	0.050	0.025	0.005	0.005	0.00050	0.001	0.110	0.00005	0.00200	0.020	0.420	0.001	17.000	0.005	0.0000	0.003	0.001	0.0020	0.030
Nov 19, 2003	0.030	1.4	0.050	0.025	0.010	0.030	0.00050	0.003	0.180	0.00005	0.00300	0.005	0.020	0.001	19.000	0.010	0.0000	0.003	0.001	0.0010	0.005
Apr 30, 2003	0.010	0.5	0.050	0.060	0.010	0.150	0.00050	0.002	0.120	0.00010	0.00050	0.030	0.150	0.002	19.000	0.039	0.0000	0.003	0.001	0.0020	0.003
Apr 30, 2003	0.010	1.0	0.290	0.080	0.040	0.020	0.00050	0.003	0.180	0.00005	0.00050	0.003	0.060	0.001	21.000	0.023	0.0000	0.003	0.001	0.0020	0.003

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sep 16, 2020	0.000	1.4	0.620	0.000	0.005	0.020	0.00000	0.000	0.010	0.00000	0.00000	0.007	0.350	0.000	4.000	0.000	0.0000	0.000	0.000	0.0000	0.010
Sep 16, 2020	0.000	1.3	0.000	0.000	0.007	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.006	0.180	0.001	6.000	0.020	0.0000	0.000	0.000	0.0000	0.020
Sep 16, 2020	0.000	0.6	0.110	0.000	0.004	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.008	0.160	0.000	4.000	0.040	0.0000	0.000	0.000	0.0000	0.020
Aug 16, 2017	0.000	1.0	0.070	0.000	0.007	0.000	0.00000	0.000	0.009	0.00000	0.00000	0.014	0.350	0.002	4.500	0.051	0.0000	0.000	0.000	0.0000	0.110

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Aug 16, 2017	0.000	1.2	0.000	0.000	0.012	0.011	0.00000	0.000	0.016	0.00000	0.00000	0.004	0.340	0.005	5.000	0.036	0.0000	0.000	0.000	0.0000	0.053
Aug 16, 2017	0.000	1.0	0.750	0.000	0.006	0.008	0.00000	0.000	0.012	0.00000	0.00500	0.140	0.096	0.022	4.300	0.000	0.0000	0.000	0.000	0.0000	0.100
May 19, 2011	0.000	2.8	0.290	0.000	0.000	0.020	0.00000	0.000	0.000	0.00000	0.00000	0.003	0.040	0.000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2011	0.000	1.5	0.000	0.160	0.000	0.050	0.00000	0.000	0.060	0.00000	0.00200	0.004	0.440	0.002	9.000	0.100	0.0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00100	0.001	0.070	0.001	3.000	0.010	0.0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	1.3	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.000	0.590	0.002	5.000	0.060	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.001	0.050	0.000	6.000	0.050	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.8	0.290	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.004	0.190	0.002	3.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	1.2	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.002	0.470	0.002	2.000	0.030	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.001	0.040	0.000	3.000	0.010	0.0000	0.000	0.000	0.0000	0.020

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department.

Quality Assurance / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.

LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects of contaminants.

Contaminant and Aesthetic Exceedances

Nitrate(ite) - The maximum acceptable concentration for nitrate(ite) in drinking water is 10 mg/L expressed as nitrate-nitrogen. Nitrate and nitrite are naturally occurring ions that are widespread in the environment. High levels of this contaminant can cause adverse health effects for some people.

Arsenic - The interim maximum acceptable concentration for arsenic in drinking water is 0.01 mg/L. Arsenic is introduced into water through the dissolution of minerals and ores, from industrial effluents and via atmospheric deposition. High levels of this contaminant can cause adverse health effects for some people.

Barium - The maximum acceptable concentration for barium in drinking water is 2.0 mg/L. Barium is not found free in nature but occurs as in a number of compounds. High levels of this contaminant can cause adverse health effects for some people.

Cadmium - The maximum acceptable concentration for cadmium in drinking water is 0.007 mg/L. Cadmium that is present as an impurity in galvanized pipes, a constituent of solders used in fitting water heaters or incorporated into stabilizers in black polyethylene pipes may contaminate water supplies during their distribution. High levels of this contaminant can cause adverse health effects for some people.

Chromium - The maximum acceptable concentration for chromium in drinking water is 0.05 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Lead - The maximum acceptable concentration for lead in drinking water is 0.005 mg/l. Lead is present in tap water as a result of dissolution from natural sources or from the distribution systems and plumbing containing lead in pipes, solder or service connections. High levels of this contaminant can cause adverse health effects for some people.

Mercury - The maximum acceptable concentration for mercury in drinking water is 0.001 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Selenium - The maximum acceptable concentration for selenium in drinking water is 0.01 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Uranium - The interim maximum acceptable concentration for uranium in drinking water is 0.02 mg/L. Uranium may enter drinking water from naturally occurring deposits or as a result of human activity, such as mill tailings and phosphate fertilizers. High levels of this contaminant can cause adverse health effects for some people.

Antimony - The interim maximum acceptable concentration (IMAC) for antimony in drinking water is 0.006 mg/L. It is a naturally occurring metal that is introduced into water through the natural weathering of rocks, runoff from soils, effluents from mining and manufacturing operations, industrial and municipal leachate discharges and from household piping and possibly non-leaded solders. High levels of this contaminant can cause adverse health effects for some people.

Copper - The maximum acceptable concentration for copper in drinking water is 2.0 mg/L and the aesthetic objective for copper in drinking water is 1.0 mg/L. Copper is widely distributed in nature and is found frequently in surface water and in some groundwater. Usually, copper in tap water is the result of dissolution of copper piping within the distribution system. The aesthetic objective was set to ensure palatability and to minimize staining of laundry and plumbing fixtures. Copper is an essential element in human metabolism and copper deficiency results in a variety of clinical disorders. At extremely high doses copper intake can result in adverse health effects. High levels of copper in tap water may result in blue-green staining on some fixtures.

Iron - The aesthetic objective for iron in drinking water is 0.3 mg/L. Usually, iron in tap water is the result of high iron content in the raw water and dissolution of iron piping within the distribution system. Iron is an essential element in nutrition. High levels of iron in tap water can cause staining of laundry and plumbing fixtures, unpleasant taste, colour and promote biological growths in the distribution system.

Manganese - The maximum acceptable concentration for manganese in drinking water is 0.12 mg/L and the aesthetic objective for manganese in drinking water is 0.02 mg/L. Usually, manganese in drinking water is the result of high amounts of manganese in the source water supply's bedrock Levels above the maximum acceptable concentration can cause adverse health effects for some people. Levels above the aesthetic objective may cause staining of plumbing and laundry and undesirable tastes in beverages.

Zinc - The aesthetic objective for zinc in drinking water is 5.0 mg/L. Zinc in water can be naturally occurring or due to zinc in plumbing materials. Zinc is an essential element for human nutrition. Long term ingestion of zinc has not resulted in adverse effects. Water with zinc concentrations higher than the aesthetic objective has an astringent taste and may be opalescent and develop a greasy film on boiling.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ = Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Source Water Quality for Public Water Supplies
Nutrients and Metals

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Community Name: **Sheaves Cove**
Service Area: **Sheaves Cove**
Source Name: **Drilled**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Sep 15, 2020	0.000	1.3	0.310	0.000	0.002	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.105	0.000	0.000	15.000	0.000	.0000	0.000	0.000	0.0000	0.020
Aug 15, 2017	0.000	1.6	0.220	0.000	0.004	0.011	0.00000	0.000	0.057	0.00003	0.00000	0.000	0.000	0.000	15.000	0.000	.0000	0.000	0.000	0.0004	0.026
Jun 01, 2011	0.000	1.7	0.110	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00100	0.000	0.000	0.000	14.000	0.000	.0000	0.000	0.000	0.0000	0.000
Jun 04, 2010	0.000	4.3	0.110	0.000	0.030	0.220	0.00000	0.000	0.020	0.00000	0.00200	0.002	0.170	0.000	7.000	0.010	.0000	0.000	0.000	0.0000	0.000
Jun 02, 2008	0.000	2.2	0.240	0.000	0.000	0.070	0.00000	0.000	0.030	0.00000	0.00000	0.003	0.060	0.001	7.400	0.008	.0000	0.000	0.000	0.0002	0.006
Sep 18, 2006	0.000	1.7	0.200	0.000	0.010	0.040	0.00000	0.000	0.070	0.00000	0.00200	0.003	0.050	0.001	14.000	0.000	.0000	0.000	0.000	0.0000	0.020
Jan 16, 2006	0.000	2.8	0.110	0.360	0.010	0.110	0.00000	0.000	0.020	0.00000	0.00300	0.001	0.090	0.001	5.000	0.000	.0000	0.000	0.000	0.0000	0.000
Nov 09, 2004	0.040	2.3	0.240	0.120	0.000	0.010	0.00000	0.000	0.030	0.00000	0.00400	0.001	0.020	0.000	10.000	0.000	.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 16, 2004	0.000	3.6	0.130	0.260	0.030	0.080	0.00000	0.000	0.020	0.00000	0.00000	0.002	0.080	0.002	6.000	0.000	).0000	0.000	0.000	0.0000	0.000
Nov 17, 2003	0.010	4.7	0.120	0.050	0.030	0.040	0.00050	0.001	0.060	0.00005	0.00400	0.005	0.020	0.001	15.000	0.005	).0000	0.003	0.001	0.0005	0.020
Apr 29, 2003	0.010	2.7	0.320	0.100	0.005	0.070	0.00050	0.001	0.020	0.00005	0.00050	0.007	0.130	0.002	5.000	0.005	).0000	0.003	0.001	0.0005	0.003
Nov 23, 2001	0.010	19.1	0.150	0.025	0.005	0.025		0.001	0.050	0.00005	0.00050	0.008	0.020	0.002	15.000	0.005	).0000	0.005	0.001		0.010

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Sep 16, 2020	0.000	1.3	0.000	0.000	0.007	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.006	0.180	0.001	6.000	0.020	).0000	0.000	0.000	0.0000	0.020
Sep 16, 2020	0.000	1.4	0.620	0.000	0.005	0.020	0.00000	0.000	0.010	0.00000	0.00000	0.007	0.350	0.000	4.000	0.000	).0000	0.000	0.000	0.0000	0.010
Sep 16, 2020	0.000	0.6	0.110	0.000	0.004	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.008	0.160	0.000	4.000	0.040	).0000	0.000	0.000	0.0000	0.020
Aug 16, 2017	0.000	1.2	0.000	0.000	0.012	0.011	0.00000	0.000	0.016	0.00000	0.00000	0.004	0.340	0.005	5.000	0.036	).0000	0.000	0.000	0.0000	0.053
Aug 16, 2017	0.000	1.0	0.750	0.000	0.006	0.008	0.00000	0.000	0.012	0.00000	0.00500	0.140	0.096	0.022	4.300	0.000	).0000	0.000	0.000	0.0000	0.100

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Aug 16, 2017	0.000	1.0	0.070	0.000	0.007	0.000	0.00000	0.000	0.009	0.00000	0.00000	0.014	0.350	0.002	4.500	0.051	).0000	0.000	0.000	0.0000	0.110
May 19, 2011	0.000	1.3	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.000	0.590	0.002	5.000	0.060	).0000	0.000	0.000	0.0000	0.000
May 19, 2011	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00100	0.001	0.070	0.001	3.000	0.010	).0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	2.8	0.290	0.000	0.000	0.020	0.00000	0.000	0.000	0.00000	0.00000	0.003	0.040	0.000	0.000	0.000	).0000	0.000	0.000	0.0000	0.000
May 19, 2011	0.000	1.5	0.000	0.160	0.000	0.050	0.00000	0.000	0.060	0.00000	0.00200	0.004	0.440	0.002	9.000	0.100	).0000	0.000	0.000	0.0000	0.020
May 20, 2010	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.001	0.040	0.000	3.000	0.010	).0000	0.000	0.000	0.0000	0.020
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May 20, 2010	0.000	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.001	0.050	0.000	6.000	0.050	).0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	1.2	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.002	0.470	0.002	2.000	0.030	).0000	0.000	0.000	0.0000	0.000

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Selenium - The maximum acceptable concentration for selenium in drinking water is 0.01 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Uranium - The interim maximum acceptable concentration for uranium in drinking water is 0.02 mg/L. Uranium may enter drinking water from naturally occurring deposits or as a result of human activity, such as mill tailings and phosphate fertilizers. High levels of this contaminant can cause adverse health effects for some people.

Antimony - The interim maximum acceptable concentration (IMAC) for antimony in drinking water is 0.006 mg/L. It is a naturally occurring metal that is introduced into water through the natural weathering of rocks, runoff from soils, effluents from mining and manufacturing operations, industrial and municipal leachate discharges and from household piping and possibly non-leaded solders. High levels of this contaminant can cause adverse health effects for some people.

Copper - The maximum acceptable concentration for copper in drinking water is 2.0 mg/L and the aesthetic objective for copper in drinking water is 1.0 mg/L. Copper is widely distributed in nature and is found frequently in surface water and in some groundwater. Usually, copper in tap water is the result of dissolution of copper piping within the distribution system. The aesthetic objective was set to ensure palatability and to minimize staining of laundry and plumbing fixtures. Copper is an essential element in human metabolism and copper deficiency results in a variety of clinical disorders. At extremely high doses copper intake can result in adverse health effects. High levels of copper in tap water may result in blue-green staining on some fixtures.

Iron - The aesthetic objective for iron in drinking water is 0.3 mg/L. Usually, iron in tap water is the result of high iron content in the raw water and dissolution of iron piping within the distribution system. Iron is an essential element in nutrition. High levels of iron in tap water can cause staining of laundry and plumbing fixtures, unpleasant taste, colour and promote biological growths in the distribution system.

Manganese - The maximum acceptable concentration for manganese in drinking water is 0.12 mg/L and the aesthetic objective for manganese in drinking water is 0.02 mg/L. Usually, manganese in drinking water is the result of high amounts of manganese in the source water supply's bedrock Levels above the maximum acceptable concentration can cause adverse health effects for some people. Levels above the aesthetic objective may cause staining of plumbing and laundry and undesirable tastes in beverages.

Zinc - The aesthetic objective for zinc in drinking water is 5.0 mg/L. Zinc in water can be naturally occurring or due to zinc in plumbing materials. Zinc is an essential element for human nutrition. Long term ingestion of zinc has not resulted in adverse effects. Water with zinc concentrations higher than the aesthetic objective has an astringent taste and may be opalescent and develop a greasy film on boiling.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ = Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Source Water Quality for Public Water Supplies
Nutrients and Metals

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Community Name: **Ship Cove-Lower Cove-Jerry's**
Service Area: **Lower Cove**
Source Name: **#6 Well - Lower Cove Well**

Sep 15, 2020	0.000	0.7	0.520	0.000	0.000	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.003	0.000	0.000	18.000	0.000	).0000	0.000	0.000	0.0000	0.000
Jun 01, 2011	0.000	0.8	0.390	0.000	0.030	0.000	0.00000	0.000	0.080	0.00000	0.00200	0.000	0.000	0.000	22.000	0.000	).0000	0.000	0.000	0.0000	0.000
May 18, 2010	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.000	0.080	0.00000	0.00200	0.008	0.000	0.002	17.000	0.000	).0000	0.000	0.000	0.0000	0.010
Jun 02, 2008	0.000	0.0	0.320	0.000	0.000	0.000	0.00000	0.000	0.095	0.00000	0.00000	0.000	0.000	0.001	18.000	0.000	).0000	0.000	0.000	0.0005	0.012
Sep 11, 2007	0.000	0.8	0.350	0.000	0.000	0.010	0.00000	0.000	0.092	0.00000	0.00000	0.000	0.000	0.001	19.000	0.002	).0000	0.000	0.000	0.0006	0.011
Sep 18, 2006	0.000	0.6	0.420	0.000	0.000	0.010	0.00000	0.000	0.090	0.00000	0.00100	0.000	0.000	0.000	16.000	0.000	).0000	0.000	0.000	0.0000	0.000
Jan 16, 2006	0.000	0.0	0.380	0.170	0.010	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.000	0.000	0.000	16.000	0.000	).0000	0.000	0.000	0.0000	0.000
Nov 08, 2004	0.000	0.0	0.450	0.100	0.000	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.000	0.000	0.000	17.000	0.000	).0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 16, 2004	0.000	0.0	0.430	0.130	0.020	0.000	0.00000	0.000	0.080	0.00000	0.00000	0.000	0.000	0.000	16.000	0.000	).0000	0.000	0.000	0.0000	0.000
Nov 17, 2003	0.010	0.6	0.360	0.025	0.010	0.005	0.00050	0.001	0.090	0.00005	0.00300	0.001	0.005	0.001	16.000	0.005	).0000	0.003	0.001	0.0005	0.005
Apr 29, 2003	0.010	0.6	0.330	0.060	0.020	0.040	0.00050	0.001	0.090	0.00005	0.00100	0.039	0.060	0.006	17.000	0.025	).0000	0.003	0.001	0.0005	0.003
Nov 23, 2001	0.010	3.7	0.270	0.300	0.020	0.025		0.001	0.070	0.00005	0.00050	0.003	0.005	0.001	18.000	0.005	).0000	0.005	0.001		0.005

Service Area: **Ship Cove East**

Source Name: **#3 Well - Bernard Brake Well**

Sep 15, 2020	0.000	2.2	0.290	0.000	0.003	0.000	0.00000	0.000	0.140	0.00000	0.00000	0.009	0.000	0.025	11.000	0.020	).0000	0.000	0.000	0.0000	0.040
Jun 01, 2011	0.000	2.4	0.200	0.000	0.000	0.000	0.00000	0.000	0.120	0.00010	0.00100	0.006	0.000	0.046	10.000	0.050	).0000	0.000	0.000	0.0010	0.070
May 18, 2010	0.000	2.2	0.000	0.130	0.050	0.000	0.00000	0.000	0.110	0.00020	0.00200	0.005	0.000	0.062	8.000	0.060	).0000	0.000	0.000	0.0000	0.070
Jun 05, 2008	0.000	1.9	0.140	0.100	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.005	0.000	0.045	9.700	0.043	).0000	0.000	0.000	0.0009	0.085
Sep 11, 2007	0.000	1.6	0.110	0.300	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.007	0.090	0.067	11.000	0.067	).0000	0.000	0.000	0.0011	0.110

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Sep 18, 2006	0.000	3.2	0.000	0.220	0.000	0.000	0.00000	0.000	0.140	0.00020	0.00100	0.008	0.000	0.068	9.000	0.050	).0000	0.000	0.000	0.0010	0.100
Jan 16, 2006	0.000	3.0	0.000	0.150	0.020	0.000	0.00000	0.000	0.130	0.00020	0.00000	0.007	0.000	0.074	9.000	0.080	).0000	0.000	0.000	0.0000	0.110
Nov 08, 2004	0.030	2.8	0.000	0.110	0.020	0.000	0.00000	0.000	0.140	0.00020	0.00000	0.008	0.010	0.064	9.000	0.080	).0000	0.000	0.000	0.0000	0.140
Jun 16, 2004	0.000	2.7	0.000	0.150	0.030	0.000	0.00000	0.000	0.120	0.00020	0.00000	0.007	0.010	0.066	8.000	0.060	).0000	0.000	0.001	0.0010	0.130
Nov 17, 2003	0.010	3.1	0.050	0.140	0.005	0.040	0.00050	0.001	0.130	0.00020	0.00300	0.008	0.020	0.063	8.000	0.080	).0000	0.003	0.001	0.0010	0.170
Apr 29, 2003	0.010	2.9	0.050	0.100	0.005	0.030	0.00050	0.001	0.130	0.00020	0.00050	0.018	0.070	0.071	9.000	0.078	).0000	0.003	0.001	0.0010	0.143
Oct 24, 2002	0.010	3.6	0.050	0.130	0.005	0.200	0.00050	0.001	0.130	0.00020	0.00300	0.009	0.050	0.056	9.000	0.103	).0000	0.003	0.001	0.0010	0.111
May 14, 2002	0.010	2.1	0.110	0.130	0.005	0.025	0.00050	0.001	0.120	0.00005	0.00050	0.006	0.005	0.048	10.000	0.070	).0000	0.005	0.001	0.0010	0.100
Apr 24, 2002	0.010	2.4	0.050	0.100	0.010	0.025	0.00050	0.001	0.110	0.00005	0.00100	0.006	0.020	0.044	9.000	0.060	).0000	0.005	0.001		0.110
Nov 23, 2001	0.030	3.9	0.050	0.025	0.005	0.025		0.001	0.120	0.00040	0.00050	0.006	0.010	0.045	11.000	0.070	).0000	0.005	0.001		0.110

Service Area: **Ship Cove, Jerry's Nose**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Source Name:	**#1 Well - PJ's Variety Well**																				
Sep 15, 2020	0.000	1.5	0.000	0.000	0.010	0.010	0.00000	0.000	0.130	0.00000	0.00000	0.006	0.060	0.000	16.000	0.080	.0000	0.000	0.000	0.0010	0.000
Jun 01, 2011	0.060	1.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.120	0.00000	0.00200	0.000	0.090	0.000	17.000	0.150	.0000	0.000	0.000	0.0020	0.000
May 18, 2010	0.040	2.3	0.000	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00300	0.000	0.060	0.000	13.000	0.120	.0000	0.000	0.000	0.0020	0.000
Jun 05, 2008	0.000	1.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.006	0.000	0.001	17.000	0.110	.0000	0.000	0.000	0.0014	0.017
Sep 11, 2007	0.050	0.9	0.000	0.100	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.003	0.000	0.001	19.000	0.084	.0000	0.000	0.000	0.0019	0.016
Sep 18, 2006	0.030	1.5	0.000	0.000	0.030	0.000	0.00000	0.000	0.130	0.00000	0.00200	0.002	0.050	0.000	16.000	0.140	.0000	0.000	0.000	0.0020	0.010
Jan 16, 2006	0.050	1.5	0.000	0.100	0.000	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.002	0.120	0.001	16.000	0.160	.0000	0.000	0.000	0.0010	0.010
Nov 08, 2004	0.050	0.9	0.000	0.000	0.030	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.003	0.080	0.001	17.000	0.160	.0000	0.000	0.000	0.0020	0.010
Jun 16, 2004	0.070	1.1	0.000	0.470	0.020	0.000	0.00000	0.001	0.110	0.00000	0.00000	0.002	0.130	0.002	18.000	0.200	.0000	0.000	0.000	0.0020	0.000
Nov 17, 2003	0.050	1.4	0.050	0.110	0.005	0.005	0.00050	0.001	0.120	0.00005	0.00300	0.026	0.110	0.004	17.000	0.200	.0000	0.003	0.001	0.0020	0.030

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Aug 12, 2003	0.060	1.3	0.050	0.150	0.010	0.010	0.00050	0.002	0.140	0.00005	0.01100	0.002	0.620	0.009	16.000	0.215	).0000	0.001	0.001	0.0030	0.015
Nov 23, 2001	0.040	2.4	0.050	0.025	0.005	0.025		0.001	0.100	0.00005	0.00050	0.062	0.180	0.004	19.000	0.170	).0000	0.005	0.001		0.040
Source Name:	**#2 Well - Howard & Rodney Jesso Well**																				
Sep 15, 2020	0.000	1.6	0.130	0.000	0.005	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.005	0.000	0.000	14.000	0.000	).0000	0.000	0.000	0.0000	0.000
Jun 01, 2011	0.000	1.5	0.000	0.000	0.000	0.050	0.00000	0.000	0.120	0.00000	0.00200	0.003	0.060	0.003	15.000	0.010	).0000	0.000	0.000	0.0010	0.000
May 18, 2010	0.020	1.4	0.000	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00300	0.002	0.000	0.002	15.000	0.000	).0000	0.000	0.000	0.0000	0.000
Jun 05, 2008	0.000	1.1	0.120	0.000	0.000	0.000	0.00000	0.000	0.130	0.00000	0.00000	0.003	0.000	0.000	15.000	0.008	).0000	0.000	0.000	0.0008	0.007
Sep 11, 2007	0.000	0.9	0.090	0.100	0.000	0.040	0.00000	0.000	0.110	0.00000	0.00000	0.002	0.000	0.001	19.000	0.005	).0000	0.000	0.000	0.0017	0.008
Sep 18, 2006	0.000	1.7	0.140	0.000	0.000	0.000	0.00000	0.000	0.140	0.00000	0.00200	0.003	0.000	0.000	16.000	0.020	).0000	0.000	0.000	0.0000	0.020
Jan 16, 2006	0.000	1.7	0.120	0.000	0.020	0.020	0.00000	0.000	0.120	0.00000	0.00000	0.002	0.000	0.002	16.000	0.000	).0000	0.000	0.000	0.0010	0.000
Nov 08, 2004	0.000	0.8	0.150	0.000	0.000	0.010	0.00000	0.000	0.120	0.00000	0.00000	0.002	0.010	0.001	18.000	0.010	).0000	0.000	0.000	0.0010	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 16, 2004	0.000	1.3	0.000	0.150	0.000	0.040	0.00000	0.000	0.110	0.00000	0.00100	0.013	0.040	0.003	14.000	0.010	0.0000	0.000	0.000	0.0010	0.010
Nov 17, 2003	0.010	0.5	0.250	0.070	0.030	0.030	0.00050	0.001	0.120	0.00005	0.00400	0.005	0.030	0.006	15.000	0.210	0.0000	0.003	0.001	0.0005	0.010
Apr 29, 2003	0.010	1.4	0.310	0.100	0.010	0.020	0.00050	0.001	0.100	0.00005	0.00100	0.004	0.020	0.002	12.000	0.032	0.0000	0.003	0.001	0.0010	0.015
Nov 23, 2001	0.010	1.9	0.310	0.025	0.005	0.025		0.001	0.100	0.00005	0.00050	0.002	0.005	0.001	15.000	0.005	0.0000	0.005	0.001		0.005
Source Name: **#4B Well - Nancy Rowe Well**																					
Sep 15, 2020	0.000	3.4	0.270	0.000	0.010	0.020	0.00000	0.000	0.100	0.00000	0.00000	0.006	0.070	0.003	11.000	0.070	0.0000	0.000	0.000	0.0000	0.000
Source Name: **#5 Well - Murdock Wheeler Well**																					
Sep 15, 2020	0.000	0.7	0.270	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.003	0.000	0.000	23.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jun 01, 2011	0.000	1.1	0.190	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00200	0.000	0.000	0.000	15.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 18, 2010	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00100	0.000	0.000	0.000	19.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jun 02, 2008	0.000	0.0	0.200	0.000	0.000	0.000	0.00000	0.000	0.052	0.00000	0.00000	0.004	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0007	0.010

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Sep 11, 2007	0.000	0.7	0.160	0.000	0.000	0.000	0.00000	0.000	0.047	0.00000	0.00000	0.004	0.000	0.000	24.000	0.000	0.0000	0.000	0.000	0.0005	0.011
Sep 18, 2006	0.000	0.6	0.220	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.003	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 16, 2006	0.000	1.0	0.160	0.080	0.020	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.002	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Nov 08, 2004	0.080	0.0	0.200	0.000	0.020	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.002	0.000	0.000	22.000	0.000	0.0000	0.000	0.000	0.0000	0.080
Jun 16, 2004	0.000	0.5	0.170	0.110	0.010	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.004	0.000	0.000	20.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Nov 17, 2003	0.030	0.7	0.190	0.025	0.005	0.005	0.00050	0.001	0.040	0.00005	0.00400	0.002	0.005	0.001	20.000	0.005	0.0000	0.003	0.001	0.0005	0.005
Apr 29, 2003	0.020	0.7	0.180	0.025	0.010	0.030	0.00050	0.001	0.050	0.00005	0.00050	0.003	0.010	0.001	21.000	0.007	0.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	0.9	0.150	0.025	0.005	0.200	0.00050	0.001	0.050	0.00005	0.00500	0.009	0.040	0.003	22.000	0.031	0.0000	0.003	0.001	0.0005	0.003
May 14, 2002	0.040	0.3	0.180	0.060	0.005	0.210	0.00050	0.001	0.050	0.00005	0.00050	0.004	0.005	0.001	23.000	0.005	0.0000	0.005	0.001	0.0005	0.005
Feb 15, 2002	0.010	2.5	0.050	0.080	0.005	0.025	0.00050	0.001	0.140	0.00005	0.00800	0.004	0.120	0.006	10.000	0.060	0.0000	0.005	0.001	0.0005	0.100
Feb 04, 2002								0.001						0.044							

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Nov 23, 2001	0.010	1.7	0.210	0.025	0.005	0.025		0.001	0.040	0.00005	0.00050	0.007	0.005	0.001	23.000	0.005	).0000	0.005	0.001		0.005

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sep 16, 2020	0.000	1.4	0.620	0.000	0.005	0.020	0.00000	0.000	0.010	0.00000	0.00000	0.007	0.350	0.000	4.000	0.000	).0000	0.000	0.000	0.0000	0.010
Sep 16, 2020	0.000	0.6	0.110	0.000	0.004	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.008	0.160	0.000	4.000	0.040	).0000	0.000	0.000	0.0000	0.020
Sep 16, 2020	0.000	1.3	0.000	0.000	0.007	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.006	0.180	0.001	6.000	0.020	).0000	0.000	0.000	0.0000	0.020
Aug 16, 2017	0.000	1.2	0.000	0.000	0.012	0.011	0.00000	0.000	0.016	0.00000	0.00000	0.004	0.340	0.005	5.000	0.036	).0000	0.000	0.000	0.0000	0.053
Aug 16, 2017	0.000	1.0	0.070	0.000	0.007	0.000	0.00000	0.000	0.009	0.00000	0.00000	0.014	0.350	0.002	4.500	0.051	).0000	0.000	0.000	0.0000	0.110
Aug 16, 2017	0.000	1.0	0.750	0.000	0.006	0.008	0.00000	0.000	0.012	0.00000	0.00500	0.140	0.096	0.022	4.300	0.000	).0000	0.000	0.000	0.0000	0.100
May 19, 2011	0.000	1.5	0.000	0.160	0.000	0.050	0.00000	0.000	0.060	0.00000	0.00200	0.004	0.440	0.002	9.000	0.100	).0000	0.000	0.000	0.0000	0.020
May 19, 2011	0.000	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00100	0.001	0.070	0.001	3.000	0.010	).0000	0.000	0.000	0.0000	0.020

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
May 19, 2011	0.000	2.8	0.290	0.000	0.000	0.020	0.00000	0.000	0.000	0.00000	0.00000	0.003	0.040	0.000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2011	0.000	1.3	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.000	0.590	0.002	5.000	0.060	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.001	0.050	0.000	6.000	0.050	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.8	0.290	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.004	0.190	0.002	3.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	1.2	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.002	0.470	0.002	2.000	0.030	0.0000	0.000	0.000	0.0000	0.000
May 20, 2010	0.000	0.8	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.001	0.040	0.000	3.000	0.010	0.0000	0.000	0.000	0.0000	0.020

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department

Quality Assurance / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.

LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects of contaminants

Contaminant and Aesthetic Exceedances

Nitrate(ite) - The maximum acceptable concentration for nitrate(ite) in drinking water is 10 mg/L expressed as nitrate-nitrogen. Nitrate and nitrite are naturally occurring ions that are widespread in the environment. High levels of this contaminant can cause adverse health effects for some people.

Arsenic - The interim maximum acceptable concentration for arsenic in drinking water is 0.01 mg/L. Arsenic is introduced into water through the dissolution of minerals and ores, from industrial effluents and via atmospheric deposition. High levels of this contaminant can cause adverse health effects for some people.

Barium - The maximum acceptable concentration for barium in drinking water is 2.0 mg/L. Barium is not found free in nature but occurs as in a number of compounds. High levels of this contaminant can cause adverse health effects for some people.

Cadmium - The maximum acceptable concentration for cadmium in drinking water is 0.007 mg/L. Cadmium that is present as an impurity in galvanized pipes, a constituent of solders used in fitting water heaters or incorporated into stabilizers in black polyethylene pipes may contaminate water supplies during their distribution. High levels of this contaminant can cause adverse health effects for some people.

Chromium - The maximum acceptable concentration for chromium in drinking water is 0.05 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Lead - The maximum acceptable concentration for lead in drinking water is 0.005 mg/l. Lead is present in tap water as a result of dissolution from natural sources or from the distribution systems and plumbing containing lead in pipes, solder or service connections. High levels of this contaminant can cause adverse health effects for some people.

Mercury - The maximum acceptable concentration for mercury in drinking water is 0.001 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Selenium - The maximum acceptable concentration for selenium in drinking water is 0.01 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Uranium - The interim maximum acceptable concentration for uranium in drinking water is 0.02 mg/L. Uranium may enter drinking water from naturally occurring deposits or as a result of human activity, such as mill tailings and phosphate fertilizers. High levels of this contaminant can cause adverse health effects for some people.

Antimony - The interim maximum acceptable concentration (IMAC) for antimony in drinking water is 0.006 mg/L. It is a naturally occurring metal that is introduced into water through the natural weathering of rocks, runoff from soils, effluents from mining and manufacturing operations, industrial and municipal leachate discharges and from household piping and possibly non-leaded solders. High levels of this contaminant can cause adverse health effects for some people.

Copper - The maximum acceptable concentration for copper in drinking water is 2.0 mg/L and the aesthetic objective for copper in drinking water is 1.0 mg/L. Copper is widely distributed in nature and is found frequently in surface water and in some groundwater. Usually, copper in tap water is the result of dissolution of copper piping within the distribution system. The aesthetic objective was set to ensure palatability and to minimize staining of laundry and plumbing fixtures. Copper is an essential element in human metabolism and copper deficiency results in a variety of clinical disorders. At extremely high doses copper intake can result in adverse health effects. High levels of copper in tap water may result in blue-green staining on some fixtures.

Iron - The aesthetic objective for iron in drinking water is 0.3 mg/L. Usually, iron in tap water is the result of high iron content in the raw water and dissolution of iron piping within the distribution system. Iron is an essential element in nutrition. High levels of iron in tap water can cause staining of laundry and plumbing fixtures, unpleasant taste, colour and promote biological growths in the distribution system.

Manganese - The maximum acceptable concentration for manganese in drinking water is 0.12 mg/L and the aesthetic objective for manganese in drinking water is 0.02 mg/L. Usually, manganese in drinking water is the result of high amounts of manganese in the source water supply's bedrock Levels above the maximum acceptable concentration can cause adverse health effects for some people Levels above the aesthetic objective may cause staining of plumbing and laundry and undesirable tastes in beverages.

Zinc - The aesthetic objective for zinc in drinking water is 5.0 mg/L. Zinc in water can be naturally occurring or due to zinc in plumbing materials. Zinc is an essential element for human nutrition. Long term ingestion of zinc has not resulted in adverse effects. Water with zinc concentrations higher than the aesthetic objective has an astringent taste and may be opalescent and develop a greasy film on boiling.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ = Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Source Water Quality for Public Water Supplies
Nutrients and Metals

Community Name: **Stephenville**
Service Area: **Stephenville**
Source Name: **Well Field**

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Sep 16, 2020	0.000	0.6	0.000	0.000	0.006	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.002	0.050	0.000	9.000	0.200	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	2.5	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.005	0.090	0.000	9.000	0.240	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	1.1	0.000	0.000	0.000	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.011	0.000	0.001	11.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.070	0.9	0.000	0.000	0.007	0.000	0.00000	0.000	0.080	0.00000	0.00000	0.005	0.260	0.000	12.000	0.280	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	0.0	0.480	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	0.0	0.480	0.000	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.001	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Sep 16, 2020	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.001	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Sep 16, 2020	0.023	0.5	0.000	0.000	0.007	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.002	0.240	0.000	13.000	0.170	).0000	0.000	0.000	0.0000	0.000
Aug 16, 2017	0.000	0.0	0.450	0.000	0.006	0.000	0.00000	0.000	0.036	0.00000	0.00000	0.000	0.000	0.000	11.000	0.000	).0000	0.000	0.000	0.0003	0.000
Aug 16, 2017	0.000	0.5	0.000	0.000	0.007	0.000	0.00000	0.000	0.054	0.00000	0.00000	0.000	0.000	0.000	11.000	0.000	).0000	0.000	0.000	0.0008	0.000
Aug 16, 2017	0.000	0.5	0.000	0.000	0.005	0.000	0.00000	0.000	0.059	0.00000	0.00000	0.000	0.000	0.000	11.000	0.004	).0000	0.000	0.000	0.0008	0.000
Aug 16, 2017	0.050	0.8	0.000	0.000	0.007	0.000	0.00000	0.000	0.120	0.00000	0.00000	0.004	0.000	0.000	8.500	0.190	).0000	0.000	0.000	0.0002	0.000
Aug 16, 2017	0.091	1.1	0.000	0.000	0.008	0.000	0.00000	0.000	0.074	0.00000	0.00000	0.000	0.260	0.000	12.000	0.250	).0000	0.000	0.000	0.0002	0.000
Aug 16, 2017	0.000	1.1	0.140	0.000	0.000	0.010	0.00000	0.000	0.013	0.00000	0.00000	0.008	0.000	0.002	12.000	0.011	).0000	0.000	0.000	0.0004	0.012
Aug 16, 2017	0.000	0.7	0.430	0.000	0.006	0.012	0.00000	0.000	0.033	0.00000	0.00000	0.000	0.000	0.000	11.000	0.000	).0000	0.000	0.000	0.0003	0.000
Aug 16, 2017	0.061	0.7	0.000	0.000	0.008	0.000	0.00000	0.000	0.080	0.00000	0.00000	0.000	0.080	0.000	13.000	0.160	).0000	0.000	0.000	0.0005	0.000
May 31, 2011	0.000	0.5	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00100	0.000	0.000	0.000	10.000	0.000	).0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.000	0.6	0.440	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	).0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
May 31, 2011	0.000	2.2	0.000	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.002	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.050	1.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.110	0.00000	0.00000	0.000	0.000	0.000	9.000	0.180	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.040	0.6	0.000	0.000	0.190	0.000	0.00000	0.000	0.060	0.00000	0.00100	0.000	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.040	1.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.220	0.000	11.000	0.200	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.000	1.0	0.130	0.000	0.000	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.003	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.000	0.6	0.420	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00200	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 31, 2011	0.050	0.7	0.000	0.000	0.000	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.000	0.050	0.000	12.000	0.160	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.000	0.0	0.440	0.000	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.000	1.1	0.000	0.000	0.000	0.000	0.00000	0.000	0.010	0.00000	0.00100	0.002	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.000	1.9	0.000	0.130	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00100	0.002	0.000	0.000	8.000	0.000	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
May 19, 2010	0.000	0.7	0.440	0.000	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.020	0.9	0.000	0.000	0.000	0.000	0.00000	0.000	0.100	0.00000	0.00000	0.000	0.040	0.000	7.000	0.180	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.040	1.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.210	0.000	10.000	0.190	0.0000	0.000	0.000	0.0000	0.000
May 19, 2010	0.040	0.7	0.000	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.050	0.000	11.000	0.140	0.0000	0.000	0.000	0.0000	0.000
May 29, 2008	0.000	0.0	0.000	0.000	0.000	0.010	0.00000	0.000	0.053	0.00000	0.00000	0.010	0.000	0.000	9.800	0.000	0.0000	0.000	0.000	0.0008	0.006
May 29, 2008	0.060	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.066	0.00000	0.00000	0.000	0.080	0.000	11.000	0.150	0.0000	0.000	0.000	0.0005	0.007
May 29, 2008	0.060	0.6	0.000	0.100	0.000	0.000	0.00000	0.000	0.069	0.00000	0.00000	0.000	0.130	0.000	11.000	0.210	0.0000	0.000	0.000	0.0003	0.007
May 29, 2008	0.060	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.100	0.00000	0.00000	0.000	0.000	0.000	7.600	0.180	0.0000	0.000	0.000	0.0002	0.007
May 29, 2008	0.000	0.0	0.070	0.000	0.000	0.000	0.00000	0.000	0.063	0.00000	0.00000	0.000	0.000	0.000	11.000	0.005	0.0000	0.000	0.000	0.0008	0.008
May 29, 2008	0.000	0.6	0.160	0.000	0.000	0.000	0.00000	0.000	0.011	0.00000	0.00000	0.004	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0004	0.008

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
May 29, 2008	0.050	1.7	0.130	0.000	0.000	0.000	0.00000	0.000	0.019	0.00000	0.00000	0.003	0.000	0.000	8.400	0.000	0.0000	0.000	0.000	0.0003	0.007
May 29, 2008	0.000	0.0	0.540	0.000	0.000	0.000	0.00000	0.000	0.035	0.00000	0.00000	0.000	0.000	0.000	9.500	0.000	0.0000	0.000	0.000	0.0003	0.008
Sep 11, 2007	0.000	0.0	0.000	0.100	0.000	0.000	0.00000	0.000	0.052	0.00000	0.00000	0.000	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0008	0.009
Feb 05, 2007	0.000	0.0	0.480	0.110	0.010	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.001	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	0.8	0.000	0.110	0.020	0.000	0.00000	0.000	0.100	0.00000	0.00100	0.000	0.000	0.000	7.000	0.170	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.040	0.5	0.000	0.090	0.030	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.070	0.000	11.000	0.150	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	2.2	0.170	0.000	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.003	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.040	0.0	0.000	0.140	0.020	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.022	0.050	0.003	11.000	0.150	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	1.0	0.000	0.060	0.010	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.001	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	0.0	0.500	0.080	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Feb 05, 2007	0.000	0.0	0.000	0.000	0.010	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.001	0.000	0.000	10.000	0.000	).0000	0.000	0.000	0.0000	0.000
Feb 05, 2007	0.000	0.7	0.190	0.050	0.020	0.000	0.00000	0.000	0.050	0.00000	0.00100	0.000	0.000	0.000	9.000	0.020	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	2.0	0.000	0.000	0.020	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.040	0.9	0.000	0.000	0.030	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.000	0.130	0.000	10.000	0.200	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	2.9	0.000	0.120	0.010	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.002	0.000	0.000	8.000	0.090	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	0.0	0.000	0.000	0.010	0.000	0.00000	0.000	0.060	0.00000	0.00100	0.000	0.000	0.000	10.000	0.000	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	0.0	0.460	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	0.7	0.000	0.000	0.020	0.000	0.00000	0.000	0.100	0.00000	0.00100	0.001	0.000	0.000	6.000	0.170		0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	0.0	0.480	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.040	0.6	0.000	0.000	0.050	0.000	0.00000	0.000	0.080	0.00000	0.00000	0.000	0.060	0.000	11.000	0.150	).0000	0.000	0.000	0.0000	0.000
Sep 19, 2006	0.000	1.0	0.000	0.000	0.020	0.000	0.00000	0.000	0.010	0.00000	0.00000	0.002	0.000	0.000	10.000	0.000	).0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jan 17, 2006	0.000	0.5	0.450	0.070	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.001	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.000	0.0	0.430	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.040	1.0	0.000	0.060	0.020	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.210	0.000	12.000	0.220	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.000	0.0	0.000	0.000	0.020	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.020	1.2	0.000	0.060	0.030	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.002	0.030	0.000	7.000	0.170	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.000	2.4	0.200	0.190	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.003	0.000	0.001	8.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.000	0.0	0.000	0.140	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.050	1.0	0.000	0.070	0.020	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.000	0.080	0.000	11.000	0.170	0.0000	0.000	0.000	0.0000	0.000
Jan 17, 2006	0.000	1.4	0.000	0.070	0.010	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.002	0.000	0.000	11.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Sep 20, 2005	0.060	0.0	0.000	0.070	0.030	0.000	0.00000	0.000	0.070	0.00000	0.00000	0.001	0.060	0.000	11.000	0.160	0.0000	0.000	0.000	0.0000	0.000
Sep 20, 2005	0.060	0.0	0.000	0.000	0.020	0.000	0.00000	0.000	0.090	0.00000	0.00000	0.000	0.030	0.000	7.000	0.160	0.0000	0.000	0.000	0.0000	0.000

	Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality				10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)				C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
	Sep 20, 2005	0.000	0.0	0.440	0.000	0.000	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.000	0.0	0.490	0.070	0.000	0.000	0.00000	0.000	0.030	0.00000	0.00000	0.001	0.000	0.000	9.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.000	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.000	2.3	0.000	0.070	0.020	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.002	0.000	0.000	8.000	0.070	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.000	0.6	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.000	0.0	0.000	0.060	0.010	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Sep 20, 2005	0.030	0.0	0.000	0.000	0.000	0.000	0.00000	0.000	0.050	0.00000	0.00100	0.000	0.280	0.000	10.000	0.180	.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.030	0.0	0.110	0.000	0.020	0.050	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.030	0.000	9.000	0.050	.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.030	0.0	0.400	0.000	0.030	0.000	0.00000	0.000	0.040	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.030	0.0	0.000	0.000	0.030	0.050	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.360	0.000	11.000	0.220	.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.080	0.0	0.000	0.160	0.030	0.050	0.00000	0.000	0.070	0.00000	0.00000	0.001	0.010	0.000	11.000	0.000	.0000	0.000	0.000	0.0000	0.000

	Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality				10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)				C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
	Nov 09, 2004	0.030	0.8	0.000	0.000	0.040	0.050	0.00000	0.000	0.010	0.00000	0.00000	0.001	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.080	0.0	0.000	0.130	0.040	0.050	0.00000	0.000	0.080	0.00000	0.00000	0.000	0.060	0.000	13.000	0.180	0.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.060	2.4	0.150	0.110	0.010	0.050	0.00000	0.000	0.020	0.00000	0.00000	0.002	0.000	0.002	8.000	0.030	0.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.000	0.0	0.000	0.000	0.020	0.050	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Nov 09, 2004	0.030	0.0	0.000	0.000	0.050	0.050	0.00000	0.000	0.100	0.00000	0.00000	0.000	0.050	0.000	7.000	0.160	0.0000	0.000	0.000	0.0000	0.000
	Jun 16, 2004	0.000	2.7	0.270	0.340	0.010	0.010	0.00000	0.000	0.050	0.00000	0.00200	0.000	0.020	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Jun 16, 2004	0.000	0.6	0.000	0.100	0.040	0.000	0.00000	0.000	0.060	0.00000	0.00100	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Jun 16, 2004	0.000	0.7	0.380	0.220	0.010	0.000	0.00000	0.000	0.040	0.00000	0.00100	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Jun 16, 2004	0.000	0.6	0.430	0.050	0.040	0.000	0.00000	0.000	0.040	0.00000	0.00100	0.000	0.000	0.000	9.000	0.000	0.0000	0.000	0.000	0.0000	0.000
	Jun 16, 2004	0.000	0.0	0.000	0.200	0.020	0.000	0.00000	0.000	0.050	0.00000	0.00000	0.000	0.000	0.000	8.000	0.000	0.0010	0.000	0.000	0.0000	0.000
	Jun 15, 2004	0.080	0.7	0.000	0.100	0.070	0.000	0.00000	0.000	0.080	0.00000	0.00000	0.000	0.070	0.000	13.000	0.170	0.0000	0.000	0.000	0.0000	0.000

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Jun 15, 2004	0.060	0.8	0.000	0.060	0.080	0.000	0.00000	0.000	0.060	0.00000	0.00000	0.000	0.220	0.000	11.000	0.210	0.0000	0.000	0.000	0.0000	0.000
Jun 15, 2004	0.000	1.1	0.140	0.000	0.040	0.000	0.00000	0.000	0.000	0.00000	0.00000	0.000	0.000	0.000	10.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Jun 15, 2004	0.020	0.5	0.000	0.000	0.050	0.000	0.00000	0.000	0.100	0.00000	0.00000	0.000	0.020	0.000	6.000	0.130	0.0000	0.000	0.000	0.0000	0.000
Jun 15, 2004	0.060	2.2	0.150	0.150	0.000	0.000	0.00000	0.000	0.020	0.00000	0.00000	0.002	0.000	0.000	7.000	0.000	0.0000	0.000	0.000	0.0000	0.000
Oct 01, 2003	0.060	0.3	0.050	0.090	0.040	0.120	0.00050	0.001	0.070	0.00020	0.00050	0.001	0.080	0.001	11.000	0.161	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.050	0.050	0.050	0.040	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.440	0.001	10.000	0.173	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.410	0.025	0.030	0.070	0.00050	0.001	0.040	0.00005	0.00050	0.001	0.010	0.001	9.000	0.012	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.080		0.360	0.120	0.040	0.110	0.00050	0.001	0.040	0.00005	0.00050	0.001	0.020	0.001	9.000	0.018	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	1.3	0.120	0.070	0.030	0.080	0.00050	0.001	0.020	0.00005	0.00050	0.003	0.020	0.001	9.000	0.024	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.050	0.025	0.010	0.005	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.005	0.001	8.000	0.003	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.210	0.025	0.010	0.005	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.060	0.001	9.000	0.028	0.0000	0.003	0.001	0.0005	0.005

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Oct 01, 2003	0.010	0.3	0.050	0.025	0.050	0.030	0.00050	0.001	0.080	0.00005	0.00050	0.001	0.030	0.001	6.000	0.132	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.110	0.025	0.040	0.090	0.00050	0.001	0.010	0.00005	0.00050	0.012	0.020	0.001	11.000	0.014	0.0000	0.003	0.001	0.0005	0.005
Oct 01, 2003	0.010	0.3	0.100	0.025	0.005	0.210	0.00050	0.001	0.070	0.00005	0.00050	0.002	0.030	0.001	9.000	0.045	0.0000	0.003	0.001	0.0005	0.005
Apr 29, 2003	0.010	0.7	0.180	0.025	0.010	0.050	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.030	0.001	8.000	0.051	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.010	0.3	0.050	0.025	0.050	0.005	0.00050	0.001	0.060	0.00005	0.00050	0.001	0.005	0.001	8.000	0.016	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.010	0.3	0.050	0.025	0.005	0.005	0.00050	0.001	0.070	0.00005	0.00050	0.001	0.005	0.001	9.000	0.003	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.010	0.3	0.420	0.025	0.005	0.005	0.00050	0.001	0.040	0.00005	0.00050	0.001	0.005	0.001	9.000	0.003	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.010	0.3	0.420	0.025	0.020	0.005	0.00050	0.001	0.040	0.00005	0.00050	0.001	0.005	0.001	10.000	0.003	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.070	0.3	0.050	0.100	0.020	0.005	0.00050	0.001	0.070	0.00005	0.00050	0.001	0.080	0.001	10.000	0.159	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.030	0.3	0.050	0.025	0.040	0.050	0.00050	0.001	0.060	0.00005	0.00050	0.001	0.220	0.001	12.000	0.219	0.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.020	0.3	0.050	0.025	0.040	0.005	0.00050	0.001	0.090	0.00005	0.00050	0.001	0.010	0.001	7.000	0.158	0.0000	0.003	0.001	0.0005	0.003

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Apr 29, 2003	0.010	1.9	0.200	0.025	0.020	0.020	0.00050	0.001	0.020	0.00005	0.00050	0.002	0.010	0.001	6.000	0.011	.0000	0.003	0.001	0.0005	0.003
Apr 29, 2003	0.010	0.5	0.110	0.025	0.030	0.040	0.00050	0.001	0.010	0.00005	0.00050	0.002	0.005	0.001	9.000	0.009	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	2.9	0.140	0.170	0.020	0.200	0.00050	0.001	0.020	0.00005	0.00100	0.003	0.040	0.001	8.000	0.029	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	1.2	0.050	0.025	0.005	0.200	0.00050	0.001	0.010	0.00005	0.00100	0.001	0.040	0.001	11.000	0.033	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	0.5	0.050	0.090	0.020	0.210	0.00050	0.001	0.080	0.00005	0.00050	0.001	0.050	0.001	6.000	0.162	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	0.3	0.050	0.025	0.020	0.210	0.00050	0.001	0.070	0.00005	0.00100	0.002	0.040	0.001	10.000	0.034	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.080	0.7	0.050	0.080	0.050	0.210	0.00050	0.001	0.070	0.00005	0.00100	0.002	0.120	0.001	11.000	0.175	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	0.3	0.410	0.025	0.005	0.150	0.00050	0.001	0.040	0.00005	0.00100	0.002	0.030	0.001	10.000	0.022	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.010	0.3	0.050	0.025	0.040	0.130	0.00050	0.001	0.050	0.00005	0.00100	0.001	0.020	0.001	9.000	0.019	.0000	0.003	0.001	0.0005	0.003
Oct 24, 2002	0.070	0.6	0.050	0.070	0.050	0.130	0.00050	0.001	0.070	0.00005	0.00100	0.002	0.100	0.001	11.000	0.162	.0000	0.003	0.001	0.0005	0.003
May 14, 2002	0.050	0.3	0.150	0.080	0.020	0.210	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.030	0.001	10.000	0.040	.0000	0.005	0.001	0.0005	0.005

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
May 14, 2002	0.010	0.3	0.050	0.025	0.005	0.025	0.00050	0.001	0.050	0.00005	0.00050	0.001	0.005	0.001	10.000	0.005	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.010	0.3	0.050	0.025	0.080	0.150	0.00050	0.001	0.070	0.00020	0.00050	0.001	0.005	0.001	11.000	0.005	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.010	0.3	0.420	0.025	0.010	0.070	0.00050	0.001	0.030	0.00005	0.00050	0.001	0.005	0.001	10.000	0.005	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.010	0.3	0.390	0.060	0.005	0.320	0.00050	0.001	0.040	0.00005	0.00050	0.002	0.020	0.001	11.000	0.005	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.010	0.3	0.050	0.025	0.020	0.025	0.00050	0.001	0.050	0.00005	0.00050	0.002	0.190	0.001	13.000	0.180	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.060	0.3	0.050	0.080	0.030	0.710	0.00050	0.001	0.070	0.00005	0.00050	0.001	0.130	0.001	13.000	0.150	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.010	0.3	0.130	0.025	0.020	0.390	0.00050	0.001	0.010	0.00005	0.00050	0.001	0.010	0.001	11.000	0.005	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.020	0.3	0.050	0.080	0.030	0.120	0.00050	0.001	0.080	0.00005	0.00050	0.002	0.005	0.001	6.000	0.130	0.0000	0.005	0.001	0.0005	0.005
May 14, 2002	0.040	1.9	0.120	0.025	0.005	0.025	0.00050	0.001	0.010	0.00005	0.00050	0.002	0.005	0.001	8.000	0.005	0.0000	0.005	0.001	0.0005	0.005
Nov 23, 2001	0.050	3.1	0.170	0.070	0.020	0.025		0.001	0.010	0.00005	0.00050	0.002	0.005	0.001	7.000	0.005	0.0000	0.005	0.001		0.005
Nov 23, 2001	0.030	0.3	0.050	0.025	0.005	0.025		0.001	0.005	0.00005	0.00050	0.001	0.005	0.001	12.000	0.005	0.0000	0.005	0.001		0.005

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A
Nov 23, 2001	0.010	0.3	0.400	0.025	0.005	0.025		0.001	0.030	0.00005	0.00050	0.001	0.005	0.001	10.000	0.005	.0000	0.005	0.001		0.005
Nov 23, 2001	0.030	0.3	0.400	0.025	0.005	0.025		0.001	0.030	0.00005	0.00050	0.001	0.010	0.001	10.000	0.005	.0000	0.005	0.001		0.005
Nov 23, 2001	0.010	0.3	0.170	0.025	0.005	0.025		0.001	0.040	0.00005	0.00050	0.001	0.020	0.001	9.000	0.040	.0000	0.005	0.001		0.005
Nov 23, 2001	0.050	2.5	0.050	0.025	0.020	0.025		0.001	0.060	0.00005	0.00050	0.001	0.005	0.001	11.000	0.005	.0000	0.005	0.001		0.005
Nov 23, 2001	0.070	0.3	0.050	0.070	0.005	0.025		0.001	0.050	0.00005	0.00050	0.001	0.180	0.001	12.000	0.180	.0000	0.005	0.001		0.005
Nov 23, 2001	0.100	0.3	0.050	0.100	0.040	0.025		0.001	0.060	0.00005	0.00050	0.001	0.080	0.001	11.000	0.130	.0000	0.005	0.001		0.005
Nov 23, 2001	0.010	0.3	0.050	0.025	0.005	0.025		0.001	0.060	0.00005	0.00050	0.001	0.005	0.001	6.000	0.130	.0000	0.005	0.001		0.005
Nov 23, 2001	0.070	0.3	0.050	0.070	0.005	0.025		0.001	0.050	0.00005	0.00050	0.001	0.005	0.001	10.000	0.005	.0000	0.005	0.001		0.005

Sample Date	Ammonia	DOC	Nitrate(ite)	Kjeldahl Nitrogen	Total Phosphorus	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Uranium	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			10				0.006	0.01	2.0	0.007	0.05	1.0 / 2.0	0.3	0.005		0.02 / 0.12	0.001		0.01	0.02	5.0
Aesthetic(A) Parameter or Contaminant (C)			C				C	C	C	C	C	A / C	A	C		A / C	C		C	C	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department

Quality Assurace / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.

LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects of contaminants.

Contaminant and Aesthetic Exceedances

Nitrate(ite) - The maximum acceptable concentration for nitrate(ite) in drinking water is 10 mg/L expressed as nitrate-nitrogen. Nitrate and nitrite are naturally occurring ions that are widespread in the environment. High levels of this contaminant can cause adverse health effects for some people.

Arsenic - The interim maximum acceptable concentration for arsenic in drinking water is 0.01 mg/L. Arsenic is introduced into water through the dissolution of minerals and ores, from industrial effluents and via atmospheric deposition. High levels of this contaminant can cause adverse health effects for some people.

Barium - The maximum acceptable concentration for barium in drinking water is 2.0 mg/L. Barium is not found free in nature but occurs as in a number of compounds. High levels of this contaminant can cause adverse health effects for some people.

Cadmium - The maximum acceptable concentration for cadmium in drinking water is 0.007 mg/L. Cadmium that is present as an impurity in galvanized pipes, a constituent of solders used in fitting water heaters or incorporated into stabilizers in black polyethylene pipes may contaminate water supplies during their distribution. High levels of this contaminant can cause adverse health effects for some people.

Chromium - The maximum acceptable concentration for chromium in drinking water is 0.05 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Lead - The maximum acceptable concentration for lead in drinking water is 0.005 mg/l. Lead is present in tap water as a result of dissolution from natural sources or from the distribution systems and plumbing containing lead in pipes, solder or service connections. High levels of this contaminant can cause adverse health effects for some people.

Mercury - The maximum acceptable concentration for mercury in drinking water is 0.001 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Selenium - The maximum acceptable concentration for selenium in drinking water is 0.01 mg/L. High levels of this contaminant can cause adverse health effects for some people.

Uranium - The interim maximum acceptable concentration for uranium in drinking water is 0.02 mg/L. Uranium may enter drinking water from naturally occurring deposits or as a result of human activity, such as mill tailings and phosphate fertilizers. High levels of this contaminant can cause adverse health effects for some people.

Antimony - The interim maximum acceptable concentration (IMAC) for antimony in drinking water is 0.006 mg/L. It is a naturally occurring metal that is introduced into water through the natural weathering of rocks, runoff from soils, effluents from mining and manufacturing operations, industrial and municipal leachate discharges and from household piping and possibly non-leaded solders. High levels of this contaminant can cause adverse health effects for some people.

Copper - The maximum acceptable concentration for copper in drinking water is 2.0 mg/L and the aesthetic objective for copper in drinking water is 1.0 mg/L. Copper is widely distributed in nature and is found frequently in surface water and in some groundwater. Usually, copper in tap water is the result of dissolution of copper piping within the distribution system. The aesthetic objective was set to ensure palatability and to minimize staining of laundry and plumbing fixtures. Copper is an essential element in human metabolism and copper deficiency results in a variety of clinical disorders. At extremely high doses copper intake can result in adverse health effects. High levels of copper in tap water may result in blue-green staining on some fixtures.

Iron - The aesthetic objective for iron in drinking water is 0.3 mg/L. Usually, iron in tap water is the result of high iron content in the raw water and dissolution of iron piping within the distribution system. Iron is an essential element in nutrition. High levels of iron in tap water can cause staining of laundry and plumbing fixtures, unpleasant taste, colour and promote biological growths in the distribution system.

Manganese - The maximum acceptable concentration for manganese in drinking water is 0.12 mg/L and the aesthetic objective for manganese in drinking water is 0.02 mg/L. Usually, manganese in drinking water is the result of high amounts of manganese in the source water supply's bedrock Levels above the maximum acceptable concentration can cause adverse health effects for some people Levels above the aesthetic objective may cause staining of plumbing and laundry and undesirable tastes in beverages.

Zinc - The aesthetic objective for zinc in drinking water is 5.0 mg/L. Zinc in water can be naturally occurring or due to zinc in plumbing materials. Zinc is an essential element for human nutrition. Long term ingestion of zinc has not resulted in adverse effects. Water with zinc concentrations higher than the aesthetic objective has an astringent taste and may be opalescent and develop a greasy film on boiling.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ = Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Source Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Community Name: **Piccadilly Slant-Abraham's Cove**

Service Area: **Abraham's Cove**

Source Name: **#2 Well - Abraham's Cove**

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
	Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A
	Sep 12, 2022	250.00	9	660.0	270.00	7.7	370		2.00	0.00	0.00	93.00	40	0.000	1.800	25	7
	Sep 25, 2020	222.00	8	559.0	249.00	7.8	363		0.80	0.02	0.00	88.00	36	0.000	2.000	28	7
	Sep 14, 2020	231.00	0	533.0	238.00	8.1	346		0.40	0.03	0.00	69.00	30	0.000	1.000	18	15
	Aug 15, 2017	250.00	14	610.0	260.00	7.8	340		0.30	0.00	0.00	88.00	52	0.000	2.000	27	7
	Jun 01, 2011	201.00	19	467.0	197.00	8.4	304		0.80	0.02	0.00	69.00	28	0.000	1.000	17	6
	Jun 22, 2010	231.00	14	520.0	240.00	7.9	338		1.30	0.02	0.00	83.00	21	0.000	1.000	18	6
	Jun 02, 2008	200.00	16	520.0	220.00	7.8	284		0.30	0.02	0.00	76.00	32	0.000	2.000	23	7
	Sep 11, 2007	230.00	11	530.0	270.00	7.6	303		0.40	0.03	0.00	94.00	22	0.000	2.100	21	6
	Feb 05, 2007	195.00	5	519.0	214.00	7.8	337		0.60	0.02	0.00	76.00	40	0.000	1.000	21	8

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Sep 18, 2006	245.00	10	565.0	256.00	7.6	367		1.10	0.03	0.06	91.00	24	0.000	2.000	20	7
Jan 16, 2006	196.00	7	501.0	206.00	7.4	326		9.70	0.04	0.00	71.00	44	0.000	1.000	20	7
Sep 20, 2005	251.00	13	533.0	241.00	7.5	346		1.10	0.03	0.07	85.00	25	0.140	2.000	19	8
Nov 08, 2004	260.00	5	554.0	283.00	7.3	360		1.10	0.04	0.00	97.00	21	0.000	2.000	20	6
Jun 16, 2004	176.00	10	421.0	185.00	7.1	274		7.20	0.02	0.00	64.00	24	0.000	2.000	17	7
Nov 19, 2003	206.00	9	469.0	209.00	7.3	305		0.50	0.02	0.11	74.00	23	0.110	3.000	20	8
Apr 29, 2003	205.00	3	599.0	224.00	7.6	389		1.30	0.03	0.03	75.00	58	0.100	3.000	35	8

Service Area: **Piccadilly Slant**

Source Name: **#1 Well - Piccadilly Slant**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Mar 03, 2022	200.00	0	480.0	230.00	7.9	270		0.16	0.00	0.00	66.00	26	0.100	1.200	15	18
Nov 16, 2021	220.00	0	500.0	230.00	7.8	280		0.12	0.00	0.00	68.00	27	0.000	1.300	14	16
Sep 14, 2020	223.00	15	555.0	234.00	8.0	361		1.60	0.02	0.00	82.00	35	0.000	1.000	24	8
Aug 15, 2017	230.00	0	490.0	240.00	8.0	290		0.29	0.00	0.00	69.00	28	0.130	1.300	15	18

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jun 01, 2011	215.00	4	491.0	236.00	8.4	319		0.20	0.03	0.00	68.00	23	0.140	1.000	15	17
Jun 22, 2010	211.00	2	504.0	238.00	8.1	328		0.00	0.03	0.00	69.00	22	0.150	1.000	16	16
Jun 02, 2008	210.00	0	500.0	240.00	8.0	277		0.00	0.03	0.00	69.00	20	0.000	1.500	15	22
Sep 11, 2007	220.00	0	520.0	270.00	8.0	293		0.00	0.03	0.00	81.00	27	0.000	1.400	18	13
Feb 05, 2007	218.00	0	514.0	232.00	8.0	334		0.20	0.03	0.57	68.00	24	0.140	1.000	15	19
Sep 18, 2006	218.00	0	517.0	237.00	8.0	336		0.20	0.03	0.05	70.00	25	0.130	1.000	15	15
Jan 16, 2006	219.00	0	485.0	227.00	7.7	315		0.70	0.03	0.00	66.00	23	0.160	1.000	14	16
Sep 20, 2005	224.00	0	487.0	233.00	7.9	317		0.30	0.04	0.00	67.00	23	0.220	1.000	14	20
Nov 08, 2004	217.00	0	494.0	248.00	7.7	321		0.00	0.03	0.00	73.00	22	0.180	1.000	15	16
Jun 16, 2004	213.00	0	482.0	213.00	7.5	313		0.20	0.03	0.13	59.00	23	0.210	1.000	14	18
Nov 19, 2003	218.00	1	485.0	231.00	7.7	315		0.10	0.04	0.03	66.00	21	0.220	2.000	15	20
Apr 29, 2003	209.00	2	492.0	214.00	7.9	320		0.10	0.03	0.03	61.00	25	0.130	1.000	20	11

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units		mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A
	Sep 16, 2020	53.00	0	252.0	49.00	7.4	164		0.40	0.00	0.00	13.00	41	0.000	0.000	30	5
	Sep 16, 2020	26.00	2	281.0	51.00	7.2	183		1.20	0.00	0.00	14.00	62	0.000	0.000	31	7
	Sep 16, 2020	65.00	2	361.0	62.00	7.2	235		0.40	0.00	0.00	15.00	69	0.000	1.000	46	11
	Aug 16, 2017	58.00	0	230.0	49.00	7.3	150		0.26	0.00	0.00	12.00	39	0.000	0.910	31	7
	Aug 16, 2017	28.00	0	310.0	60.00	6.8	170		0.16	0.00	0.00	17.00	76	0.000	0.770	35	7
	Aug 16, 2017	55.00	0	310.0	53.00	7.3	190		0.52	0.00	0.00	13.00	60	0.000	0.960	45	14
	May 19, 2011	46.00	2	202.0	35.00	7.7	131		0.50	0.00	0.00	9.00	32	0.000	0.000	27	7
	May 19, 2011	57.00	5	705.0	112.00	7.9	458		1.90	0.00	0.93	30.00	164	0.200	1.000	77	9
	May 19, 2011	29.00	2	149.0	15.00	7.5	97		0.40	0.00	0.00	6.00	26	0.000	0.000	21	6
	May 19, 2011	50.00	3	279.0	60.00	7.6	181		1.10	0.00	0.00	16.00	46	0.000	0.000	30	19
	May 20, 2010	49.00	0	517.0	97.00	7.7	336		0.20	0.01	0.49	29.00	111	0.100	1.000	52	10

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 20, 2010	41.00	6	166.0	26.00	7.4	108		1.00	0.00	0.00	7.00	16	0.000	0.000	18	13
May 20, 2010	39.00	0	175.0	27.00	7.6	114		0.30	0.00	0.00	6.00	24	0.000	0.000	19	7
May 20, 2010	40.00	0	489.0	70.00	7.6	318		1.30	0.00	0.40	23.00	105	0.000	0.000	57	12

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department.

Quality Assurace / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.
LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the

Contaminant and Aesthetic Exceedances

Turbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Boron - The interim maximum acceptable concentration for boron in drinking water is 5.0 mg/L. Boron is widespread in the environment, occurring naturally in over 80 minerals and in the earth's crust. Levels in well water have been reported to be more variable and often higher than those in surface waters, most likely due to erosion from natural resources. High levels of this contaminant can cause adverse health effects for some peopleTurbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Fluoride - The maximum acceptable concentration for fluoride in drinking water is 1.5mg/L.The fluoride concentration in natural water varies widely as it depends on such factors as the source of the water and the geological formations present. Trace amounts of fluoride may be essential for human nutrition and the presence of small quantities leads to a reduction of dental caries. High levels of this contaminant can cause adverse health effects for some people.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids
TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ =Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Colour - An aesthetic objective of 15 true colour units (TCU) has been established for colour in drinking water. Colour in drinking water may be due to the presence of coloured organic substances or metals such as iron, manganese and copper. Highly coloured industrial wastes also contribute to colour. The presence of colour is not directly linked to health but it can be aesthetically displeasing.

pH -The acceptable range for drinking water pH is 6.5 - 8.5. The control of pH is primarily based on minimizing corrosion and encrustration in the distribution system. Tap water with low pH may accelerate the corrosion process in the distribution system, and contribute to increased levels of copper, lead and possibly other metals. Incrustation and scaling problems may become more frequent above pH 8.5

TDS - The aesthetic objective for TDS in drinking water is 500 mg/L. The term "total dissolved solids"(TDS) refers mainly to the inorganic substances that are dissolved in water. At low levels TDS contributes to the palatability of water. At high levels it may cause excessive hardness, taste, mineral deposition and corrosion.

Chloride - The aesthetic objective for chloride in drinking water is 250 mg/L. Chloride can be in water from a variety of sources, including the dissolution of salt deposits and salting of roads for ice control. No evidence has been found suggesting that ingestion of chloride is harmful to humans. However, high levels of chloride in water can impart undesirable tastes to water and beverages prepared from water.

Sodium - The aesthetic objective for sodium in drinking water is 200 mg/L. Since the body has very effective means to control levels of sodium, sodium is not an acutely toxic element in the normal range of environmental or dietary concentrations. At extremely high dosages it has adverse health effects. Sodium levels may be of interest to authorities who wish to prescribe sodium restricted diets for their patients..

Sulphate - The aesthetic objective for sulphate in drinking water is 500 mg/L. Sulphates, which occur naturally in numerous minerals, are used in the mining and pulping industries and in wood preservation. Large quantities of sulphate can result in catharsis and gastrointestinal irritation. The presence of sulphate above

Source Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A

Community Name: **Port au Port West-Aguathuna-Felix Cove**

Service Area: **Felix Cove**

Source Name: **#4-Goose Pond Road Well**

Sep 15, 2020	236.00	0	536.0	259.00	8.0	348		0.10	0.03	0.00	69.00	29	0.170	1.000	16	7
Aug 15, 2017	270.00	0	530.0	270.00	7.8	310		0.19	0.00	0.00	70.00	28	0.150	1.100	16	7
Jun 01, 2011	252.00	2	524.0	242.00	8.4	341		0.10	0.02	0.00	64.00	23	0.160	1.000	16	7
Jun 22, 2010	240.00	2	532.0	258.00	8.0	346		0.00	0.02	0.00	67.00	22	0.160	1.000	15	7
Jun 05, 2008	240.00	0	520.0	240.00	7.8	275		0.00	0.02	0.00	61.00	22	0.000	1.100	15	7
Sep 19, 2006	235.00	0	538.0	255.00	8.0	350		0.20	0.02	0.06	69.00	28	0.170	1.000	16	8
Jan 17, 2006	246.00	0	515.0	242.00	7.8	335		0.20	0.03	0.05	64.00	22	0.200	1.000	14	8
Nov 09, 2004	233.00	0	496.0	245.00	7.7	322		0.20	0.03	0.00	65.00	20	0.210	1.000	14	8

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jun 16, 2004	230.00	0	487.0	228.00	7.5	317		0.10	0.03	0.00	60.00	21	0.220	1.000	13	8
Nov 19, 2003	235.00	1	493.0	233.00	7.7	320		0.20	0.03	0.03	62.00	22	0.240	2.000	16	8
Apr 30, 2003	232.00	1	497.0	227.00	7.8	323		0.05	0.03	0.03	58.00	19	0.200	1.000	19	8

Source Name: **#5 Ocean View Drive Well**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Sep 15, 2020	248.00	0	573.0	264.00	8.0	372		0.10	0.06	0.00	66.00	42	0.210	2.000	20	9
Aug 15, 2017	260.00	0	580.0	260.00	7.9	340		0.17	0.07	0.00	65.00	46	0.250	2.100	22	10
Jun 01, 2011	242.00	5	640.0	265.00	8.4	416		0.60	0.10	0.81	65.00	57	0.340	3.000	28	14
Jul 05, 2010	239.00	0	549.0	254.00	7.9	357		0.20	0.05	0.00	62.00	33	0.240	2.000	19	9
Jun 05, 2008	220.00	0	570.0	250.00	8.1	289		0.00	0.06	0.00	62.00	32	0.000	2.400	20	10
Sep 11, 2007	240.00	0	560.0	270.00	8.0	307		0.00	0.06	0.00	68.00	34	0.000	2.600	19	9
Sep 19, 2006	239.00	0	571.0	250.00	8.0	371		0.10	0.06	0.14	64.00	34	0.230	2.000	18	9
Jan 17, 2006	245.00	0	565.0	243.00	7.9	367		0.10	0.07	0.17	61.00	34	0.260	2.000	18	10
Nov 09, 2004	189.00	0	1,170.0	321.00	7.7	761		0.20	0.26	1.69	74.00	242	1.000	5.000	105	48

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jun 16, 2004	201.00	0	919.0	289.00	7.3	597		0.20	0.22	1.25	68.00	158	0.730	4.000	74	39
Nov 19, 2003	239.00	1	582.0	254.00	7.5	378		0.10	0.09	0.25	62.00	44	0.370	4.000	24	13
Apr 30, 2003	209.00	1	881.0	277.00	7.7	573		0.40	0.22	1.18	60.00	133	0.810	5.000	72	34

Service Area: **Port au Port West, Aguathuna**

Source Name: **#1 & #3 & #6 FatherJoy's Well**

Sep 15, 2020	200.00	0	592.0	231.00	8.1	385		0.20	0.09	0.00	58.00	61	0.430	3.000	30	16
Sep 15, 2020	200.00	0	529.0	223.00	8.1	344		0.10	0.06	0.00	58.00	39	0.280	2.000	25	12
Aug 15, 2017	210.00	16	450.0	220.00	7.8	260		0.15	0.00	0.00	66.00	27	0.130	1.000	16	10
Aug 15, 2017	210.00	0	510.0	220.00	8.1	290		0.18	0.05	0.00	55.00	43	0.440	2.500	23	13
Aug 15, 2017	220.00	0	600.0	240.00	8.0	350		0.10	0.09	0.00	58.00	70	0.520	3.200	39	17
Jun 01, 2011	204.00	2	510.0	213.00	8.3	332		0.10	0.04	0.34	54.00	37	0.450	2.000	22	12
Jun 01, 2011	204.00	2	609.0	210.00	8.3	396		0.40	0.08	0.31	51.00	65	0.560	3.000	35	17
Jun 01, 2011	185.00	16	429.0	188.00	8.3	279		0.20	0.02	0.00	57.00	24	0.160	1.000	14	9

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jul 15, 2010	200.00	0	616.0	213.00	8.0	400		0.10	0.08	0.30	54.00	66	0.560	3.000	36	16
Jul 05, 2010	189.00	7	434.0	197.00	7.9	282		0.20	0.02	0.00	59.00	22	0.170	1.000	13	9
Jun 23, 2010	195.00	2	616.0	217.00	8.2	400		2.60	0.08	0.00	54.00	66	0.600	3.000	37	16
Jun 22, 2010	177.00	17	418.0	184.00	8.0	272		0.20	0.03	0.00	57.00	19	0.180	0.000	13	9
Jun 22, 2010	193.00	0	515.0	209.00	8.1	335		0.00	0.05	0.00	54.00	39	0.490	2.000	22	13
Jun 05, 2008	190.00	0	520.0	200.00	8.0	265		0.10	0.05	0.00	52.00	32	0.000	2.600	25	14
Jun 05, 2008	190.00	0	610.0	210.00	8.0	340		0.20	0.08	0.60	52.00	81	0.700	3.300	41	19
Feb 05, 2007	206.00	2	615.0	217.00	8.1	400		0.50	0.09	0.33	54.00	64	0.580	3.000	36	18
Feb 05, 2007	196.00	0	514.0	202.00	8.0	334		0.20	0.05	0.00	53.00	41	0.410	2.000	24	13
Sep 19, 2006	202.00	0	620.0	216.00	8.1	403		0.10	0.09	0.26	55.00	66	0.610	3.000	38	17
Sep 19, 2006	196.00	0	507.0	202.00	8.1	330		0.20	0.05	0.16	53.00	36	0.460	2.000	20	12
Jan 17, 2006	208.00	2	610.0	215.00	7.9	397		0.60	0.10	0.23	53.00	62	0.580	3.000	37	18

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jan 17, 2006	184.00	4	477.0	188.00	7.9	310		0.20	0.05	0.00	49.00	39	0.390	2.000	21	12
Sep 20, 2005	199.00	0	473.0	200.00	7.8	307		0.10	0.06	0.16	52.00	39	0.470	2.000	20	13
Sep 20, 2005	206.00	3	582.0	208.00	7.8	378		0.10	0.11	0.27	52.00	69	0.620	3.000	36	18
Nov 09, 2004	166.00	3	453.0	176.00	7.9	294		2.20	0.04	0.00	49.00	40	0.290	2.000	25	9
Nov 09, 2004	202.00	0	615.0	226.00	7.7	400		0.20	0.09	0.36	56.00	67	0.610	3.000	39	17
Jun 16, 2004	198.00	2	593.0	206.00	7.5	385		0.20	0.09	0.43	51.00	62	0.580	3.000	35	15
Jun 16, 2004	192.00	2	487.0	199.00	7.3	317		1.50	0.06	0.00	50.00	39	0.490	3.000	22	13
Nov 19, 2003	202.00	1	523.0	195.00	7.9	340		3.20	0.05	0.03	50.00	45	0.490	4.000	29	13
Nov 19, 2003	207.00	2	618.0	211.00	7.8	402		0.30	0.10	0.28	53.00	68	0.590	5.000	41	17
Apr 30, 2003	196.00	1	502.0	201.00	7.9	326		1.40	0.06	0.03	49.00	37	0.410	3.000	28	12
Apr 30, 2003	201.00	2	625.0	241.00	7.8	406		0.50	0.10	0.31	62.00	69	0.540	4.000	44	17

Community Name: **St. George's**
Service Area: **St. George's**

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
	Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A
Source Name: **Wellfield**																	
	Sep 16, 2020	26.00	2	281.0	51.00	7.2	183		1.20	0.00	0.00	14.00	62	0.000	0.000	31	7
	Sep 16, 2020	65.00	2	361.0	62.00	7.2	235		0.40	0.00	0.00	15.00	69	0.000	1.000	46	11
	Sep 16, 2020	53.00	0	252.0	49.00	7.4	164		0.40	0.00	0.00	13.00	41	0.000	0.000	30	5
	Aug 16, 2017	58.00	0	230.0	49.00	7.3	150		0.26	0.00	0.00	12.00	39	0.000	0.910	31	7
	Aug 16, 2017	55.00	0	310.0	53.00	7.3	190		0.52	0.00	0.00	13.00	60	0.000	0.960	45	14
	Aug 16, 2017	28.00	0	310.0	60.00	6.8	170		0.16	0.00	0.00	17.00	76	0.000	0.770	35	7
	May 19, 2011	29.00	2	149.0	15.00	7.5	97		0.40	0.00	0.00	6.00	26	0.000	0.000	21	6
	May 19, 2011	57.00	5	705.0	112.00	7.9	458		1.90	0.00	0.93	30.00	164	0.200	1.000	77	9
	May 19, 2011	46.00	2	202.0	35.00	7.7	131		0.50	0.00	0.00	9.00	32	0.000	0.000	27	7
	May 19, 2011	50.00	3	279.0	60.00	7.6	181		1.10	0.00	0.00	16.00	46	0.000	0.000	30	19
	May 20, 2010	49.00	0	517.0	97.00	7.7	336		0.20	0.01	0.49	29.00	111	0.100	1.000	52	10
	May 20, 2010	40.00	0	489.0	70.00	7.6	318		1.30	0.00	0.40	23.00	105	0.000	0.000	57	12

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 20, 2010	41.00	6	166.0	26.00	7.4	108		1.00	0.00	0.00	7.00	16	0.000	0.000	18	13
May 20, 2010	39.00	0	175.0	27.00	7.6	114		0.30	0.00	0.00	6.00	24	0.000	0.000	19	7

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department.

Quality Assurace / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.
LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the

Contaminant and Aesthetic Exceedances

Turbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Boron - The interim maximum acceptable concentration for boron in drinking water is 5.0 mg/L. Boron is widespread in the environment, occurring naturally in over 80 minerals and in the earth's crust. Levels in well water have been reported to be more variable and often higher than those in surface waters, most likely due to erosion from natural resources. High levels of this contaminant can cause adverse health effects for some peopleTurbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Fluoride - The maximum acceptable concentration for fluoride in drinking water is 1.5mg/L.The fluoride concentration in natural water varies widely as it depends on such factors as the source of the water and the geological formations present. Trace amounts of fluoride may be essential for human nutrition and the presence of small quantities leads to a reduction of dental caries. High levels of this contaminant can cause adverse health effects for some people.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids
TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ =Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Colour - An aesthetic objective of 15 true colour units (TCU) has been established for colour in drinking water. Colour in drinking water may be due to the presence of coloured organic substances or metals such as iron, manganese and copper. Highly coloured industrial wastes also contribute to colour. The presence of colour is not directly linked to health but it can be aesthetically displeasing.

pH -The acceptable range for drinking water pH is 6.5 - 8.5. The control of pH is primarily based on minimizing corrosion and encrustration in the distribution system. Tap water with low pH may accelerate the corrosion process in the distribution system, and contribute to increased levels of copper, lead and possibly other metals. Incrustation and scaling problems may become more frequent above pH 8.5

TDS - The aesthetic objective for TDS in drinking water is 500 mg/L. The term “total dissolved solids”(TDS) refers mainly to the inorganic substances that are dissolved in water. At low levels TDS contributes to the palatability of water. At high levels it may cause excessive hardness, taste, mineral deposition and corrosion.

Chloride - The aesthetic objective for chloride in drinking water is 250 mg/L. Chloride can be in water from a variety of sources, including the dissolution of salt deposits and salting of roads for ice control. No evidence has been found suggesting that ingestion of chloride is harmful to humans. However, high levels of chloride in water can impart undesirable tastes to water and beverages prepared from water.

Sodium - The aesthetic objective for sodium in drinking water is 200 mg/L. Since the body has very effective means to control levels of sodium, sodium is not an acutely toxic element in the normal range of environmental or dietary concentrations. At extremely high dosages it has adverse health effects. Sodium levels may be of interest to authorities who wish to prescribe sodium restricted diets for their patients..

Sulphate - The aesthetic objective for sulphate in drinking water is 500 mg/L. Sulphates, which occur naturally in numerous minerals, are used in the mining and pulping industries and in wood preservation. Large quantities of sulphate can result in catharsis and gastrointestinal irritation. The presence of sulphate above

Source Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Community Name: **Sheaves Cove**
Service Area: **Sheaves Cove**
Source Name: **Drilled**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Sep 15, 2020	198.00	0	622.0	259.00	8.1	404		0.20	0.02	0.00	79.00	50	0.000	0.000	33	55
Aug 15, 2017	210.00	6	580.0	250.00	8.0	350		1.10	0.00	0.00	76.00	45	0.000	1.000	31	52
Jun 01, 2011	190.00	6	597.0	242.00	8.3	388		0.20	0.01	0.00	74.00	46	0.000	0.000	26	54
Jun 04, 2010	162.00	26	450.0	159.00	7.8	293		5.40	0.00	0.00	52.00	42	0.000	0.000	29	7
Jun 02, 2008	160.00	18	570.0	190.00	7.8	294		1.10	0.00	0.00	62.00	63	0.000	0.700	52	8
Sep 18, 2006	214.00	7	684.0	257.00	7.9	445		1.20	0.02	0.00	80.00	58	0.000	0.000	39	49
Jan 16, 2006	145.00	13	621.0	158.00	7.5	404		3.10	0.00	0.00	55.00	99	0.000	0.000	56	9
Nov 09, 2004	209.00	8	518.0	226.00	7.6	337		1.10	0.01	0.00	74.00	32	0.130	0.000	26	15
Jun 16, 2004		20		137.00		0		6.50	0.00	0.00	45.00	29	0.000	0.000	27	6

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Nov 17, 2003	201.00	3	570.0	259.00	7.5	370		0.50	0.02	0.03	79.00	33	0.190	1.000	24	64
Apr 29, 2003	119.00	13	375.0	128.00	7.5	244		3.30	0.03	0.03	43.00	40	0.050	0.500	28	8
Nov 23, 2001	205.00	4	606.0	252.00	7.8	460		1.80	0.03	0.11	76.00	45	0.130	0.500	26	44

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Sep 16, 2020	65.00	2	361.0	62.00	7.2	235		0.40	0.00	0.00	15.00	69	0.000	1.000	46	11
Sep 16, 2020	26.00	2	281.0	51.00	7.2	183		1.20	0.00	0.00	14.00	62	0.000	0.000	31	7
Sep 16, 2020	53.00	0	252.0	49.00	7.4	164		0.40	0.00	0.00	13.00	41	0.000	0.000	30	5
Aug 16, 2017	55.00	0	310.0	53.00	7.3	190		0.52	0.00	0.00	13.00	60	0.000	0.960	45	14
Aug 16, 2017	28.00	0	310.0	60.00	6.8	170		0.16	0.00	0.00	17.00	76	0.000	0.770	35	7
Aug 16, 2017	58.00	0	230.0	49.00	7.3	150		0.26	0.00	0.00	12.00	39	0.000	0.910	31	7
May 19, 2011	50.00	3	279.0	60.00	7.6	181		1.10	0.00	0.00	16.00	46	0.000	0.000	30	19

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 19, 2011	46.00	2	202.0	35.00	7.7	131		0.50	0.00	0.00	9.00	32	0.000	0.000	27	7
May 19, 2011	29.00	2	149.0	15.00	7.5	97		0.40	0.00	0.00	6.00	26	0.000	0.000	21	6
May 19, 2011	57.00	5	705.0	112.00	7.9	458		1.90	0.00	0.93	30.00	164	0.200	1.000	77	9
May 20, 2010	39.00	0	175.0	27.00	7.6	114		0.30	0.00	0.00	6.00	24	0.000	0.000	19	7
May 20, 2010	40.00	0	489.0	70.00	7.6	318		1.30	0.00	0.40	23.00	105	0.000	0.000	57	12
May 20, 2010	49.00	0	517.0	97.00	7.7	336		0.20	0.01	0.49	29.00	111	0.100	1.000	52	10
May 20, 2010	41.00	6	166.0	26.00	7.4	108		1.00	0.00	0.00	7.00	16	0.000	0.000	18	13

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units		mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A

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The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

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Contaminant and Aesthetic Exceedances

Turbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Boron - The interim maximum acceptable concentration for boron in drinking water is 5.0 mg/L. Boron is widespread in the environment, occurring naturally in over 80 minerals and in the earth's crust. Levels in well water have been reported to be more variable and often higher than those in surface waters, most likely due to erosion from natural resources. High levels of this contaminant can cause adverse health effects for some peopleTurbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Fluoride - The maximum acceptable concentration for fluoride in drinking water is 1.5mg/L.The fluoride concentration in natural water varies widely as it depends on such factors as the source of the water and the geological formations present. Trace amounts of fluoride may be essential for human nutrition and the presence of small quantities leads to a reduction of dental caries. High levels of this contaminant can cause adverse health effects for some people.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids
TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ =Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Colour - An aesthetic objective of 15 true colour units (TCU) has been established for colour in drinking water. Colour in drinking water may be due to the presence of coloured organic substances or metals such as iron, manganese and copper. Highly coloured industrial wastes also contribute to colour. The presence of colour is not directly linked to health but it can be aesthetically displeasing.

pH -The acceptable range for drinking water pH is 6.5 - 8.5. The control of pH is primarily based on minimizing corrosion and encrustration in the distribution system. Tap water with low pH may accelerate the corrosion process in the distribution system, and contribute to increased levels of copper, lead and possibly other metals. Incrustation and scaling problems may become more frequent above pH 8.5

TDS - The aesthetic objective for TDS in drinking water is 500 mg/L. The term “total dissolved solids”(TDS) refers mainly to the inorganic substances that are dissolved in water. At low levels TDS contributes to the palatability of water. At high levels it may cause excessive hardness, taste, mineral deposition and corrosion.

Chloride - The aesthetic objective for chloride in drinking water is 250 mg/L. Chloride can be in water from a variety of sources, including the dissolution of salt deposits and salting of roads for ice control. No evidence has been found suggesting that ingestion of chloride is harmful to humans. However, high levels of chloride in water can impart undesirable tastes to water and beverages prepared from water.

Sodium - The aesthetic objective for sodium in drinking water is 200 mg/L. Since the body has very effective means to control levels of sodium, sodium is not an acutely toxic element in the normal range of environmental or dietary concentrations. At extremely high dosages it has adverse health effects. Sodium levels may be of interest to authorities who wish to prescribe sodium restricted diets for their patients..

Sulphate - The aesthetic objective for sulphate in drinking water is 500 mg/L. Sulphates, which occur naturally in numerous minerals, are used in the mining and pulping industries and in wood preservation. Large quantities of sulphate can result in catharsis and gastrointestinal irritation. The presence of sulphate above

Source Water Quality for Public Water Supplies
Physical Parameters and Major Ions

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units		mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A
Community Name: Ship Cove-Lower Cove-Jerry's Nose																	
Service Area: Lower Cove																	
Source Name: #6 Well - Lower Cove Well																	
	Sep 15, 2020	210.00	0	659.0	254.00	8.0	428		0.00	0.01	0.00	72.00	79	0.000	1.000	37	10
	Jun 01, 2011	217.00	5	578.0	245.00	8.3	376		0.20	0.01	0.00	62.00	54	0.000	1.000	23	10
	May 18, 2010	205.00	0	547.0	227.00	8.2	356		0.40	0.01	0.00	63.00	49	0.000	1.000	23	11
	Jun 02, 2008	200.00	0	540.0	230.00	8.0	279		0.00	0.01	0.00	63.00	36	0.000	1.100	23	11
	Sep 11, 2007	210.00	0	570.0	250.00	8.1	305		0.10	0.01	0.00	70.00	52	0.000	1.100	23	9
	Sep 18, 2006	207.00	0	607.0	221.00	8.0	395		0.10	0.00	0.08	62.00	63	0.000	0.000	28	9
	Jan 16, 2006	210.00	0	564.0	218.00	7.7	367		0.20	0.01	0.08	61.00	56	0.100	0.000	26	11
	Nov 08, 2004	206.00	0	543.0	235.00	7.7	353		0.10	0.01	0.17	66.00	48	0.130	0.000	26	9
	Jun 16, 2004	200.00	11	530.0	216.00	7.4	345		0.20	0.01	0.24	60.00	49	0.120	0.000	24	9

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Nov 17, 2003	207.00	1	514.0	221.00	7.6	334		0.10	0.01	0.12	62.00	45	0.150	1.000	24	11
Apr 29, 2003	203.00	1	523.0	215.00	7.8	340		1.20	0.03	0.03	58.00	41	0.100	1.000	25	10
Nov 23, 2001	207.00	1	524.0	237.00	7.9	368		0.20	0.03	0.17	65.00	39	0.120	0.500	25	11

Service Area: **Ship Cove East**

Source Name: **#3 Well - Bernard Brake Well**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Sep 15, 2020	215.00	4	607.0	240.00	8.0	395		0.10	0.03	0.00	78.00	59	0.100	1.000	33	12
Jun 01, 2011	225.00	6	565.0	226.00	8.4	367		0.00	0.02	0.00	74.00	46	0.000	1.000	24	10
May 18, 2010	201.00	6	534.0	208.00	8.1	347		0.20	0.02	0.00	70.00	45	0.000	1.000	22	11
Jun 05, 2008	190.00	8	530.0	220.00	7.9	270		0.00	0.02	0.00	72.00	34	0.000	1.400	25	11
Sep 11, 2007	200.00	9	540.0	250.00	7.9	300		0.60	0.02	0.00	82.00	42	0.000	1.500	27	10
Sep 18, 2006	209.00	9	537.0	222.00	7.9	349		0.20	0.02	0.00	74.00	39	0.000	1.000	23	10
Jan 16, 2006	215.00	10	508.0	214.00	7.5	330		0.30	0.03	0.00	71.00	35	0.110	1.000	21	11
Nov 08, 2004	208.00	11	488.0	227.00	7.5	317		0.10	0.03	0.00	76.00	32	0.140	1.000	22	10

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jun 16, 2004	186.00	10	455.0	193.00	7.3	296		0.10	0.02	0.00	64.00	31	0.140	1.000	20	11
Nov 17, 2003	206.00	12	478.0	208.00	7.5	311		0.20	0.02	0.03	70.00	32	0.150	2.000	21	10
Apr 29, 2003	186.00	10	469.0	192.00	7.6	305		0.60	0.03	0.03	62.00	32	0.110	1.000	26	11
Oct 24, 2002	207.00	13	492.0	237.00	7.6	320		0.20	0.03	0.03	80.00	32	0.120	2.000	20	9
May 14, 2002	193.00	9	503.0	216.00	7.8	327		0.05	0.03	0.19	70.00	39	0.120	1.000	23	12
Apr 24, 2002	193.00	9	505.0	197.00	8.1	328		0.10	0.03	0.03	64.00	40	0.160	0.500	20	12
Nov 23, 2001	217.00	8	553.0	233.00	7.8	408		0.10	0.03	0.03	75.00	42	0.130	1.000	25	14

Service Area: **Ship Cove, Jerry's Nose**

Source Name: **#1 Well - PJ's Variety Well**

Sep 15, 2020	242.00	0	738.0	276.00	7.9	480		0.60	0.05	0.00	84.00	80	0.000	2.000	49	12
Jun 01, 2011	252.00	4	638.0	252.00	8.3	415		0.60	0.06	0.00	73.00	54	0.130	2.000	29	11
May 18, 2010	238.00	2	655.0	243.00	8.1	426		0.30	0.06	0.00	76.00	65	0.140	2.000	31	12
Jun 05, 2008	220.00	7	660.0	260.00	8.1	340		0.30	0.04	0.00	78.00	53	0.000	2.000	39	11

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Sep 11, 2007	250.00	0	650.0	310.00	8.0	372		0.30	0.05	0.00	91.00	56	0.000	2.200	39	11
Sep 18, 2006	246.00	0	676.0	253.00	8.0	439		0.40	0.05	0.00	75.00	63	0.120	2.000	33	11
Jan 16, 2006	245.00	3	630.0	248.00	7.6	410		0.50	0.06	0.00	73.00	57	0.170	2.000	30	12
Nov 08, 2004	239.00	0	607.0	265.00	7.6	395		0.60	0.06	0.00	78.00	50	0.240	2.000	30	12
Jun 16, 2004	237.00	0	599.0	241.00	7.5	389		0.60	0.07	0.23	67.00	50	0.240	2.000	27	13
Nov 17, 2003	239.00	2	594.0	247.00	7.7	386		0.60	0.07	0.03	71.00	51	0.210	3.000	30	13
Aug 12, 2003	231.00	2	616.0	256.00	8.0	400		2.90	0.08	0.15	76.00	61	0.210	2.000	33	12
Nov 23, 2001	242.00	2	607.0	258.00	7.9	436		0.70	0.06	0.03	72.00	48	0.180	2.000	27	13

Source Name: **#2 Well - Howard & Rodney Jesso Well**

Sep 15, 2020	243.00	0	759.0	272.00	8.0	493		0.20	0.02	0.00	86.00	88	0.000	1.000	54	11
Jun 01, 2011	231.00	3	670.0	257.00	8.3	436		3.30	0.03	0.00	78.00	74	0.110	1.000	40	10
May 18, 2010	232.00	5	672.0	247.00	8.2	437		5.20	0.03	0.00	74.00	77	0.150	2.000	35	11

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
	Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality			15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)			A			A	A		C	C			A	C		A	A
	Jun 05, 2008	220.00	5	690.0	270.00	8.0	353		0.30	0.02	0.00	83.00	63	0.000	1.500	46	9
	Sep 11, 2007	240.00	0	620.0	270.00	8.0	337		0.60	0.05	0.00	76.00	50	0.000	1.900	31	11
	Sep 18, 2006	247.00	0	665.0	246.00	7.9	432		0.40	0.02	0.00	72.00	59	0.140	1.000	34	11
	Jan 16, 2006	255.00	3	598.0	243.00	7.7	389		0.60	0.05	0.10	71.00	45	0.170	2.000	29	11
	Nov 08, 2004	248.00	0	581.0	261.00	7.6	378		0.90	0.05	0.00	75.00	40	0.230	2.000	30	11
	Jun 16, 2004	223.00	4	593.0	232.00	7.4	385		3.00	0.03	0.00	70.00	56	0.190	1.000	31	10
	Nov 17, 2003	252.00	2	610.0	249.00	7.7	397		1.20	0.03	0.09	75.00	49	0.210	2.000	33	11
	Apr 29, 2003	202.00	4	558.0	214.00	7.7	363		0.30	0.03	0.03	66.00	52	0.130	2.000	33	10
	Nov 23, 2001	251.00	3	642.0	262.00	7.9	424		1.00	0.03	0.03	80.00	54	0.150	1.000	35	11

Source Name: **#4B Well - Nancy Rowe Well**

	Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
	Sep 15, 2020	189.00	5	556.0	225.00	7.9	361		0.90	0.04	0.00	72.00	51	0.140	2.000	30	30

Source Name: **#5 Well - Murdock Wheeler Well**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Sep 15, 2020	228.00	0	517.0	255.00	8.0	336		0.20	0.01	0.00	64.00	28	0.000	0.000	15	4
Jun 01, 2011	232.00	3	500.0	227.00	8.3	325		0.20	0.00	0.00	66.00	26	0.000	1.000	15	6
May 18, 2010	224.00	2	491.0	211.00	8.2	319		0.10	0.01	0.00	53.00	23	0.000	0.000	12	6
Jun 02, 2008	220.00	0	530.0	230.00	7.9	274		0.20	0.03	0.00	57.00	28	0.000	1.800	18	8
Sep 11, 2007	230.00	0	500.0	250.00	8.0	269		0.00	0.03	0.00	61.00	23	0.000	1.500	13	6
Sep 18, 2006	228.00	0	506.0	238.00	8.0	329		0.20	0.02	0.08	59.00	23	0.110	1.000	13	7
Jan 16, 2006	227.00	2	515.0	222.00	7.7	335		0.10	0.02	0.06	56.00	34	0.120	1.000	17	8
Nov 08, 2004	228.00	0	472.0	245.00	7.6	307		0.10	0.01	0.00	62.00	19	0.130	0.000	13	6
Jun 16, 2004	214.00	3	453.0	217.00	7.4	294		0.30	0.02	0.00	54.00	21	0.130	0.000	12	6
Nov 17, 2003	229.00	1	459.0	225.00	7.6	298		0.20	0.01	0.03	57.00	19	0.140	1.000	14	7
Apr 29, 2003	221.00	1	475.0	221.00	7.8	309		0.10	0.03	0.03	54.00	21	0.100	1.000	18	7
Oct 24, 2002	231.00	1	490.0	263.00	7.9	319		0.30	0.03	0.03	69.00	21	0.120	2.000	12	7

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	μS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 14, 2002	218.00	1	477.0	252.00	8.0	310		0.20	0.03	0.07	63.00	23	0.110	1.000	12	7
Feb 15, 2002	210.00	8	529.0	209.00	7.5	344		0.05	0.03	0.03	67.00	39	0.140	1.000	21	12
Feb 04, 2002																
Nov 23, 2001	235.00	1	535.0	240.00	7.9	400		0.20	0.03	0.03	58.00	31	0.100	0.500	18	7

Community Name: **St. George's**
Service Area: **St. George's**
Source Name: **Wellfield**

Sep 16, 2020	26.00	2	281.0	51.00	7.2	183		1.20	0.00	0.00	14.00	62	0.000	0.000	31	7
Sep 16, 2020	53.00	0	252.0	49.00	7.4	164		0.40	0.00	0.00	13.00	41	0.000	0.000	30	5
Sep 16, 2020	65.00	2	361.0	62.00	7.2	235		0.40	0.00	0.00	15.00	69	0.000	1.000	46	11
Aug 16, 2017	55.00	0	310.0	53.00	7.3	190		0.52	0.00	0.00	13.00	60	0.000	0.960	45	14
Aug 16, 2017	58.00	0	230.0	49.00	7.3	150		0.26	0.00	0.00	12.00	39	0.000	0.910	31	7
Aug 16, 2017	28.00	0	310.0	60.00	6.8	170		0.16	0.00	0.00	17.00	76	0.000	0.770	35	7

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 19, 2011	57.00	5	705.0	112.00	7.9	458		1.90	0.00	0.93	30.00	164	0.200	1.000	77	9
May 19, 2011	46.00	2	202.0	35.00	7.7	131		0.50	0.00	0.00	9.00	32	0.000	0.000	27	7
May 19, 2011	29.00	2	149.0	15.00	7.5	97		0.40	0.00	0.00	6.00	26	0.000	0.000	21	6
May 19, 2011	50.00	3	279.0	60.00	7.6	181		1.10	0.00	0.00	16.00	46	0.000	0.000	30	19
May 20, 2010	49.00	0	517.0	97.00	7.7	336		0.20	0.01	0.49	29.00	111	0.100	1.000	52	10
May 20, 2010	40.00	0	489.0	70.00	7.6	318		1.30	0.00	0.40	23.00	105	0.000	0.000	57	12
May 20, 2010	41.00	6	166.0	26.00	7.4	108		1.00	0.00	0.00	7.00	16	0.000	0.000	18	13
May 20, 2010	39.00	0	175.0	27.00	7.6	114		0.30	0.00	0.00	6.00	24	0.000	0.000	19	7

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department.

Quality Assurace / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.
LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the

Contaminant and Aesthetic Exceedances

Turbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Boron - The interim maximum acceptable concentration for boron in drinking water is 5.0 mg/L. Boron is widespread in the environment, occurring naturally in over 80 minerals and in the earth's crust. Levels in well water have been reported to be more variable and often higher than those in surface waters, most likely due to erosion from natural resources. High levels of this contaminant can cause adverse health effects for some peopleTurbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Fluoride - The maximum acceptable concentration for fluoride in drinking water is 1.5mg/L.The fluoride concentration in natural water varies widely as it depends on such factors as the source of the water and the geological formations present. Trace amounts of fluoride may be essential for human nutrition and the presence of small quantities leads to a reduction of dental caries. High levels of this contaminant can cause adverse health effects for some people.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids
TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ =Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Colour - An aesthetic objective of 15 true colour units (TCU) has been established for colour in drinking water. Colour in drinking water may be due to the presence of coloured organic substances or metals such as iron, manganese and copper. Highly coloured industrial wastes also contribute to colour. The presence of colour is not directly linked to health but it can be aesthetically displeasing.

pH -The acceptable range for drinking water pH is 6.5 - 8.5. The control of pH is primarily based on minimizing corrosion and encrustration in the distribution system. Tap water with low pH may accelerate the corrosion process in the distribution system, and contribute to increased levels of copper, lead and possibly other metals. Incrustation and scaling problems may become more frequent above pH 8.5

TDS - The aesthetic objective for TDS in drinking water is 500 mg/L. The term "total dissolved solids"(TDS) refers mainly to the inorganic substances that are dissolved in water. At low levels TDS contributes to the palatability of water. At high levels it may cause excessive hardness, taste, mineral deposition and corrosion.

Chloride - The aesthetic objective for chloride in drinking water is 250 mg/L. Chloride can be in water from a variety of sources, including the dissolution of salt deposits and salting of roads for ice control. No evidence has been found suggesting that ingestion of chloride is harmful to humans. However, high levels of chloride in water can impart undesirable tastes to water and beverages prepared from water.

Sodium - The aesthetic objective for sodium in drinking water is 200 mg/L. Since the body has very effective means to control levels of sodium, sodium is not an acutely toxic element in the normal range of environmental or dietary concentrations. At extremely high dosages it has adverse health effects. Sodium levels may be of interest to authorities who wish to prescribe sodium restricted diets for their patients..

Sulphate - The aesthetic objective for sulphate in drinking water is 500 mg/L. Sulphates, which occur naturally in numerous minerals, are used in the mining and pulping industries and in wood preservation. Large quantities of sulphate can result in catharsis and gastrointestinal irritation. The presence of sulphate above

Source Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A

Community Name: **Stephenville**
Service Area: **Stephenville**
Source Name: **Well Field**

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Sep 16, 2020	156.00	0	357.0	132.00	8.2	232		0.10	0.03	0.00	38.00	16	0.000	1.000	28	10
Sep 16, 2020	171.00	10	388.0	182.00	8.0	252		0.10	0.00	0.00	58.00	20	0.000	0.000	14	3
Sep 16, 2020	175.00	0	425.0	190.00	8.1	276		0.10	0.00	0.00	58.00	29	0.000	0.000	17	6
Sep 16, 2020	166.00	0	384.0	192.00	8.1	250		0.50	0.00	0.00	57.00	13	0.000	1.000	10	18
Sep 16, 2020	145.00	0	322.0	135.00	8.2	209		0.00	0.03	0.00	36.00	12	0.000	0.000	19	8
Sep 16, 2020	171.00	0	356.0	171.00	8.2	231		0.20	0.00	0.00	52.00	16	0.000	0.000	10	4
Sep 16, 2020	158.00	0	349.0	174.00	8.1	227		0.10	0.00	0.00	53.00	15	0.000	0.000	8	3
Sep 16, 2020	147.00	0	320.0	145.00	8.2	208		0.00	0.02	0.00	40.00	11	0.000	0.000	15	6
Sep 16, 2020	184.00	0	408.0	203.00	8.1	265		0.80	0.01	0.00	60.00	13	0.000	1.000	10	18

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Aug 16, 2017	170.00	0	340.0	170.00	8.0	200		0.18	0.00	0.00	50.00	16	0.000	0.790	10	4
Aug 16, 2017	150.00	0	310.0	130.00	8.0	190		0.28	0.00	0.00	34.00	13	0.000	0.740	20	9
Aug 16, 2017	150.00	0	310.0	140.00	8.0	180		0.00	0.00	0.00	37.00	11	0.000	0.740	16	7
Aug 16, 2017	170.00	0	350.0	130.00	8.0	210		0.22	0.00	0.00	37.00	15	0.000	1.200	29	10
Aug 16, 2017	180.00	13	390.0	200.00	7.9	250		0.77	0.00	0.00	58.00	13	0.000	1.300	11	28
Aug 16, 2017	180.00	0	440.0	190.00	8.1	250		0.23	0.00	0.00	58.00	35	0.000	1.100	19	8
Aug 16, 2017	170.00	0	330.0	170.00	7.8	200		0.00	0.00	0.00	52.00	14	0.000	0.780	9	4
Aug 16, 2017	190.00	0	390.0	190.00	8.1	240		0.37	0.00	0.00	56.00	13	0.000	1.500	11	18
May 31, 2011	151.00	0	314.0	126.00	8.3	204		0.20	0.03	0.00	34.00	12	0.000	0.000	21	9
May 31, 2011	169.00	0	348.0	159.00	8.3	226		0.10	0.00	0.00	47.00	16	0.000	0.000	10	6
May 31, 2011	154.00	8	391.0	179.00	8.2	254		0.20	0.00	0.00	55.00	28	0.000	0.000	15	8
May 31, 2011	155.00	2	359.0	132.00	8.3	233		0.20	0.02	0.00	38.00	15	0.000	1.000	29	13

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 31, 2011	146.00	2	319.0	138.00	8.3	207		0.30	0.02	0.00	37.00	11	0.000	0.000	16	8
May 31, 2011	168.00	0	376.0	170.00	8.2	244		0.60	0.00	0.00	50.00	11	0.000	1.000	11	20
May 31, 2011	156.00	0	410.0	164.00	8.3	266		0.50	0.00	0.00	49.00	29	0.000	0.000	16	9
May 31, 2011	149.00	0	343.0	171.00	8.3	223		0.20	0.00	0.00	52.00	14	0.000	0.000	9	6
May 31, 2011	172.00	0	390.0	179.00	8.3	254		0.30	0.00	0.00	52.00	11	0.000	1.000	12	18
May 19, 2010	153.00	0	352.0	147.00	8.3	229		0.40	0.00	0.00	44.00	16	0.000	0.000	9	6
May 19, 2010	169.00	2	410.0	169.00	8.2	267		0.30	0.00	0.00	51.00	24	0.000	0.000	16	9
May 19, 2010	140.00	2	318.0	107.00	8.3	207		0.20	0.03	0.00	28.00	11	0.000	0.000	20	9
May 19, 2010	159.00	6	385.0	158.00	8.1	250		0.10	0.00	0.00	50.00	23	0.000	0.000	14	6
May 19, 2010	153.00	2	343.0	149.00	8.2	223		0.00	0.00	0.00	45.00	13	0.000	0.000	8	6
May 19, 2010	153.00	2	359.0	106.00	8.3	233		0.10	0.03	0.00	31.00	15	0.000	1.000	28	12
May 19, 2010	144.00	0	321.0	131.00	8.3	209		0.00	0.02	0.00	36.00	11	0.000	0.000	16	9

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 19, 2010	160.00	3	375.0	161.00	8.2	244		0.60	0.00	0.00	48.00	11	0.000	1.000	10	19
May 19, 2010	169.00	2	389.0	165.00	8.2	253		0.40	0.00	0.00	48.00	12	0.000	1.000	11	18
May 29, 2008	140.00	0	320.0	120.00	8.3	179		0.20	0.04	0.00	32.00	11	0.000	0.800	26	9
May 29, 2008	160.00	0	370.0	170.00	8.1	210		0.20	0.01	0.00	50.00	9	0.000	1.400	13	16
May 29, 2008	160.00	0	370.0	170.00	8.1	211		0.40	0.01	0.00	49.00	9	0.000	1.300	12	19
May 29, 2008	150.00	0	360.0	110.00	8.2	206		0.20	0.03	0.00	33.00	12	0.000	1.200	33	14
May 29, 2008	140.00	0	320.0	130.00	8.2	178		0.00	0.02	0.00	36.00	10	0.000	0.800	19	8
May 29, 2008	160.00	0	400.0	170.00	8.2	219		0.00	0.01	0.00	52.00	26	0.000	1.000	16	9
May 29, 2008	150.00	8	350.0	150.00	8.1	185		0.00	0.00	0.00	47.00	18	0.000	0.700	12	5
May 29, 2008	140.00	0	340.0	160.00	8.2	181		0.00	0.01	0.00	47.00	16	0.000	0.800	10	5
Sep 11, 2007	140.00	0	310.0	140.00	8.1	180		0.00	0.04	0.00	35.00	8	0.000	0.900	25	9
Feb 05, 2007	156.00	0	342.0	152.00	8.2	222		0.80	0.00	0.46	46.00	12	0.000	0.000	8	6

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Feb 05, 2007	156.00	0	359.0	109.00	8.2	233		0.30	0.03	0.00	32.00	13	0.000	1.000	30	14
Feb 05, 2007	172.00	0	386.0	173.00	8.2	251		0.50	0.00	0.52	51.00	11	0.000	1.000	12	17
Feb 05, 2007	159.00	8	377.0	164.00	8.0	245		0.20	0.00	0.00	51.00	22	0.000	0.000	12	7
Feb 05, 2007	143.00	0	316.0	109.00	8.0	205		0.20	0.04	0.00	29.00	11	0.000	0.000	22	10
Feb 05, 2007	174.00	0	388.0	170.00	8.2	252		0.70	0.00	0.51	50.00	12	0.000	1.000	12	16
Feb 05, 2007	170.00	0	396.0	171.00	8.1	257		0.50	0.00	0.44	52.00	22	0.000	0.000	13	8
Feb 05, 2007	156.00	2	345.0	152.00	8.3	224		0.50	0.00	0.46	46.00	13	0.000	0.000	9	5
Feb 05, 2007	150.00	0	327.0	126.00	8.3	213		0.50	0.03	0.00	34.00	10	0.000	0.000	17	9
Feb 05, 2007	159.00	0	359.0	144.00	8.2	233		0.60	0.04	0.44	43.00	14	0.000	0.000	17	9
Sep 19, 2006	142.00	0	317.0	112.00	8.1	206		0.00	0.03	0.00	30.00	11	0.000	0.000	23	9
Sep 19, 2006	164.00	2	377.0	164.00	8.1	245		0.50	0.00	0.00	49.00	12	0.000	1.000	12	17
Sep 19, 2006	157.00	9	356.0	153.00	8.0	231		0.10	0.00	0.00	48.00	17	0.000	0.000	10	5

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Sep 19, 2006	145.00	0	319.0	126.00	8.1	207		0.20	0.02	0.00	34.00	10	0.000	0.000	16	8
Sep 19, 2006	152.00	0	336.0	154.00	8.1	218		0.30	0.00	0.08	47.00	12	0.000	0.000	8	7
Sep 19, 2006	145.00	2	333.0	95.00	8.1	216		0.10	0.03	0.00	28.00	13	0.000	0.000	30	11
Sep 19, 2006	151.00	0	341.0	152.00	8.1	222		0.10	0.00	0.00	46.00	13	0.000	0.000	9	6
Sep 19, 2006	168.00	0	385.0	173.00	8.1	250		0.30	0.00	0.00	51.00	12	0.000	1.000	12	15
Sep 19, 2006	168.00	0	409.0	174.00	8.1	266		0.10	0.00	0.00	53.00	24	0.000	0.000	14	8
Jan 17, 2006	156.00	0	334.0	152.00	7.9	217		0.10	0.00	0.00	46.00	14	0.000	0.000	10	7
Jan 17, 2006	156.00	0	330.0	149.00	7.9	215		0.20	0.00	0.00	45.00	13	0.000	0.000	8	7
Jan 17, 2006	170.00	2	390.0	177.00	7.9	254		0.60	0.00	0.00	51.00	13	0.000	1.000	12	22
Jan 17, 2006	146.00	0	311.0	109.00	8.0	202		0.00	0.04	0.00	29.00	11	0.110	0.000	21	9
Jan 17, 2006	154.00	0	338.0	104.00	8.0	220		0.10	0.03	0.00	30.00	13	0.110	1.000	29	13
Jan 17, 2006	146.00	8	325.0	143.00	7.6	211		0.30	0.00	0.00	44.00	17	0.000	0.000	9	6

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jan 17, 2006	149.00	0	312.0	126.00	7.9	203		0.10	0.02	0.00	34.00	10	0.100	0.000	16	9
Jan 17, 2006	177.00	0	393.0	173.00	7.9	255		0.30	0.00	0.00	51.00	13	0.000	1.000	12	18
Jan 17, 2006	170.00	0	377.0	170.00	7.9	245		0.20	0.00	0.00	50.00	19	0.000	0.000	12	9
Sep 20, 2005	174.00	0	365.0	170.00	8.0	237		0.30	0.01	0.00	50.00	14	0.120	1.000	12	20
Sep 20, 2005	145.00	0	302.0	99.00	8.1	196		0.10	0.03	0.00	28.00	13	0.140	0.000	30	11
Sep 20, 2005	154.00	0	315.0	147.00	8.0	205		0.00	0.00	0.00	44.00	13	0.120	0.000	8	6
Sep 20, 2005	155.00	0	316.0	147.00	8.0	205		0.00	0.00	0.00	44.00	15	0.110	0.000	9	6
Sep 20, 2005	148.00	0	305.0	121.00	8.1	198		0.00	0.03	0.00	32.00	11	0.140	0.000	16	9
Sep 20, 2005	160.00	10	340.0	150.00	7.8	221		0.00	0.00	0.00	47.00	18	0.130	0.000	10	6
Sep 20, 2005	166.00	0	361.0	161.00	8.0	235		0.00	0.00	0.08	48.00	21	0.130	0.000	11	9
Sep 20, 2005	145.00	0	296.0	109.00	8.1	192		0.10	0.04	0.00	29.00	11	0.160	0.000	22	10
Sep 20, 2005	161.00	0	334.0	154.00	7.9	217		1.00	0.00	0.00	45.00	12	0.120	1.000	11	16

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Nov 09, 2004	152.00	0	340.0	147.00	7.9	221		0.10	0.02	0.00	44.00	14	0.000	0.000	19	11
Nov 09, 2004	151.00	0	321.0	166.00	7.8	209		0.00	0.00	0.00	50.00	13	0.000	0.000	9	6
Nov 09, 2004	163.00	0	369.0	178.00	7.8	240		1.00	0.01	0.00	53.00	15	0.000	1.000	13	15
Nov 09, 2004	144.00	0	305.0	138.00	7.8	198		0.10	0.03	0.00	37.00	10	0.130	0.000	18	9
Nov 09, 2004	162.00	0	365.0	159.00	7.9	237		0.40	0.01	0.00	47.00	17	0.000	1.000	11	11
Nov 09, 2004	175.00	0	417.0	201.00	7.8	271		0.20	0.01	0.10	59.00	16	0.000	1.000	14	22
Nov 09, 2004	141.00	12	321.0	158.00	7.8	209		0.30	0.01	0.00	50.00	17	0.000	0.000	9	6
Nov 09, 2004	142.00	0	305.0	114.00	7.9	198		0.00	0.04	0.00	31.00	11	0.140	0.000	25	9
Nov 09, 2004	143.00	0	322.0	106.00	7.9	209		0.10	0.03	0.00	31.00	13	0.130	1.000	33	13
Jun 16, 2004	149.00	0	324.0	134.00	7.7	211		0.20	0.04	0.00	39.00	12	0.100	0.000	13	7
Jun 16, 2004	145.00	0	312.0	121.00	7.7	203		0.00	0.02	0.00	32.00	10	0.120	0.000	17	8
Jun 16, 2004	151.00	0	328.0	147.00	7.7	213		0.00	0.00	0.00	44.00	12	0.000	0.000	8	6

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Jun 16, 2004	151.00	3	336.0	149.00	7.7	218		0.20	0.00	0.00	45.00	14	0.100	0.000	10	6
Jun 16, 2004	141.00	0	309.0	100.00	7.8	201		0.10	0.03	0.00	27.00	11	0.130	0.000	24	9
Jun 15, 2004	180.00	0	440.0	196.00	7.7	286		0.30	0.00	0.00	57.00	19	0.170	1.000	13	24
Jun 15, 2004	166.00	0	412.0	175.00	7.6	268		0.80	0.00	0.00	52.00	19	0.170	1.000	12	21
Jun 15, 2004	147.00	2	361.0	156.00	7.7	235		0.20	0.00	0.00	46.00	18	0.160	0.000	11	14
Jun 15, 2004	132.00	0	290.0	80.00	7.8	189		0.30	0.02	0.00	22.00	11	0.180	1.000	29	8
Jun 15, 2004	129.00	11	302.0	126.00	7.7	196		0.10	0.00	0.00	39.00	16	0.150	0.000	10	6
Oct 01, 2003	170.00	1	394.0	163.00	8.1	256		0.20	0.01	0.03	47.00	16	0.130	2.000	14	17
Oct 01, 2003	160.00	1	361.0	146.00	8.0	235		1.40	0.01	0.03	42.00	13	0.140	1.000	13	14
Oct 01, 2003	153.00	1	333.0	139.00	8.1	216		0.20	0.01	0.03	41.00	14	0.120	1.000	10	7
Oct 01, 2003	155.00	1	331.0	142.00	8.1	215		0.05	0.01	0.03	42.00	12	0.120	1.000	9	7
Oct 01, 2003	161.00	8	361.0	152.00	8.0	235		0.10	0.01	0.03	46.00	18	0.160	1.000	11	3

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Oct 01, 2003	139.00	1	312.0	93.00	8.1	203		0.10	0.03	0.03	24.00	11	0.150	1.000	26	9
Oct 01, 2003	155.00	1	342.0	127.00	8.1	222		0.30	0.02	0.14	36.00	15	0.140	1.000	19	9
Oct 01, 2003	144.00	1	319.0	82.00	8.2	207		0.10	0.03	0.03	23.00	12	0.180	1.000	35	11
Oct 01, 2003	164.00	1	398.0	163.00	8.1	259		0.20	0.01	0.03	47.00	25	0.130	1.000	14	10
Oct 01, 2003	141.00	1	313.0	109.00	8.1	203		0.10	0.03	0.12	29.00	10	0.140	1.000	18	9
Apr 29, 2003	147.00	1	336.0	148.00	7.8	218		0.10	0.03	0.03	46.00	15	0.100	0.500	16	10
Apr 29, 2003	144.00	1	315.0	125.00	7.9	205		0.05	0.03	0.03	37.00	11	0.110	0.500	20	9
Apr 29, 2003	146.00	1	319.0	132.00	7.8	207		0.10	0.03	0.03	38.00	10	0.100	0.500	16	8
Apr 29, 2003	154.00	1	333.0	167.00	7.8	216		0.05	0.03	0.03	52.00	12	0.050	0.500	8	6
Apr 29, 2003	153.00	1	336.0	166.00	7.8	218		0.05	0.03	0.03	50.00	14	0.050	0.500	14	6
Apr 29, 2003	166.00	1	383.0	179.00	7.8	249		0.20	0.03	0.03	55.00	15	0.050	0.500	11	15
Apr 29, 2003	162.00	1	365.0	157.00	7.8	237		0.50	0.03	0.03	43.00	13	0.050	0.500	17	14

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Apr 29, 2003	145.00	2	334.0	111.00	7.9	217		0.20	0.03	0.03	33.00	12	0.100	0.500	30	15
Apr 29, 2003	108.00	10	278.0	127.00	7.4	181		0.30	0.03	0.03	41.00	20	0.050	0.500	9	5
Apr 29, 2003	153.00	2	368.0	174.00	7.8	239		0.05	0.03	0.03	55.00	21	0.100	0.500	11	9
Oct 24, 2002	134.00	11	304.0	133.00	7.5	198		0.20	0.03	0.03	40.00	15	0.100	1.000	8	6
Oct 24, 2002	163.00	1	372.0	190.00	7.8	242		0.10	0.03	0.03	58.00	18	0.110	1.000	11	10
Oct 24, 2002	147.00	1	322.0	112.00	8.0	209		0.10	0.03	0.03	35.00	11	0.130	2.000	33	12
Oct 24, 2002	151.00	1	316.0	154.00	7.8	205		0.10	0.03	0.03	45.00	10	0.110	1.000	16	8
Oct 24, 2002	168.00	1	382.0	198.00	7.8	248		0.20	0.03	0.03	61.00	15	0.050	2.000	12	15
Oct 24, 2002	157.00	1	339.0	176.00	7.8	220		0.05	0.03	0.03	54.00	13	0.100	1.000	9	6
Oct 24, 2002	151.00	1	318.0	129.00	7.8	207		0.05	0.03	0.03	37.00	11	0.120	1.000	22	8
Oct 24, 2002	168.00	1	380.0	188.00	7.9	247		0.20	0.03	0.03	57.00	16	0.050	2.000	12	15
May 14, 2002	144.00	2	335.0	154.00	8.1	218		0.10	0.03	0.03	45.00	13	0.100	0.500	17	10

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
May 14, 2002	145.00	1	319.0	121.00	8.2	207		0.05	0.03	0.03	32.00	11	0.110	0.500	22	8
May 14, 2002	146.00	1	318.0	143.00	8.2	207		0.05	0.03	0.03	39.00	10	0.110	0.500	17	8
May 14, 2002	153.00	1	331.0	166.00	8.2	215		0.05	0.03	0.03	50.00	12	0.050	0.500	9	6
May 14, 2002	151.00	1	335.0	150.00	8.2	218		0.10	0.03	0.03	42.00	14	0.050	0.500	11	6
May 14, 2002	164.00	1	378.0	181.00	8.1	246		0.80	0.03	0.03	51.00	16	0.100	1.000	12	12
May 14, 2002	164.00	1	380.0	171.00	8.1	247		0.30	0.03	0.03	47.00	16	0.050	1.000	13	14
May 14, 2002	148.00	1	347.0	153.00	8.1	226		0.10	0.03	0.03	43.00	15	0.050	0.500	11	11
May 14, 2002	136.00	1	305.0	95.00	8.3	198		0.20	0.03	0.03	28.00	10	0.120	1.000	32	12
May 14, 2002	127.00	10	317.0	128.00	8.1	206		0.20	0.03	0.03	38.00	16	0.050	0.500	10	7
Nov 23, 2001	114.00	9	274.0	121.00	7.9	196		0.10	0.03	0.03	37.00	14	0.050	0.500	9	8
Nov 23, 2001	161.00	1	372.0	172.00	8.0	256		0.05	0.03	0.03	49.00	15	0.050	0.500	12	13
Nov 23, 2001	154.00	1	330.0	156.00	8.1	215		0.05	0.03	0.03	46.00	12	0.050	0.500	10	6

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A
Nov 23, 2001	152.00	1	329.0	151.00	8.1	214		0.30	0.03	0.03	44.00	13	0.050	0.500	11	6
Nov 23, 2001	146.00	1	326.0	130.00	8.1	212		0.20	0.03	0.03	37.00	12	0.100	0.500	17	8
Nov 23, 2001	147.00	1	311.0	130.00	8.1	202		0.10	0.03	0.06	34.00	10	0.120	0.500	17	8
Nov 23, 2001	168.00	1	379.0	174.00	8.0	246		0.70	0.03	0.03	50.00	14	0.050	1.000	13	16
Nov 23, 2001	162.00	1	357.0	163.00	8.1	232		0.40	0.03	0.03	47.00	13	0.100	1.000	13	12
Nov 23, 2001	137.00	1	301.0	82.00	8.1	196		0.30	0.03	0.03	23.00	11	0.130	0.500	31	8
Nov 23, 2001	146.00	1	311.0	116.00	8.2	202		0.10	0.03	0.03	30.00	11	0.120	0.500	22	8

Sample Date	Alkalinity	Color	Conductivit	Hardness	pH	TDS	TSS	Turbidity	Boron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate
Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines for Canadian Drinking Water Quality		15			6.5 - 8.5	500		1.0	5.0			250	1.5		200	500
Aesthetic(A) Parameter or Contaminant (C)		A			A	A		C	C			A	C		A	A

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment. The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of the water this water is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, well head recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality, the presence of disinfection by-product (DBP) pre-cursors and to ensure the integrity of a public water supply. The values for each parameter are as reported by the lap and verified by the department.

Quality Assurance / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which many result in minor changes to the reported data.
LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedence report for source water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the Guidelines for Canadian Drinking Water Quality , Sixth Edition (GCDWQ). This comparison is only for screening purposes since at present there are no guidelines for untreated source water. The GCDWQ applies to water at the consumers tap. However in the absence of water treatment these guidelines could be applicable to source water quality.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects .

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the GCDWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the

Contaminant and Aesthetic Exceedances

Turbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Boron - The interim maximum acceptable concentration for boron in drinking water is 5.0 mg/L. Boron is widespread in the environment, occurring naturally in over 80 minerals and in the earth's crust. Levels in well water have been reported to be more variable and often higher than those in surface waters, most likely due to erosion from natural resources. High levels of this contaminant can cause adverse health effects for some peopleTurbidity - The maximum acceptable concentration for turbidity is 1 NTU. Turbidity refers to the water's ability to transmit light or the cloudiness of the water. Turbidity in tap water can be the result of turbid raw water and influences within the distribution system. Turbidity is usually the result of fine organic and inorganic particles which do not settle out. Increased turbidity of drinking water results in it being less aesthetically pleasing, and may interfere with the disinfection process.

Fluoride - The maximum acceptable concentration for fluoride in drinking water is 1.5mg/L.The fluoride concentration in natural water varies widely as it depends on such factors as the source of the water and the geological formations present. Trace amounts of fluoride may be essential for human nutrition and the presence of small quantities leads to a reduction of dental caries. High levels of this contaminant can cause adverse health effects for some people.

mg/L = milligrams per litre or parts per million µS/cm = micro Siemens per centimeter NTU = nephelometric turbidity units TDS = total dissolved solids TSS = total suspended solids
TCU = true colour units
DOC = dissolved organic carbon Nitrate(ite) = Nitrate + Nitrite WS # = water supply number SA# = serviced area number GCDWQ =Guidelines for Canadian Drinking Water Quality
Notes : Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report
pH has no units

Colour - An aesthetic objective of 15 true colour units (TCU) has been established for colour in drinking water. Colour in drinking water may be due to the presence of coloured organic substances or metals such as iron, manganese and copper. Highly coloured industrial wastes also contribute to colour. The presence of colour is not directly linked to health but it can be aesthetically displeasing.

pH -The acceptable range for drinking water pH is 6.5 - 8.5. The control of pH is primarily based on minimizing corrosion and encrustration in the distribution system. Tap water with low pH may accelerate the corrosion process in the distribution system, and contribute to increased levels of copper, lead and possibly other metals. Incrustation and scaling problems may become more frequent above pH 8.5

TDS - The aesthetic objective for TDS in drinking water is 500 mg/L. The term "total dissolved solids"(TDS) refers mainly to the inorganic substances that are dissolved in water. At low levels TDS contributes to the palatability of water. At high levels it may cause excessive hardness, taste, mineral deposition and corrosion.

Chloride - The aesthetic objective for chloride in drinking water is 250 mg/L. Chloride can be in water from a variety of sources, including the dissolution of salt deposits and salting of roads for ice control. No evidence has been found suggesting that ingestion of chloride is harmful to humans. However, high levels of chloride in water can impart undesirable tastes to water and beverages prepared from water.

Sodium - The aesthetic objective for sodium in drinking water is 200 mg/L. Since the body has very effective means to control levels of sodium, sodium is not an acutely toxic element in the normal range of environmental or dietary concentrations. At extremely high dosages it has adverse health effects. Sodium levels may be of interest to authorities who wish to prescribe sodium restricted diets for their patients..

Sulphate - The aesthetic objective for sulphate in drinking water is 500 mg/L. Sulphates, which occur naturally in numerous minerals, are used in the mining and pulping industries and in wood preservation. Large quantities of sulphate can result in catharsis and gastrointestinal irritation. The presence of sulphate above

Appendix B

Drilled Water Well Records

PROJECT NUJIO’QONIK
Aquatic Environment Baseline Study
August 2023

Project Location	Well Number	Lat.	Long.	Well Town	Depth to Bedrock (m)	Static water level (m)	Well Depth (m)	Casing length (m)	Lithology	Water Use	Water Type	Date Drilled	Casing Diameter (mm)	Yield (L/min)	Depth water found (m)
Stephenville RAA	8927	48.55	-58.58306	STEPHENVILLE			91.4		OBDN 013 ROCK 091			6/15/1976 0:00			
Stephenville RAA	18916	48.56694	-58.51694	NOELS POND	23.1		74.3	23.1	GREY GRVL 23 GREY GRNT 74	DOMESTIC		6/17/1998 0:00	150	2	
Stephenville RAA	29068	48.546667	-58.520944	STEPHENVILLE	71.64634146	18.29268293	66.768293	50		NON-DOMESTIC	FRESH	2/11/2018 0:00	150	1514	30.48780488
Stephenville RAA	24219	48.542306	-58.528583	STEPHENVILLE		22.9	60.9	47.5		DOMESTIC	FRESH	5/21/2012 0:00	152		
Stephenville RAA	24164	48.5415	-58.528278	STEPHENVILLE		21.87	60.9	46.9		NON-DOMESTIC	FRESH	11/23/2010 0:00	152		21.87
Stephenville RAA	23794	48.542583	-58.529361	STEPHENVILLE			50.59	40.53		DOMESTIC	FRESH	8/7/2009 0:00	150	337.5	40.53
Stephenville RAA	10469	48.54833	-58.64556	KIPPENS			49.9	13.4	RED CLAY 011 RED SNDS 050	DOMESTIC	FRESH	11/25/1982 0:00		36	30
Stephenville RAA	22094	48.537472	-58.503746	GULL POND	10.7		49	11.6	49.7	DOMESTIC	FRESH	5/19/2005 0:00	150	3	
Stephenville RAA	17847	48.537472	-58.503746	GULL POND		1	49	17	SAND GRVL 17 GRNT 50	DOMESTIC	FRESH	7/20/1995 0:00		9	45.4
Stephenville RAA	19034	48.55	-58.58306	STEPHENVILLE	8.8		45.1	10	REAMED FR 200MM DIA TO 438MM DIA	MUNICIPAL		11/28/1998 0:00	457	1462	
Stephenville RAA	15593	48.55	-58.58306	STEPHENVILLE		3	43.8	31	BRWN GRVL 006 BRWN GRVL/SILT/CLAY 044	MUNICIPAL	FRESH	11/21/1989 0:00		113	26
Stephenville RAA	25760	48.602861	-58.534417	COLDBROOK	25.9	12	42.6	26.8		DOMESTIC	FRESH	11/22/2012 0:00	152	35	38
Stephenville RAA	14840	48.55	-58.58306	STEPHENVILLE			38	10	GREY GRNT 038		FRESH	8/4/1989 0:00		15	35
Stephenville RAA	24127	48.566472	-58.520611	NOELS POND	8.8	11	37.8	9.4		DOMESTIC	FRESH	7/8/2010 0:00	152	175	11.5
Stephenville RAA	24126	48.568667	-58.510806	NOELS POND	17.3	10.3	37.8	18.2		DOMESTIC	FRESH	7/7/2010 0:00	152	80	20
Stephenville RAA	24128	48.567889	-58.522611	NOELS POND	12.1	10	37.8	14.9		DOMESTIC	FRESH	7/9/2010 0:00	152	45	
Stephenville RAA	10514	48.54611	-58.64694	KIPPENS		7	37.8	22.8	GRVL CLAY 023 GREY CONG 038	DOMESTIC	FRESH	9/4/1983 0:00		50	36
Stephenville RAA	20224	48.6	-58.53306	COLD BROOK			37.8	28.6	GRVL SAND BRWN 25.6 GRVL BRWN 28.6 CONG GREY 37.8	DOMESTIC		8/23/2001 0:00	150	27	
Stephenville RAA	18915	48.55	-58.58306	STEPHENVILLE	10.9		37.7	11.2	OBDN 11 GREY GRNT 38	DOMESTIC		7/30/1998 0:00	150	22	
Stephenville RAA	19260	48.537472	-58.503746	GULL POND	4.5		37.7	5	GRVL BLDR 5 GREY ROCK 38	DOMESTIC		10/22/1999 0:00	150	25	
Stephenville RAA	23209	48.56403	-58.59953	STEPHENVILLE	88	7	37.7	13.3	BRWN UNCONSOLIDATED GRAVEL 36; BRWN SOME SNDS MIXED WITH MUDSTONE 43.6'; BRWN GREY SNDS 37.8	DOMESTIC	FRESH	4/25/2008 0:00	150	13	
Stephenville RAA	22793	48.56725	-58.52225	NOELS POND	13.7	6	36.6	13.7	BRWN UNCONSOLIDATED - 13.7; GRY BDRCK 36.6	DOMESTIC	FRESH	5/31/2007 0:00	150	40	
Stephenville RAA	11877	48.58333	-58.54917	STEPHENVILLE			35	27.4	RED SNDS 035			7/29/1985 0:00			
Stephenville RAA	22082	48.58606	-58.54219	COLD BROOK			35	35	BRWN GRVL & BLDR 35	DOMESTIC	FRESH	7/21/2005 0:00	150	50	
Stephenville RAA	20396	48.537472	-58.503746	GULL POND			34.7	34.7	GRVL BLDR GREY 3 SAND GREY 33.5 GRVL BRWN 34.7	DOMESTIC		5/23/2002 0:00	150	100	
Stephenville RAA	19032	48.55	-58.58306	STEPHENVILLE	29		33	23.9	SAND GRVL CLAY 28 SNDS 33			12/11/1998 0:00	200	227	
Stephenville RAA	19033	48.55	-58.58306	STEPHENVILLE	27.3		33	27.3	SAND GRVL CLAY 28 SAND GRVL 30 SNDS 33			12/5/1998 0:00	200		

Project Location	Well Number	Lat.	Long.	Well Town	Depth to Bedrock (m)	Static water level (m)	Well Depth (m)	Casing length (m)	Lithology	Water Use	Water Type	Date Drilled	Casing Diameter (mm)	Yield (L/min)	Depth water found (m)
Stephenville RAA	19025	48.6	-58.53306	COLD BROOK			33	25.1	SAND GRVL CLAY 20 CLAY 24 SAND GRVL 33	MUNICIPAL		3/7/1999 0:00	200	1793	
Stephenville RAA	19027	48.6	-58.53306	COLD BROOK			32.1	25.3	SAND GRVL CLAY 14 CLAY 18 SAND GRVL CLAY	MUNICIPAL		2/17/1999 0:00	200	1788	
Stephenville RAA	24165	48.584667	-58.543056	COLD BROOK		24.3	32	32		DOMESTIC	FRESH	12/4/2010 0:00	152	100	32
Stephenville RAA	20964	48.55	-58.58306	STEPHENVILLE	9.1		31.7	19.2	9.14 BRWN SAND, CLAY & GRAVEL; 31.7 BRWN MUD STONE	DOMESTIC	FRESH	11/4/2003 0:00	150	22.8	
Stephenville RAA	20223	48.6	-58.53306	COLD BROOK			31.7	30	UNCONSOLIDATED	DOMESTIC		8/21/2001 0:00	150	50	
Stephenville RAA	21448	48.6	-58.53306	COLD BROOK			31.7	31.7	BRWN BLDR, SAND & GRVL 5.2; BRWN SAND 8.5; 31.7 GREY/BRWN GRVL	DOMESTIC	FRESH	4/14/2004 0:00	155	43	31.7
Stephenville RAA	20218	48.6	-58.53306	COLD BROOK			31.3	31.3	SILT SAND GREY 3 BLDR GREY 6 GRVL BLDR GREY 17.6	DOMESTIC		7/27/2001 0:00	150	50	
Stephenville RAA	22415	48.56789	-58.52439	STEPHENVILLE	16.5	7	30.6	17.6	5 BRWN SAND, GRVL, BLDR 16.5 GREY CLAY; 30.6 GREY SNDS	DOMESTIC	FRESH	11/5/2006 0:00	150	16	
Stephenville RAA	8929	48.55	-58.58306	STEPHENVILLE			30.5	26.2	GRVL 024 LMSN 030	DOMESTIC		11/23/1978 0:00		68.2	
Stephenville RAA	22566	48.56714	-58.5225	NOELS POND	12.1	12	30.5	13.4	5 BRWN BLDR & GRVL; 12.1 GREY CLAY; 30.5 GREY SNDS	DOMESTIC	FRESH	11/10/2006 0:00	150	20	
Stephenville RAA	24109	48.56925	-58.509639	NOELS POND	17.3	3	30.4	17.3		DOMESTIC	FRESH	10/30/2009 0:00	152	18	
Stephenville RAA	12656	48.55	-58.58306	STEPHENVILLE		2	30	6.1	GREY CLAY 003 RED CONG 030	INDUSTRIAL	FRESH	7/28/1987 0:00		100	12
Stephenville RAA	8924	48.6	-58.53306	COLD BROOK			29.9	12.2				5/15/1974 0:00		68.2	
Stephenville RAA	13236	48.56472	-58.52	NOELS POND			28.9	28.9	SAND 028	DOMESTIC	FRESH	12/20/1987 0:00		23	29
Stephenville RAA	20217	48.6	-58.53306	COLD BROOK	29.5		28.9	28.9	GRVL BLDR BRWN 15.2 SILT SAND GRVL BRWN 28.9	DOMESTIC		9/14/2001 0:00	150	20	
Stephenville RAA	20233	48.6	-58.53306	COLD BROOK			28.9	28.9	GRVL BLDR BRWN 15.3 SAND BRWN 27.4 GRVL BRWN 28.9	DOMESTIC		8/10/2001 0:00	150	50	
Stephenville RAA	20232	48.6	-58.53306	COLD BROOK			27.4	27.4	GRVL BLDR BRWN 10 SAND GRVL SILT BRWN 27.4	DOMESTIC		8/12/2001 0:00	150	45	
Stephenville RAA	10587	48.55306	-58.48194	KIPPENS		12	26.4	23.1	RED GRVL 007 GREY CLAY 026	DOMESTIC	FRESH	7/7/1984 0:00		7	23
Stephenville RAA	19035	48.6	-58.53306	COLD BROOK	24		26	15.3	SAND GRVL CLAY 24 SNDS 26	MUNICIPAL		3/26/1999 0:00	200	910	
Stephenville RAA	8928	48.55	-58.58306	STEPHENVILLE			25.6		GRVL 018 ROCK 026			9/15/1976 0:00		90.9	
Stephenville RAA	23793	48.56661	-58.52111	NOELS POND	8.2	5	25.6	8.2	6M ;BRWN AND GREY CONSOLIDATED ROCK 6M TO 25.6M	DOMESTIC	FRESH	9/22/2009 0:00	15	38	
Stephenville RAA	26117	48.567528	-58.523306	NOELS POND	15	12	25.6	15.2		DOMESTIC	FRESH	8/20/2013 0:00	152	80	
Stephenville RAA	14836	48.56694	-58.51694	NOELS POND			25	25	RED SAND 025	DOMESTIC	FRESH	7/27/1989 0:00		30	25
Stephenville RAA	22995	48.56758	-58.51258	NOELS POND			25	25	BRWN CLAY, BLDR 6; BRWN BLDR, GRVL 12; MULTI-SAND & GRVL 22; MULTI GRVL 25	DOMESTIC	FRESH	11/22/2007 0:00	150	113	
Stephenville RAA	20720	48.56694	-58.51694	NOELS POND		12	24.5	24.5	GRVL MULTI 24.5	DOMESTIC	FRESH	6/7/2003 0:00	150	182	
Stephenville RAA	19026	48.6	-58.53306	COLD BROOK	21		24.3	15.9	SAND GRVL CLAY 17 SAND GRVL 21 SNDS 24	MUNICIPAL		3/21/1999 0:00	200	1240	
Stephenville RAA	22080	48.56761	-58.52353	NOELS POND	16.7		24.3	17	GREY TILL & BLDR 13.4 ;GREY CLAY 16.7 ;GREY SNDS CONG	DOMESTIC	FRESH	7/27/2005 0:00	150	40	
Stephenville RAA	24166	48.596028	-58.532222	COLD BROOK		12.4	24.3	24.3		DOMESTIC	FRESH	12/8/2010 0:00	152	80	24.3
Stephenville RAA	20231	48.6	-58.53306	COLD BROOK			24.3	24.3	GRVL BLDR BRWN SAND GRVL BRWN 24.3	DOMESTIC		8/11/2001 0:00	150	100	

Project Location	Well Number	Lat.	Long.	Well Town	Depth to Bedrock (m)	Static water level (m)	Well Depth (m)	Casing length (m)	Lithology	Water Use	Water Type	Date Drilled	Casing Diameter (mm)	Yield (L/min)	Depth water found (m)
Stephenville RAA	20222	48.6	-58.53306	COLD BROOK			24.3	24.3	GRVL BLDR BRWN 18 SAND GRVL BRWN 24.3	DOMESTIC		8/24/2001 0:00	150	130	
Stephenville RAA	21095	48.6	-58.53306	COLD BROOK			24.3	24.3	12 BRWN GRVL; 21.3 BRWN SAND; 24.3 BRWN GRVL	DOMESTIC	FRESH	12/20/2003 0:00	150	22.8	24.3
Stephenville RAA	22083	48.56372	-58.60047	STEPHENVILLE	7		24	12	BRWN GRVL & SAND 6.0 ;RED SNDS CONG 24.3	DOMESTIC	FRESH	7/18/2005 0:00	150	45	
Stephenville RAA	19028	48.55	-58.58306	STEPHENVILLE			24	17	SAND GRVL 4 SAND 5 SAND GRVL CLAY 24	MUNICIPAL		2/20/1998 0:00	200	318	
Stephenville RAA	16705	48.6	-58.53306	COLD BROOK			22.9	22.9	RED GRVL	DOMESTIC	FRESH	11/20/1992 0:00		9.1	22.9
Stephenville RAA	16735	48.537472	-58.503746	GULL POND			22.9	12.2	RED SHLE	DOMESTIC	FRESH	9/1/1992 0:00		9	19.8
Stephenville RAA	17796	48.55	-58.58306	STEPHENVILLE			21.3	12.2	GRVL 12 SNDS 21	DOMESTIC	FRESH	8/28/1995 0:00		9	18.3
Stephenville RAA	17797	48.55	-58.58306	STEPHENVILLE			21.3	12.2	GRVL 12 SNDS 21	DOMESTIC	FRESH	8/29/1995 0:00		9	18.3
Stephenville RAA	17024	48.6	-58.53306	COLD BROOK			21.3		RED GRVL 21	DOMESTIC	FRESH	8/24/1993 0:00		9.1	18.3
Stephenville RAA	16217	48.56694	-58.51694	NOELS POND			21.3	21.3	GREY SAND/CLAY 021	DOMESTIC	FRESH	5/9/1991 0:00		4.5	18
Stephenville RAA	21669	48.537472	-58.503746	GULL POND			21.3	21.3	GREY BLDR & GRVL 6; GREY SAND & GRVL 21.3	DOMESTIC	FRESH	12/16/2004 0:00	150	45	
Stephenville RAA	11874	48.56361	-58.51694	NOELS POND			21	21.3	SAND 021	DOMESTIC	FRESH	4/30/1985 0:00		23	
Stephenville RAA	19874	48.6	-58.53306	COLD BROOK			21	21	BRWN SILT 3 GREY GRVL BLDR 23	DOMESTIC		6/13/2001 0:00	150	160	
Stephenville RAA	19873	48.6	-58.53306	COLD BROOK	20.7		20.7	21	BRWN GRVL 17 BRWN SAND 21 BRWN SNDS 23	DOMESTIC		6/13/2001 0:00	150	31.8	
Stephenville RAA	19031	48.55	-58.58306	STEPHENVILLE	14.6		20.7	8.7	BOG 4 SAND GRVL 15 SNDS 21	MUNICIPAL		12/19/1998 0:00	200	1156	
Stephenville RAA	18930	48.6	-58.53306	COLD BROOK	0		20.1	20.1	SAND GRVL BLDR 20	DOMESTIC		10/25/1998 0:00	150	37	
Stephenville RAA	14834	48.56694	-58.51694	NOELS POND		2	20	20	GREY SAND 020	DOMESTIC	FRESH	7/25/1989 0:00		5	20
Stephenville RAA	14835	48.56694	-58.51694	NOELS POND			20	20	GREY SAND 020	DOMESTIC	FRESH	7/26/1989 0:00		16	
Stephenville RAA	13237	48.56306	-58.51944	NOELS POND			19.8	19.8	SAND 020	DOMESTIC	FRESH	12/21/1987 0:00		14	20
Stephenville RAA	13238	48.56361	-58.51944	NOELS POND			19.8	19.8	SAND 020	DOMESTIC	FRESH	12/22/1987 0:00		9	20
Stephenville RAA	24177	48.574472	-58.545833	COLDBROOK	14.3	9.2	19.5	15.8		DOMESTIC	FRESH	4/5/2011 0:00	152	65	16.4
Stephenville RAA	20579	48.6	-58.53306	COLD BROOK			19.5		GRVL SAND GREY BRWN 19.5	DOMESTIC		12/14/2002 0:00	150	45.5	
Stephenville RAA	12560	48.55944	-58.51806	NOELS POND		5	19.3	18.3	RED BRWN 007 RED GRVL 020	DOMESTIC	FRESH	11/2/1986 0:00		45	19
Stephenville RAA	13814	48.56694	-58.51694	NOELS POND		10	19.2	18.2	BRWN GRVL 020	DOMESTIC	FRESH	8/31/1988 0:00		43	18
Stephenville RAA	27768	48.586	-58.537528	COLD BROOK		19.05	19.05	19		DOMESTIC	FRESH	7/8/2015 0:00	6	40	19.05
Stephenville RAA	20225	48.6	-58.53306	COLD BROOK			19	19.5	UNCONSOLIDATED BRWN 19.5	DOMESTIC		8/19/2001 0:00	150	54	
Stephenville RAA	8926	48.56694	-58.51694	NOELS POND		12	18.3		TPSL/GRVL/CLAY 018 ROCK 000						
Stephenville RAA	24212	48.591556	-58.534833	COLDBROOK		12	18.2	0		DOMESTIC	FRESH	10/17/2011 0:00	152	80	18.2
Stephenville RAA	24163	48.564528	-58.513444	NOELS POND		3	18.2	18.2		DOMESTIC	FRESH	11/5/2010 0:00	152	30	18.2
Stephenville RAA	24129	48.568111	-58.512222	NOELS POND		10	18.2	18.2		DOMESTIC	FRESH	7/13/2010 0:00	152	182	18.2
Stephenville RAA	29299	48.537733	-58.503574	STEPHENVILLE		5	18.2	17.6		DOMESTIC	FRESH	11/13/2018 0:00	150	40	18.2
Stephenville RAA	13844	48.56694	-58.51694	NOELS POND		5	18.1	18.2	BRWN GRVL 020	DOMESTIC	FRESH	11/25/1988 0:00		273	19

Project Location	Well Number	Lat.	Long.	Well Town	Depth to Bedrock (m)	Static water level (m)	Well Depth (m)	Casing length (m)	Lithology	Water Use	Water Type	Date Drilled	Casing Diameter (mm)	Yield (L/min)	Depth water found (m)
Stephenville RAA	20202	48.537472	-58.503746	GULL POND			18	18	GRVL BRWN 3 SAND BRWN 15 SAND GRVL BRWN 18	DOMESTIC		10/22/2001 0:00	150	180	
Stephenville RAA	11849	48.56444	-58.51889	NOELS POND			17	15.8	RED SNDS 016	DOMESTIC	FRESH	4/30/1985 0:00			15
Stephenville RAA	19029	48.55	-58.58306	STEPHENVILLE	16		17	10.8	SAND GRVL 13 SAND GRVL CLAY 16 SNDS 17	MUNICIPAL		1/18/1999 0:00	200	1530	
Stephenville RAA	19030	48.55	-58.58306	STEPHENVILLE	15		17	13.1	SAND GRVL 6 SAND GRVL CLAY 13 SNDS 17	MUNICIPAL		1/16/1999 0:00	200	1156	
Stephenville RAA	24233	48.565944	-58.513111	NOELS POND		7.6	16.7	16.7		DOMESTIC	FRESH	6/27/2012 0:00	152	90	16.7

Project Location	Well Number	Lat.	Long.	Well Town	Depth to Bedrock (m)	Static water level (m)	Well Depth (m)	Casing length (m)	Lithology	Water Use	Water Type	Date Drilled	Casing Diameter (mm)	Yield (L/min)	Depth water found (m)
Stephenville RAA	17052	48.56694	-58.51694	NOELS POND			16.7	16.7	GREY SAND 17	DOMESTIC	FRESH	10/13/1993 0:00		9.1	13.7
Stephenville RAA	20221	48.6	-58.53306	COLD BROOK			15.8	15.8	GRVL SAND BRWN 15.8	DOMESTIC		8/23/2001 0:00	150	45	
Stephenville RAA	8925	48.6	-58.53306	COLD BROOK			15.2	15.2	OBDN 015 ROCK 000			5/15/1974 0:00		54.6	
Stephenville RAA	19547	48.56694	-58.51694	NOELS POND	0		15.2		BRWN GRVL BLDR CLAY 17	DOMESTIC		9/4/2000 0:00	150	45.5	
Stephenville RAA	27760	48.568083	-58.512083	NOELS POND		15.2	15.2	15.2		DOMESTIC	FRESH	6/26/2015 0:00	6	80	15.2
Stephenville RAA	22567	48.56908	-58.51022	NOELS POND	16.4	10	15.2	15.2	BRWN GRVL & SAND; 16.4 BRWN TILL	DOMESTIC	FRESH	11/10/2006 0:00	150	90	
Stephenville RAA	10039	48.54694	-58.64556	KIPPENS			14.9	13.3	015	DOMESTIC	FRESH	6/25/1980 0:00		14	13
Stephenville RAA	28123	48.566222	-58.513083	NOELS POND			14.9	14.9		DOMESTIC	FRESH	9/16/2015 0:00	152	40	14.9
Stephenville RAA	28557	48.58825	-58.537667	COLDBROOK	11.5		13.4	11.8		DOMESTIC	FRESH	7/30/2017 0:00	150	80	12.2
Stephenville RAA	20258	48.6	-58.53306	COLD BROOK			13.1	13.1	GRVL GREY 13.1	DOMESTIC		9/18/2002 0:00	150	300	
Stephenville RAA	28678	48.5695	-58.508944	NOELS POND		6	13	13		DOMESTIC	FRESH	11/15/2017 0:00	150	40	13.4
Stephenville RAA	25517	48.588278	-58.536667	COLDBROOK	19.5	3	12.8	13.4		DOMESTIC	FRESH	9/13/2012 0:00	152	80	
Stephenville RAA	26900	48.563194	-58.515944	NOELS POND		5	12.4	12.4		DOMESTIC	FRESH	8/25/2014 0:00	152	240	12.4
Stephenville RAA	20257	48.6	-58.53306	COLD BROOK			12.1	12	GRVL SAND GREY 12.1	DOMESTIC		9/18/2001 0:00	150	150	
Stephenville RAA	21671	48.537472	-58.503746	GULL POND			12.1	12.1	BRWN GRVL & SAND 12.1	DOMESTIC	FRESH	12/3/2004 0:00	150	30	
Stephenville RAA	29511	48.564177	-58.514206	NOELS POND		8	12	12		DOMESTIC	FRESH	8/23/2019 0:00	150	80	12.4
Stephenville RAA	22095	48.55	-58.58306	STEPHENVILLE			8.5	5.4	GREY GRVL & SAND	DOMESTIC		4/12/2005 0:00	150		
Stephenville RAA	15569	48.55	-58.58306	STEPHENVILLE		3	8.2	8.2	GREY GRVL 008 (S 02.1 03)		FRESH	10/26/1990 0:00		168	3
Stephenville RAA	15568	48.54472	-58.58556	STEPHENVILLE		3	7.6	7.6	GREY GRVL 008 (S 02.1 03)		FRESH	10/24/1990 0:00		141	3
Stephenville RAA	29653	48.565444	-58.513611	Noel's Pond	0		4.63296	4.63296		DOMESTIC	FRESH	11/26/2019 0:00	150	454.609	4.63296
Stephenville RAA	19559	48.6	-58.53306	COLD BROOK		17		26.8	BRWN GRVL 18 BRWN SAND SILT 26 GRVL 27	DOMESTIC	FRESH	6/12/2000 0:00		90	26.5
Stephenville RAA	10337	48.55944	-58.58333	STEPHENVILLE						DOMESTIC	FRESH				

Summary:

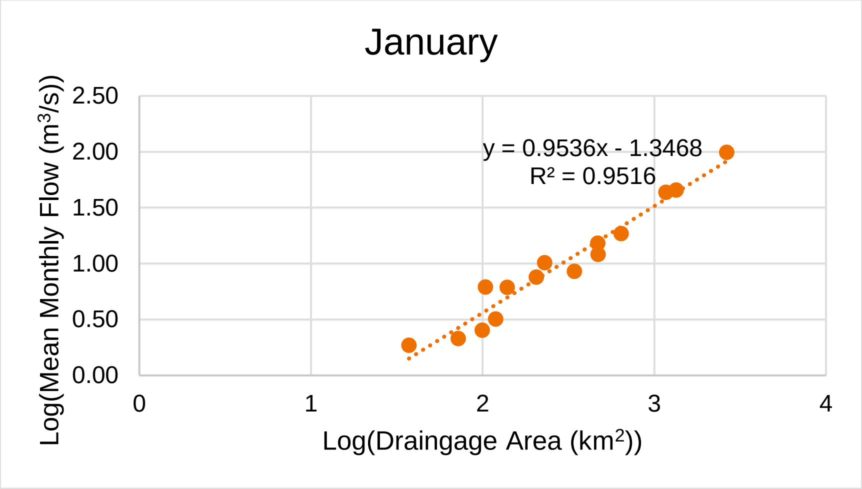
	Codroy RAA	Port au Port RAA/ LAA	Stephenville RAA
Number of Wells			
Total	203	83 / 4	115
Bedrock	158	49 / 4	42
Overburden	27	6 / 0	66
Unknown	18	28 / 0	7
Median Depth (m)	32	44 / 34	24
Static Water Level (mbgs)	6	5.5 / 8	9
Median Well Yield (L/min)	45	25 / 5	48

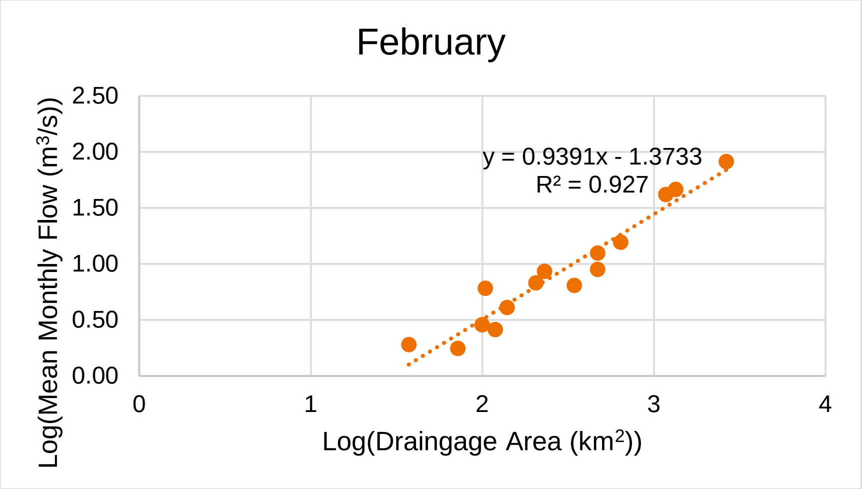
Appendix C

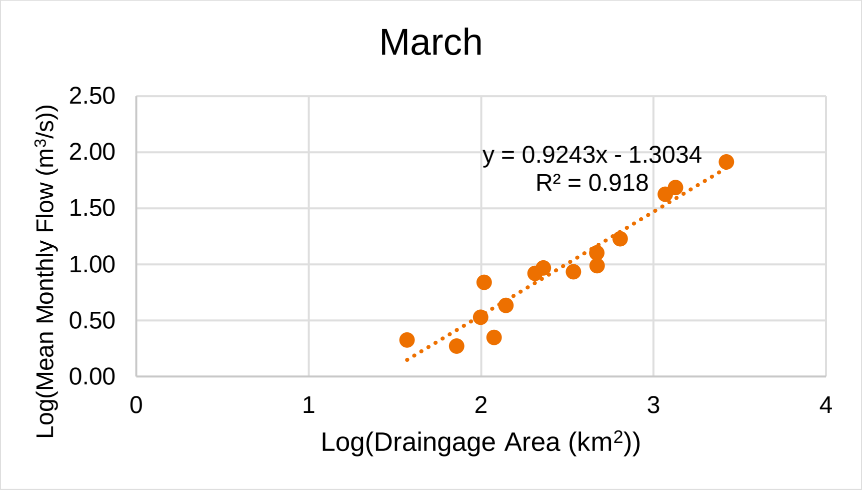
Regional Regression Relationships

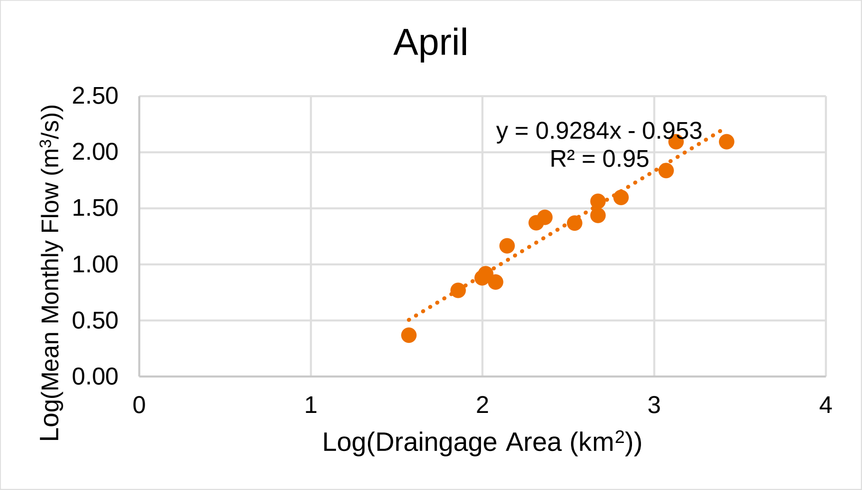
PROJECT NUJIO’QONIK
Aquatic Environment Baseline Study
August 2023

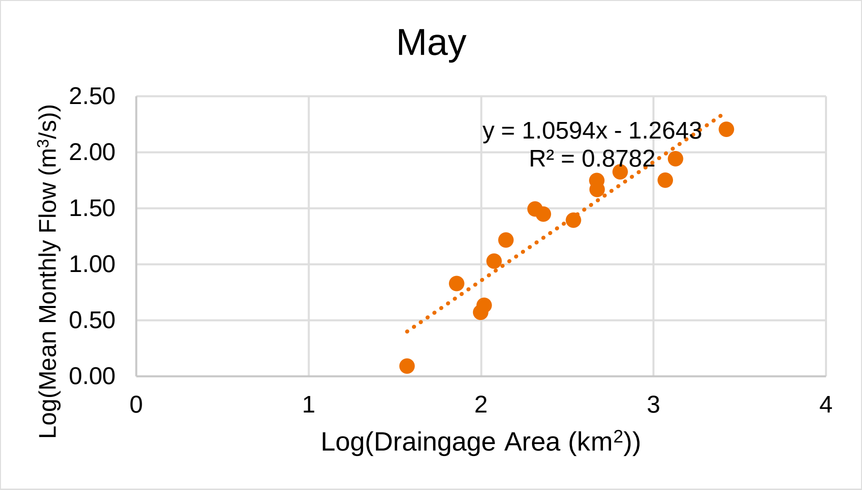
Appendix C – Regional Regression Equations

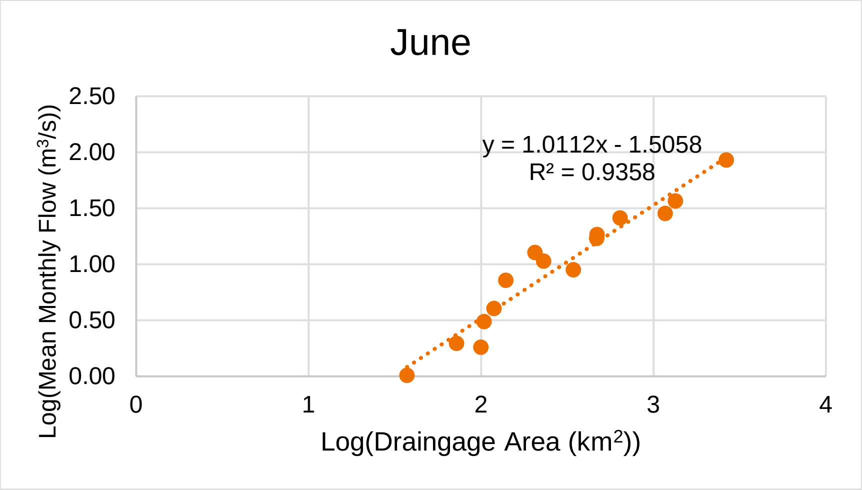


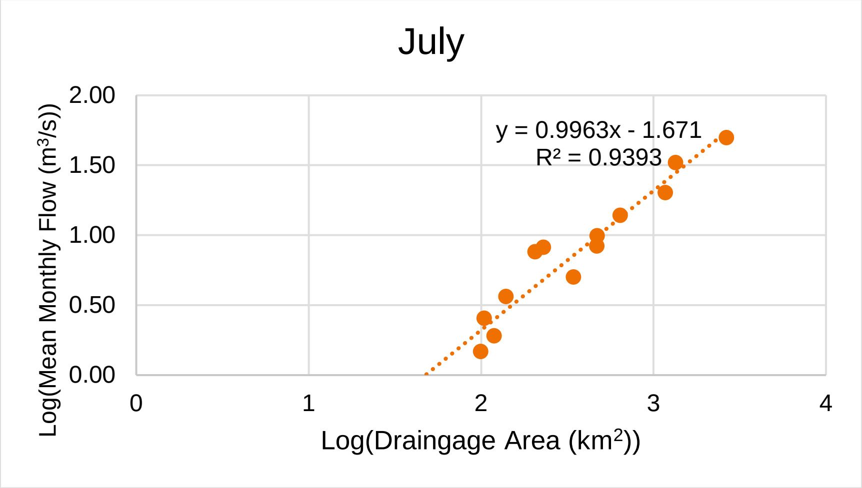


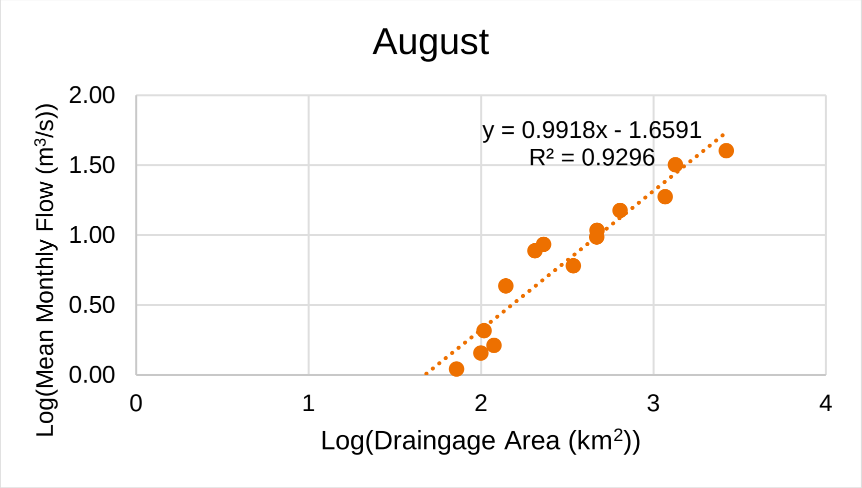


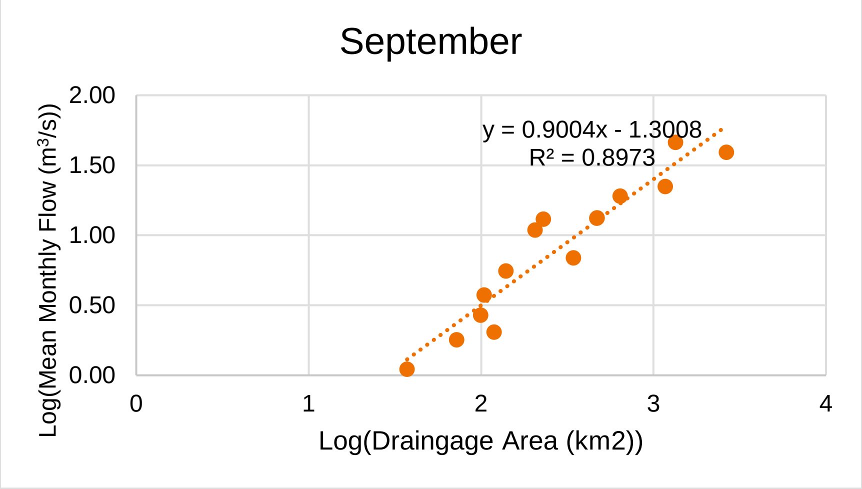


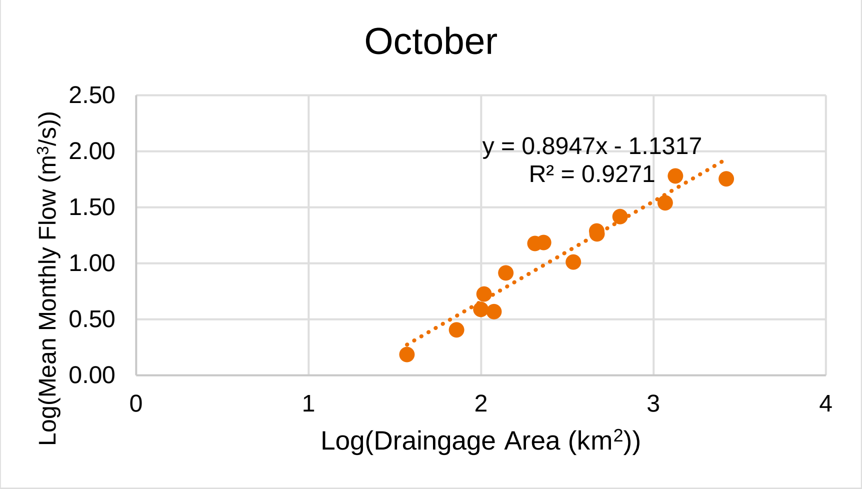

May
y = 1.0594x - 1.2643
R² = 0.8782
Log(Mean Monthly Flow (m³/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))

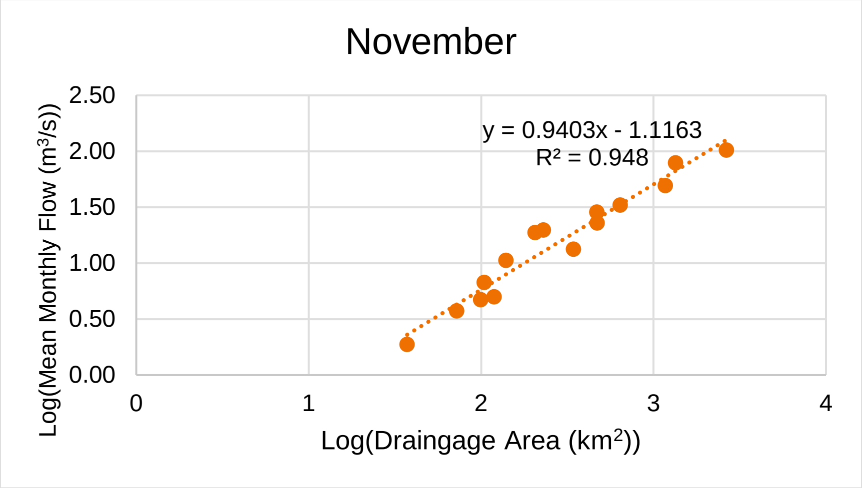

June
y = 1.0112x - 1.5058
R² = 0.9358
Log(Mean Monthly Flow (m³/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))

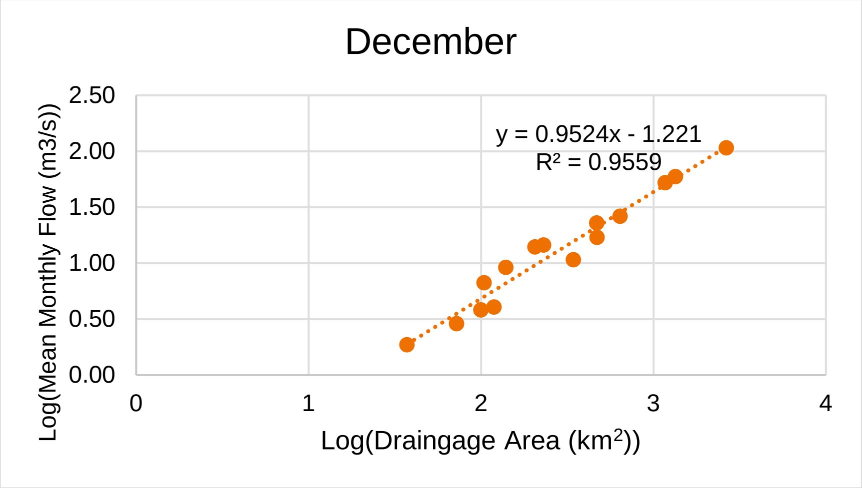

July
y = 0.9963x - 1.671
R² = 0.9393
Log(Mean Monthly Flow (m³/s))
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))


August
y = 0.9918x - 1.6591
R² = 0.9296
Log(Mean Monthly Flow (m³/s))
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))


September
y = 0.9004x - 1.3008
R² = 0.8973
Log(Mean Monthly Flow (m³/s))
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km2))


October
y = 0.8947x - 1.1317
R² = 0.9271
Log(Mean Monthly Flow (m³/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))


November
y = 0.9403x - 1.1163
R² = 0.948
Log(Mean Monthly Flow (m³/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))


December
y = 0.9524x - 1.221
R² = 0.9559
Log(Mean Monthly Flow (m3/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
1
2
3
4
Log(Draingage Area (km²))

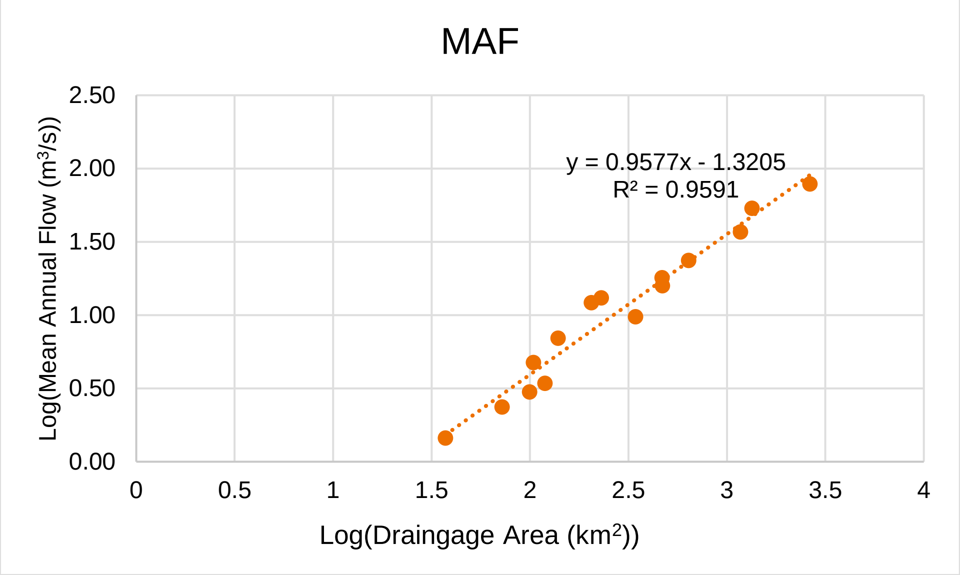

MAF
y = 0.9577x - 1.3205
R² = 0.9591
Log(Mean Annual Flow (m³/s))
2.50
2.00
1.50
1.00
0.50
0.00
0
0.5
1
1.5
2
2.5
3
3.5
4
Log(Draingage Area (km²))

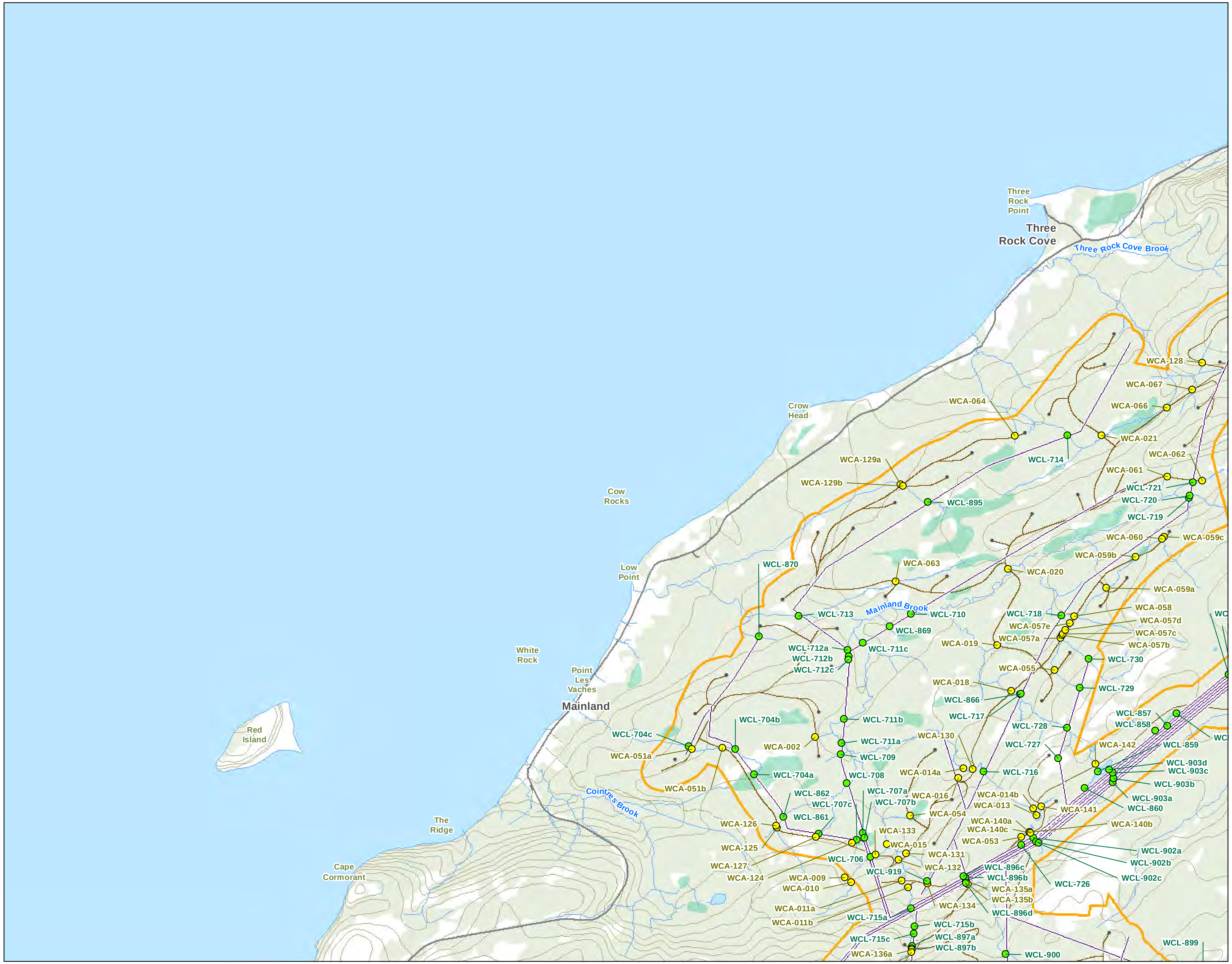
Table C.1 – Regional Regression Data

Station ID	Station Name	DA (km^2)	Regulation	Years	Number of Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	MAF
02YJ001	HARRYS RIVER BELOW HIGHWAY BRIDGE	640	NATURAL	1968-2020	53	18.58	15.68	16.96	39.45	67.01	25.91	13.84	14.98	19.02	26.12	32.97	26.26	26.40
02YJ003	PINCHGUT BROOK AT OUTLET OF PINCHGUT LAKE	119	NATURAL	1986-1997	12	3.21	2.60	2.22	6.94	10.67	4.02	1.91	1.63	2.04	3.69	4.99	4.05	4.00
02YK002	LEWASEE BROOK AT LITTLE GRAND LAKE	470	NATURAL	1952-2021	66	12.09	8.92	9.75	27.40	46.47	18.46	9.89	10.86	13.32	18.30	22.92	17.04	17.95
02YN002	LLYODS RIVER BELOW KING GEORGE IV LAKE	469	NATURAL	1981-2021	41	15.22	12.49	12.64	36.57	56.14	16.99	8.35	9.72	13.23	19.46	28.55	22.87	21.02
02ZB001	ISLE AUX MORTS RIVER BELOW HIGHWAY BRIDGE	205	NATURAL	1962-2019	58	7.58	6.78	8.29	23.50	31.28	12.78	7.62	7.75	10.92	15.03	18.83	13.96	13.69
02ZC002	GRANDY BROOK BELOW TOP POND BROOK	230	NATURAL	1982-2020	39	10.17	8.60	9.30	26.30	28.14	10.67	8.22	8.59	13.07	15.32	19.83	14.57	14.40
02ZD002	GREY RIVER NEAR GREY RIVER	1340	NATURAL	1969-2019	48	45.51	46.18	48.54	123.93	87.55	36.82	33.14	31.80	46.05	60.31	78.83	59.25	58.16
02ZE001	SALMON RIVER AT LONG POND	2640	NATURAL	1944-1965	22	98.84	82.00	81.85	123.72	160.37	85.14	49.76	40.24	39.12	56.82	102.46	106.98	85.61
02ZE004	CONNE RIVER AT OUTLET OF CONNE RIVER POND	99.5	NATURAL	1989-2021	33	2.54	2.86	3.37	7.57	3.72	1.82	1.48	1.44	2.69	3.88	4.72	3.83	3.33
02ZF001	BAY DU NORD RIVER AT BIG FALLS	1170	NATURAL	1950-2021	72	43.47	41.66	42.11	68.67	56.21	28.39	20.14	18.83	22.34	34.60	49.33	52.49	39.85
02ZK004	LITTLE SALMONIER RIVER NEAR NORTH HARBOUR	104	NATURAL	1983-2021	39	6.19	6.09	6.91	8.28	4.31	3.08	2.55	2.08	3.74	5.30	6.74	6.70	5.17
02ZA001	LITTLE BARACHOIS BROOK NEAR ST. GEORGE'S	343	NATURAL	1978-1997	20	8.56	6.44	8.58	23.30	24.80	8.92	5.03	6.04	6.89	10.29	13.36	10.72	11.08
02ZA002	HIGHLANDS RIVER AT TRANS CANADA HIGHWAY	72	NATURAL	1981-2020	39	2.14	1.76	1.87	5.88	6.73	1.97	1.00	1.11	1.80	2.54	3.76	2.88	2.79
02ZA003	LITTLE CODROY RIVER NEAR DOYLES	139	NATURAL	1982-1997	16	6.14	4.09	4.31	14.61	16.46	7.18	3.64	4.35	5.56	8.21	10.58	9.16	7.86
02ZK003	LITTLE BARACHOIS RIVER NEAR PLACENTIA	37.2	NATURAL	1983-2019	37	1.86	1.90	2.11	2.34	1.23	1.02	0.88	0.78	1.11	1.53	1.88	1.86	1.54

Appendix D

Watercourse Crossing Mapbook

PROJECT NUJIO'QONIK
Aquatic Environment Baseline Study
August 2023



Stantec

Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing

Proposed Project Features

- • Turbine Location
- — Collector Line (Proposed)
- — Access Road (Proposed)
- ▭ Project Area

Other Features

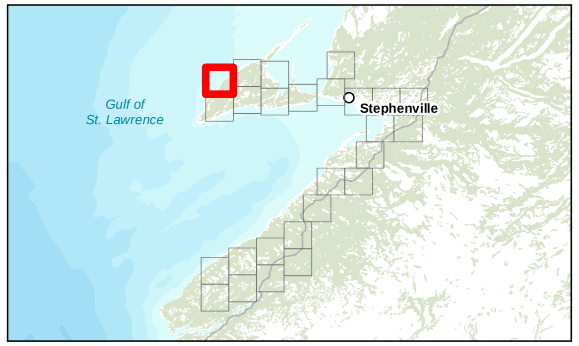
- — Road / Highway
- - - Resource Road / Trail
- — Watercourse
- ▨ Waterbody
- ▨ Wetland
- ▨ Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
Revised by NW on 2023-07-23
QR by AW on 2023-07-31

Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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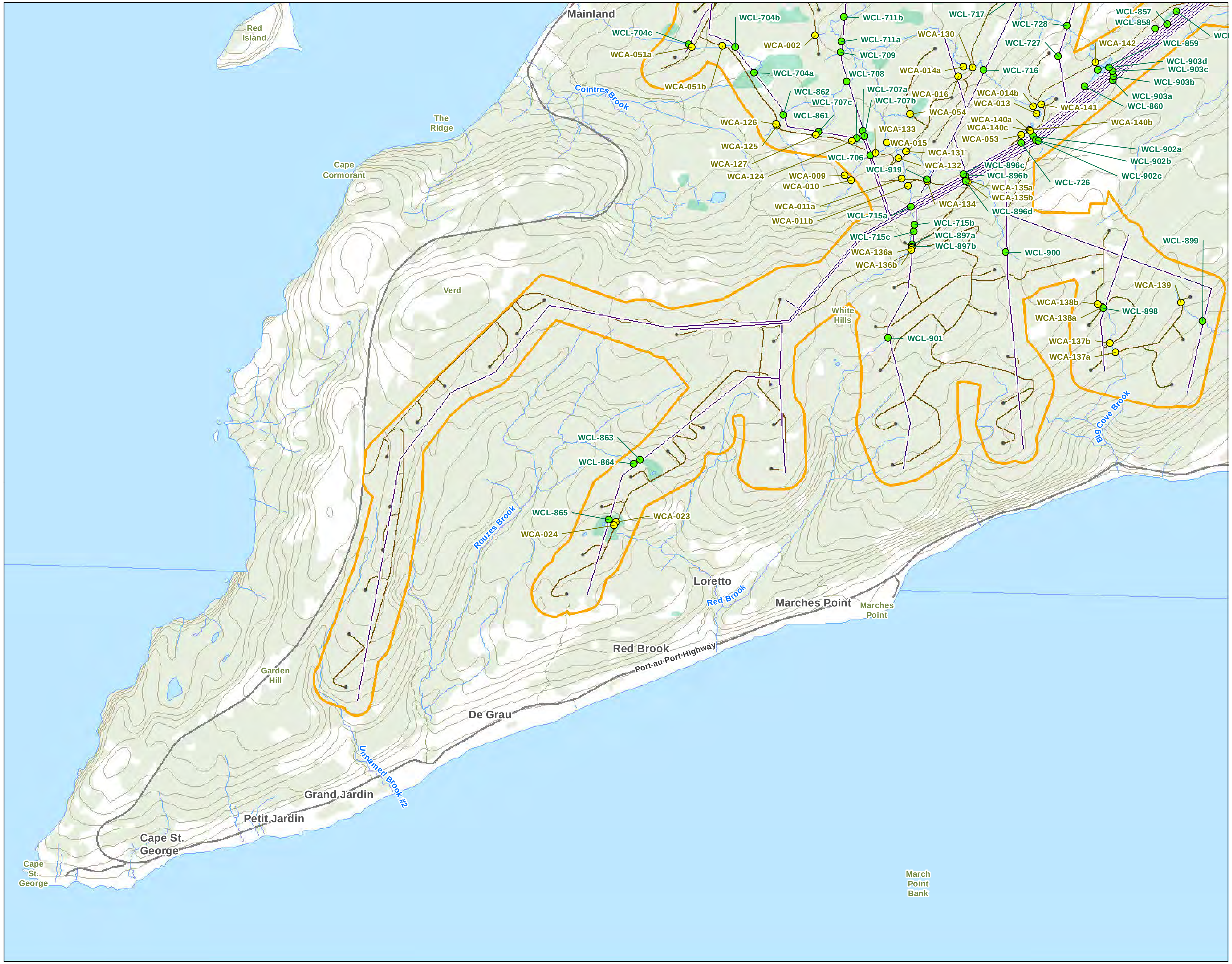

Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing

Proposed Project Features

- • Turbine Location
- — Collector Line (Proposed)
- — Access Road (Proposed)
- ▭ Project Area

Other Features

- — Road / Highway
- - - Resource Road / Trail
- — Watercourse
- ▬ Waterbody
- ▬ Wetland
- ▬ Forested Area

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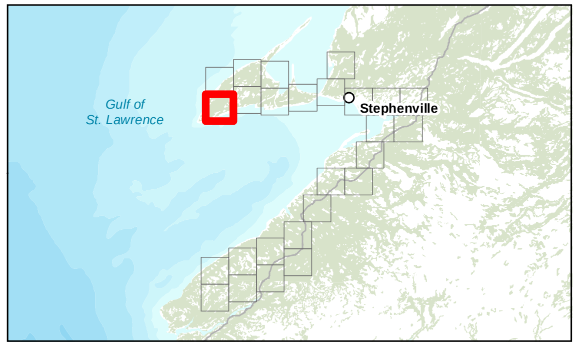

Project Location
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NL

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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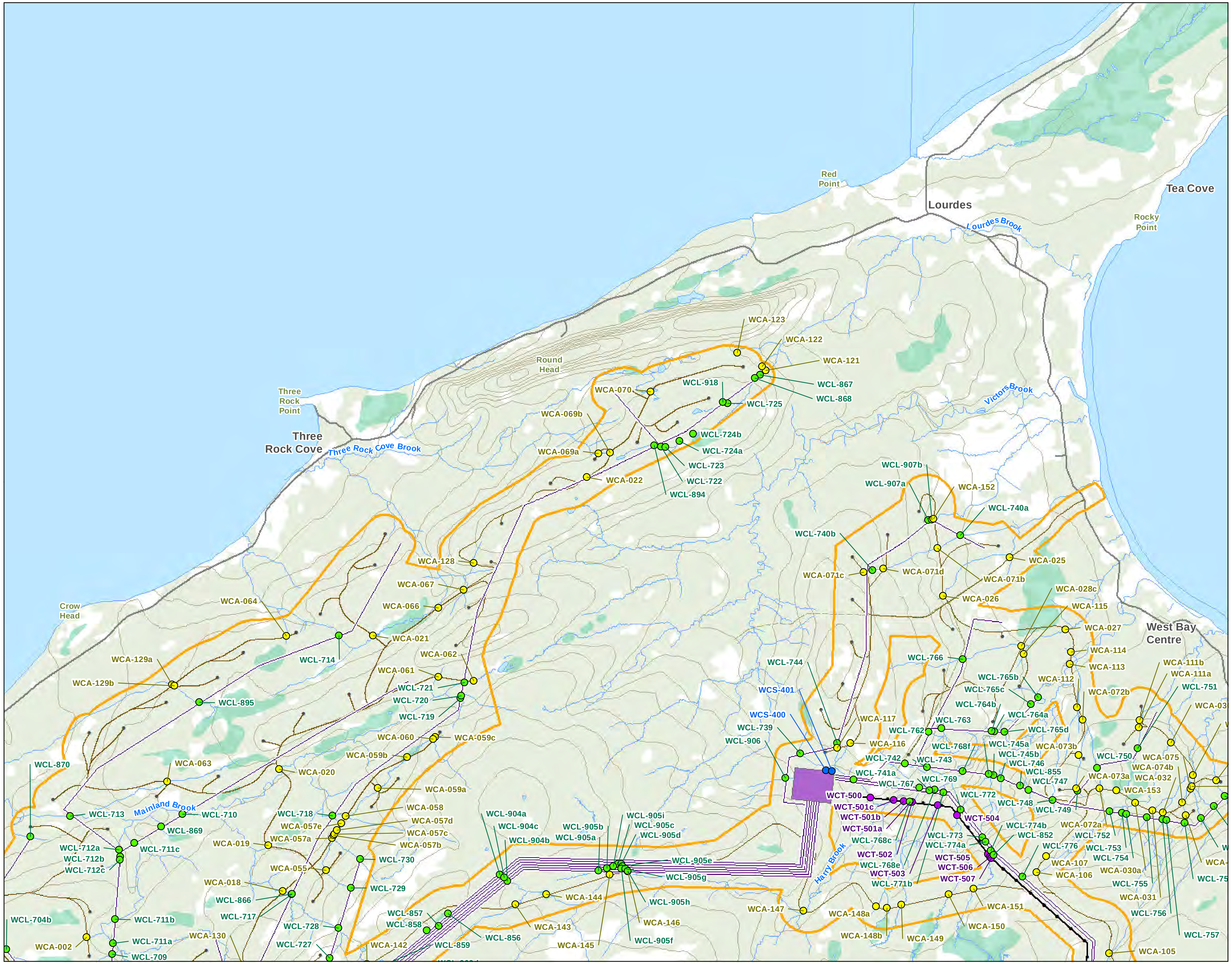

Stantec

Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing
- 🔵 Substation Crossing
- 🟣 Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- 🟪 Substation (Proposed)
- 🟧 Project Area

Other Features

- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

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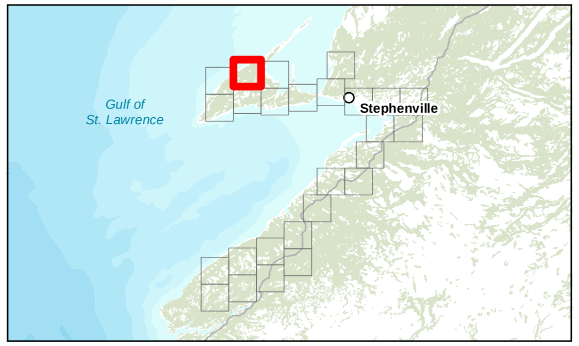

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Stephenville
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Client/Project
121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.
BSA-2 Appendix D

Title
Potential Watercourse Crossings for Project Nujio'qonik GH2

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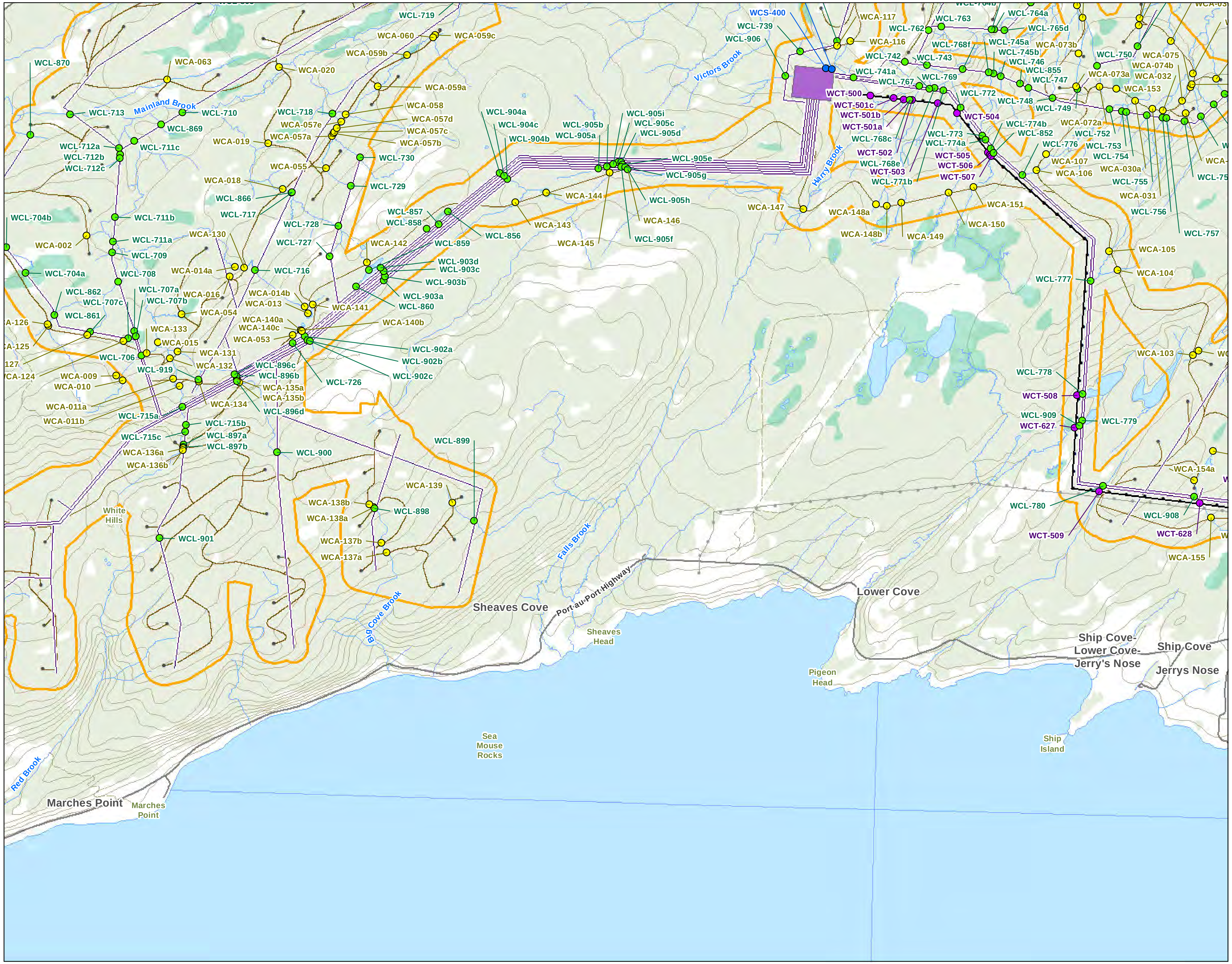

Stantec

Watercourse Crossings
- 🟡 Road Crossing
- 🟢 Collector Line Crossing
- 🔵 Substation Crossing
- 🟣 Transmission Line Crossing

Proposed Project Features
- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- 🟪 Substation (Proposed)
- ☐ Project Area

Other Features
- Transmission Line, Existing
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
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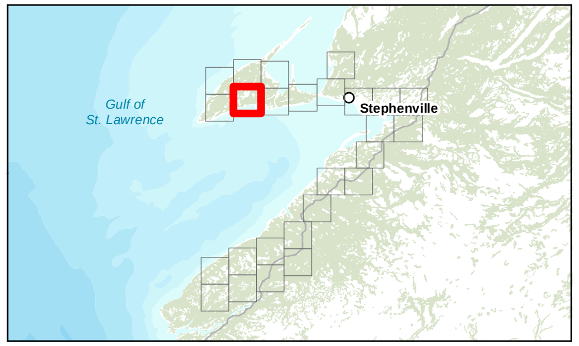

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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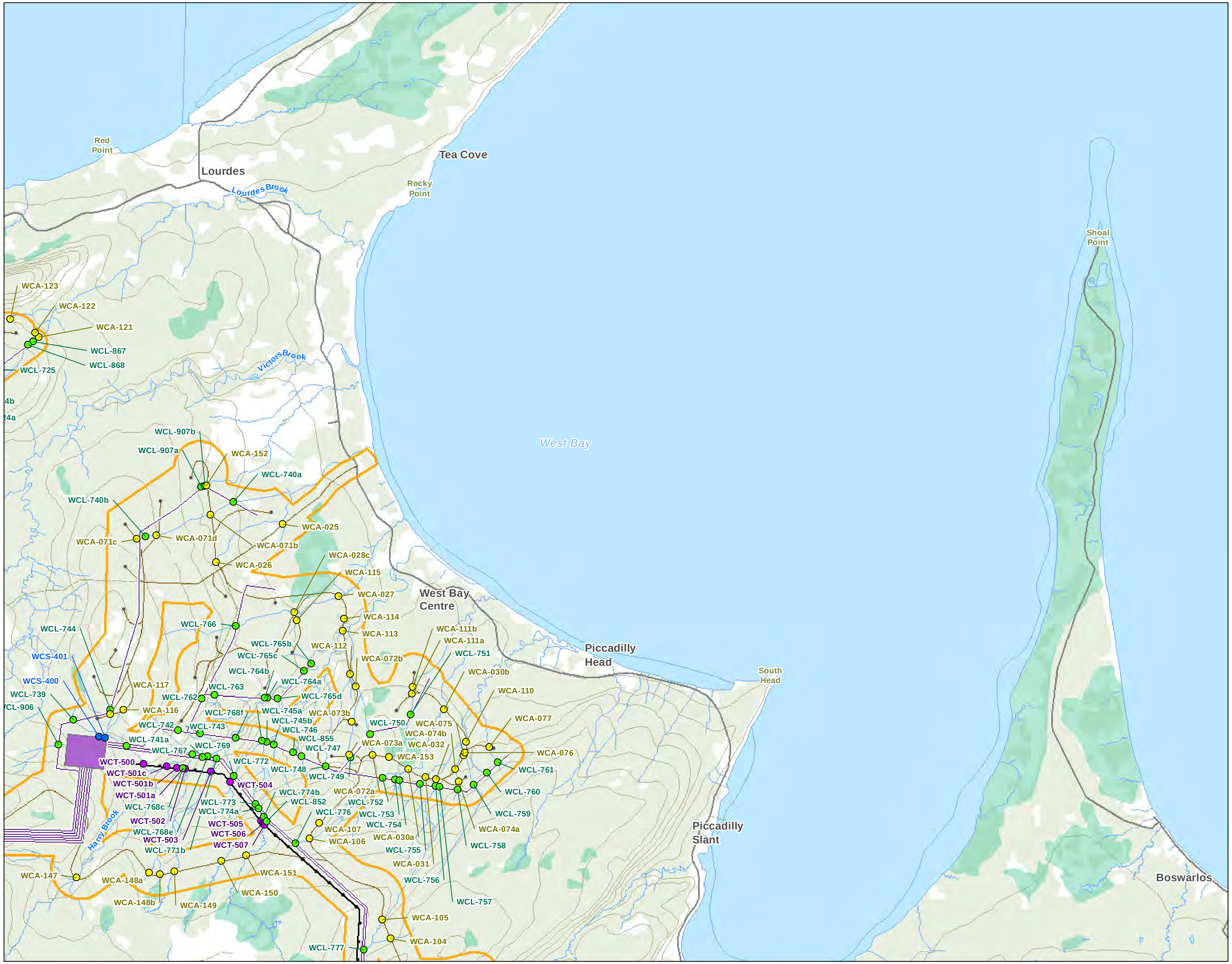

Stantec

Watercourse Crossings

- ○ Road Crossing
- ● Collector Line Crossing
- ● Substation Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- ▨ Substation (Proposed)
- ☐ Project Area

Other Features

- Road / Highway
- Resource Road / Trail
- Watercourse
- ▨ Waterbody
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- ▨ Forested Area

N

0 1 2 Kilometers

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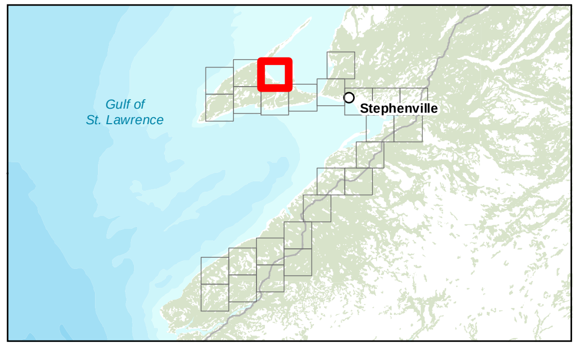

Project Location
Stephenville
NL

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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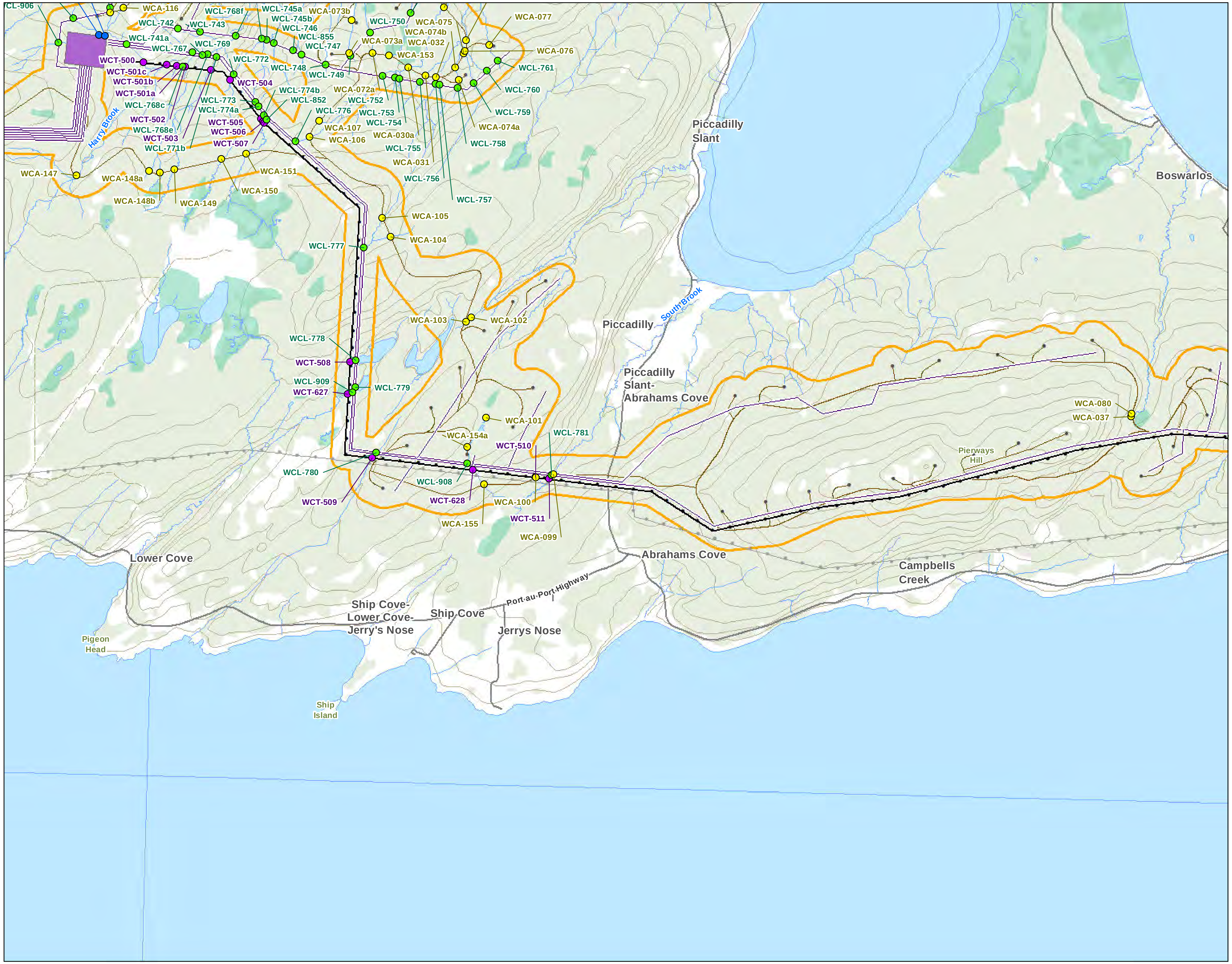

Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing
- ● Substation Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- ■ Substation (Proposed)
- ☐ Project Area

Other Features

- Transmission Line, Existing
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

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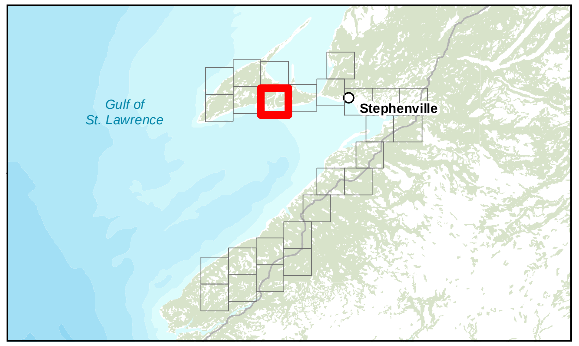

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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Stantec

Watercourse Crossings
- ● Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features
- • Turbine Location
- —• Transmission Line 230 kV (Proposed)
- — Collector Line (Proposed)
- — Access Road (Proposed)

Port au Port Interconnection
- ▬ Proposed Route
- ▬ Alternate Route
- ■ Substation (Proposed)
- ☐ Project Area

Other Features
- —• Transmission Line, Existing
- — Road / Highway
- — Resource Road / Trail
- — Watercourse
- ■ Waterbody
- ■ Wetland
- ■ Forested Area

N

0 1 2 Kilometers
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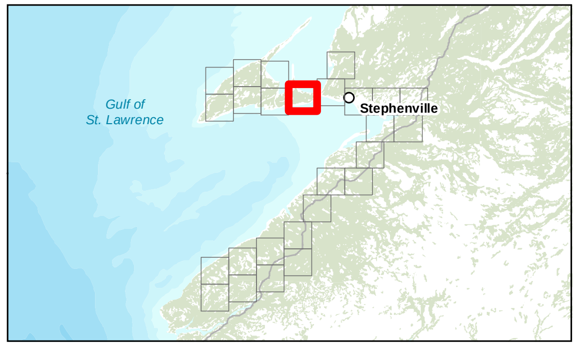

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121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.
BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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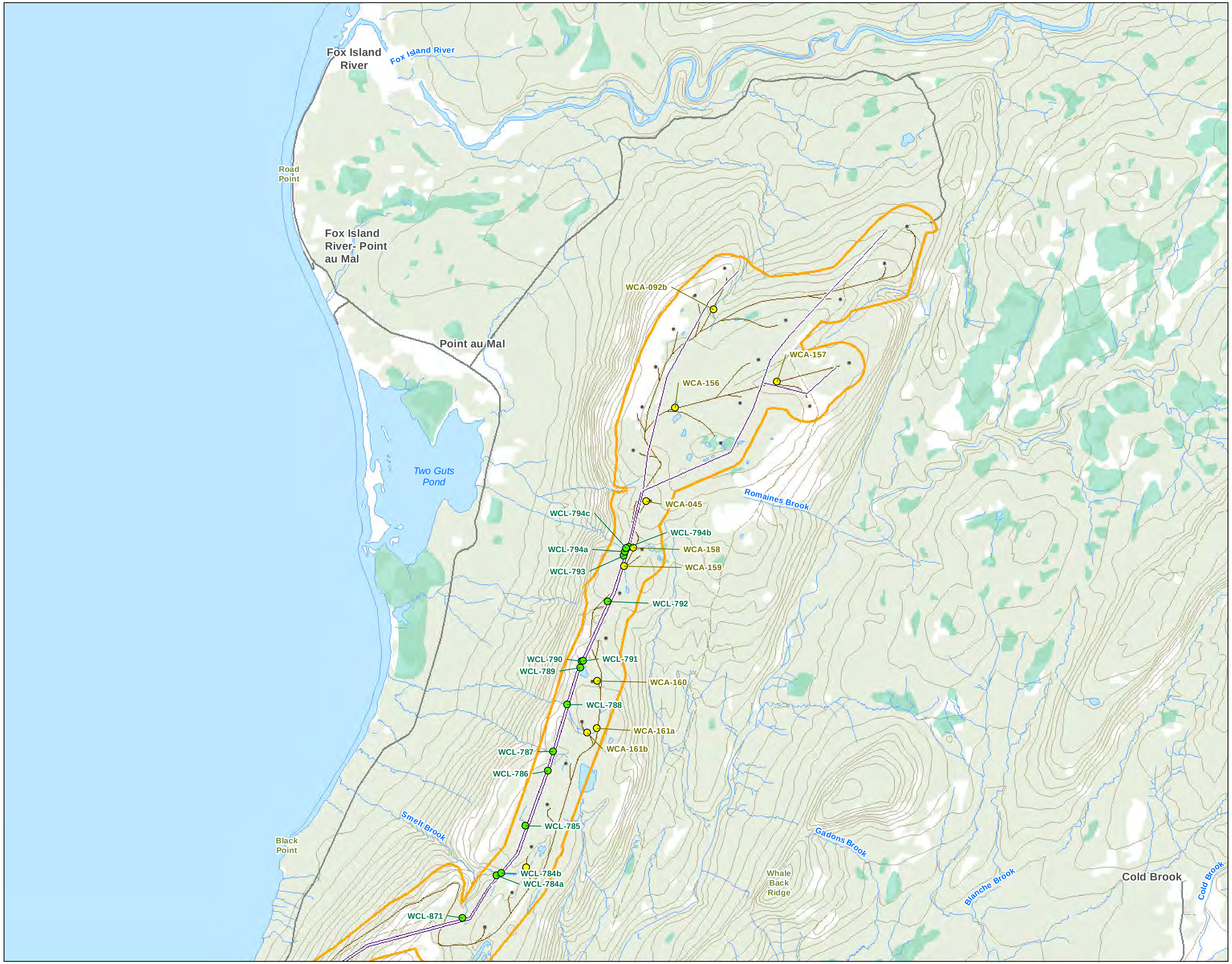

Stantec

Watercourse Crossings

- ○ Road Crossing
- ● Collector Line Crossing

Proposed Project Features

- • Turbine Location
- — Collector Line (Proposed)
- — Access Road (Proposed)
- ☐ Project Area

Other Features

- — Road / Highway
- - - Resource Road / Trail
- — Watercourse
- ▭ Waterbody
- ▭ Wetland
- ▭ Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes

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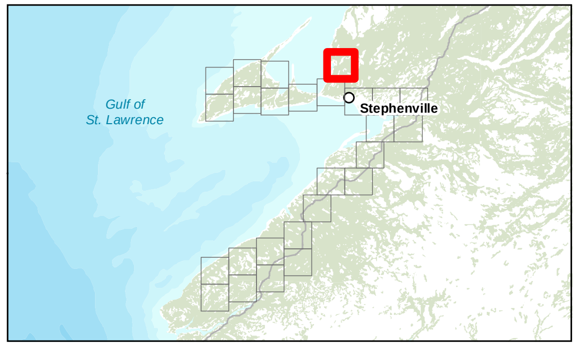

Project Location

Stephenville
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Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)

Port au Port Interconnection

- Proposed Route
- Alternate Route
- ■ Substation (Proposed)
- ☐ Project Area

Other Features

- Transmission Line, Existing
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

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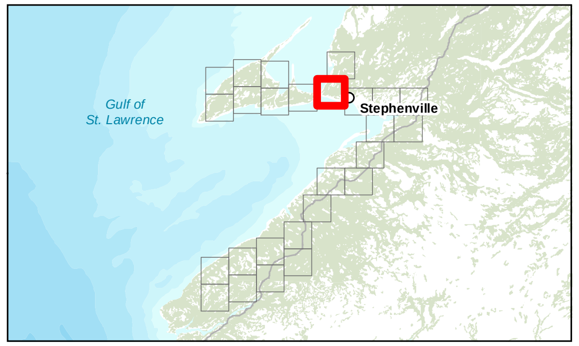

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World Energy GH2
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Figure No.

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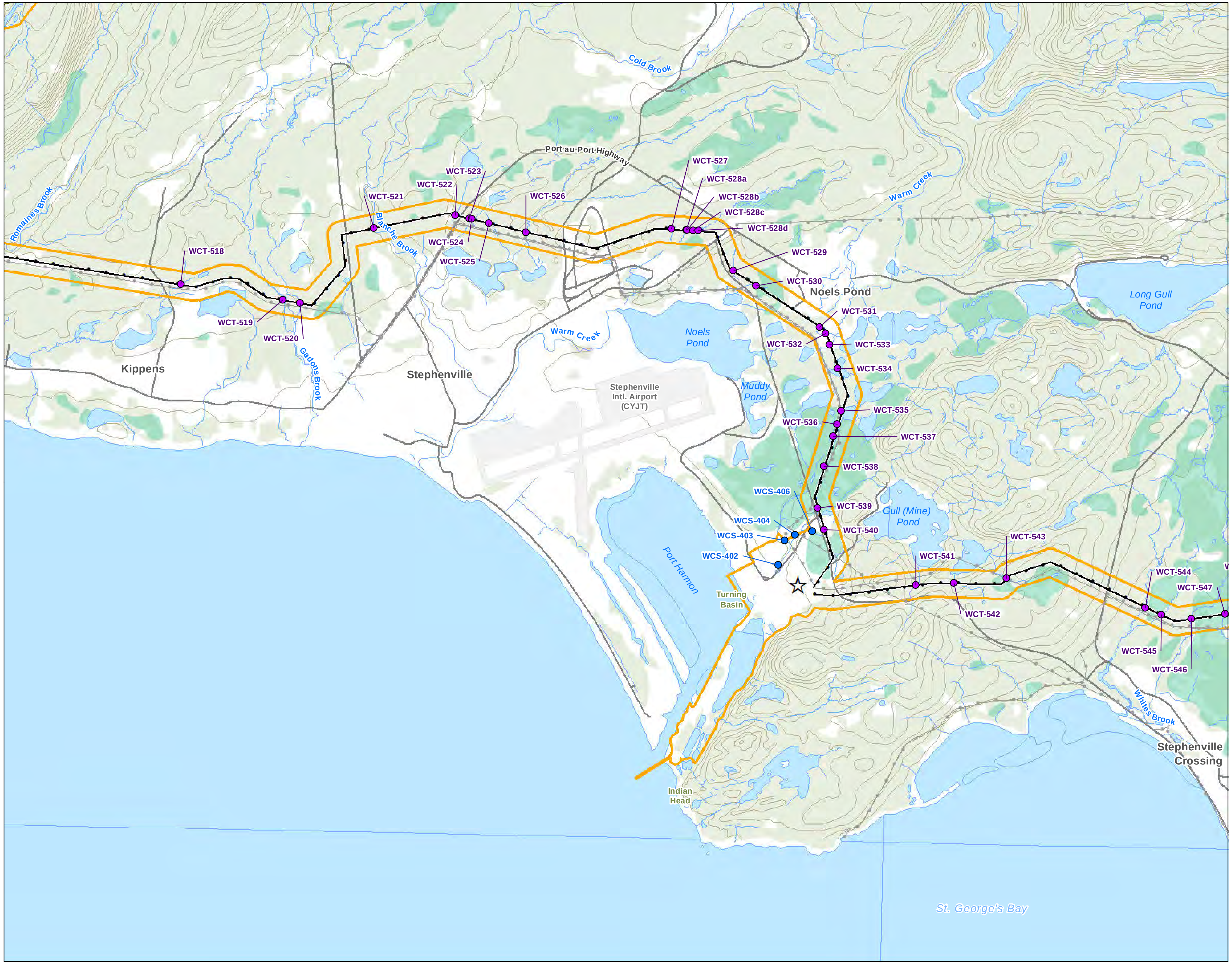

Stantec

Watercourse Crossings

- ● Within Plant Site
- ● Transmission Line Crossing

Proposed Project Features

- ☆ Hydrogen / Ammonia Plant Facility
- Transmission Line 230 kV (Proposed)
- Access Road (Proposed)
- Project Area

Other Features

- Transmission Line, Existing
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

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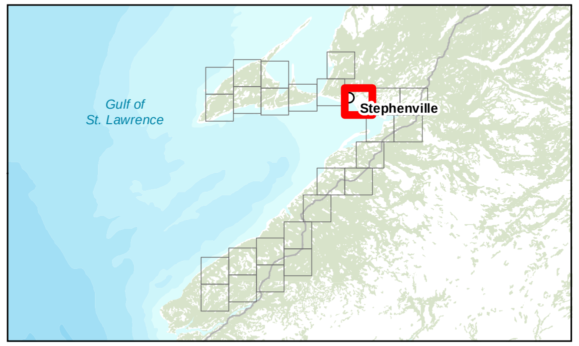

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121417233_66d REVA

World Energy GH2
Project Nujio'qonik

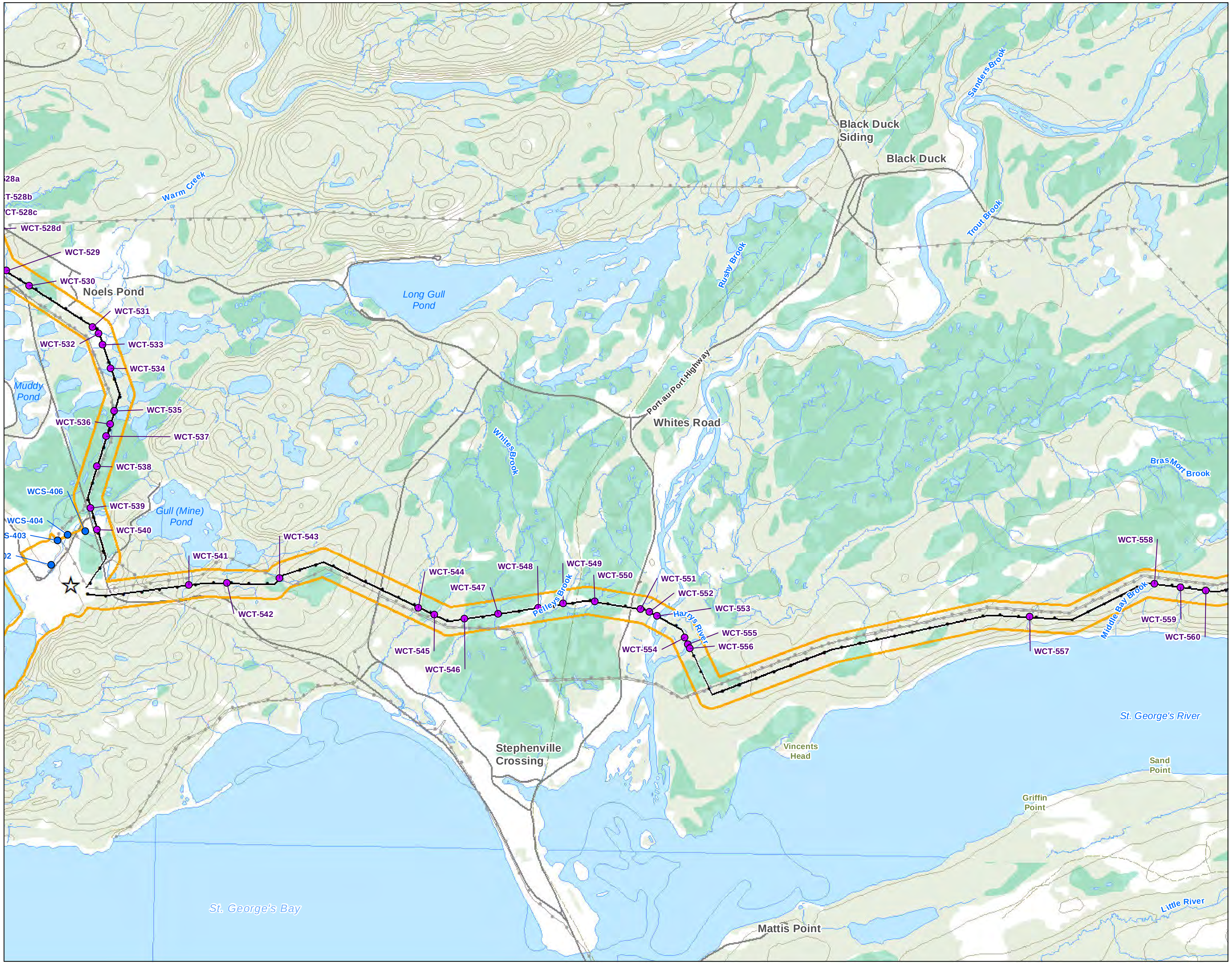
Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_066d_Watercourse_Crossings_Mapbook_REVD.mxd Revised: 2023-08-03 By: NWhite



Stantec

Watercourse Crossings

- ● Within Plant Site
- ● Transmission Line Crossing

Proposed Project Features

- ☆ Hydrogen / Ammonia Plant Facility
- Transmission Line 230 kV (Proposed)
- ▭ Project Area

Other Features

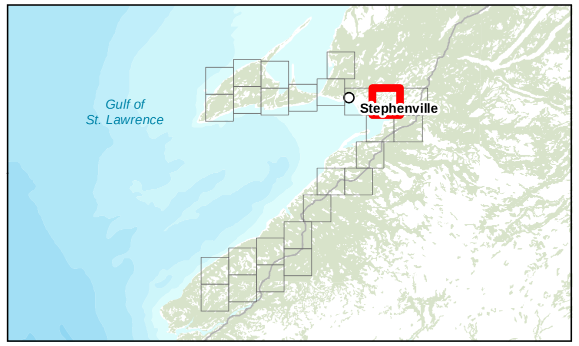
- Transmission Line, Existing
- Road / Highway
- Resource Road / Trail
- Watercourse
- ▨ Waterbody
- ▨ Wetland
- ▨ Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
Revised by NW on 2023-07-23
QR by AW on 2023-07-31

Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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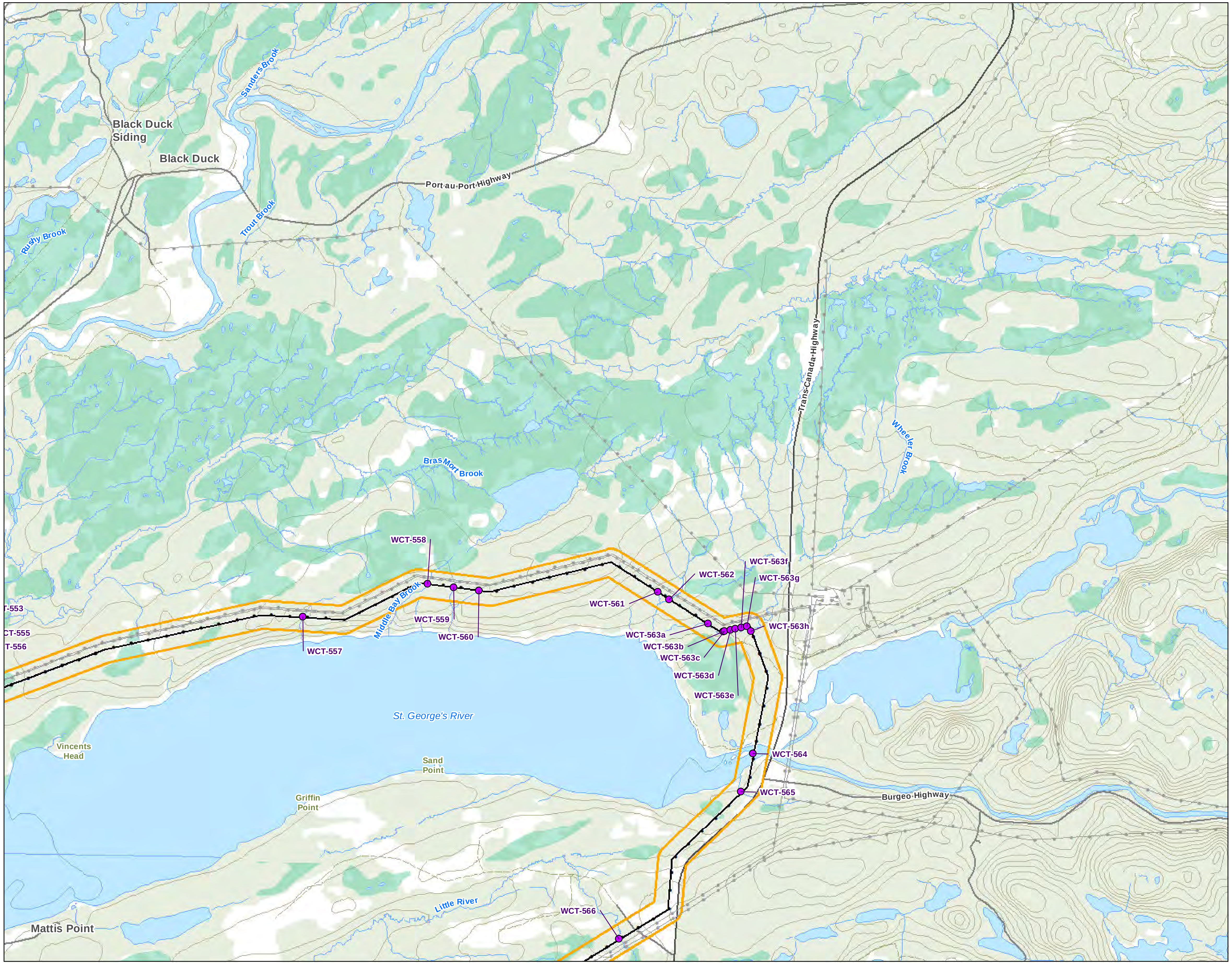
Potential Watercourse Crossings for Project Nujio'qonik GH2

\\ca0151-PPFSS01\work_group\1214\active\121417233\03_data\gis_cad\gis_data\mapping\mxd\general\aquatics\121417233_066d_Watercourse_Crossings_Mapbook_REVD.mxd Revised: 2023-08-03 By: NiWhite



Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

Transmission Line 230 kV (Proposed)

Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Road / Highway

Resource Road / Trail

Watercourse

Waterbody

Wetland

Forested Area

N

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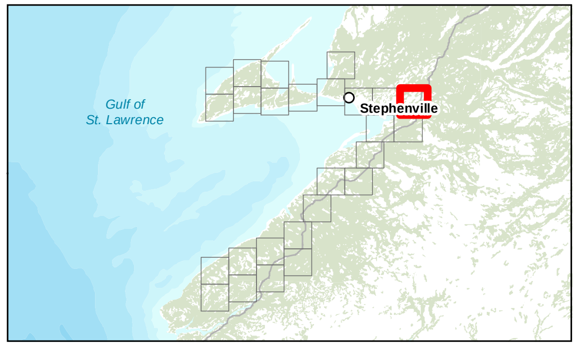

Project Location
Stephenville
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World Energy GH2
Project Nujio'qonik

Figure No.
BSA-2 Appendix D

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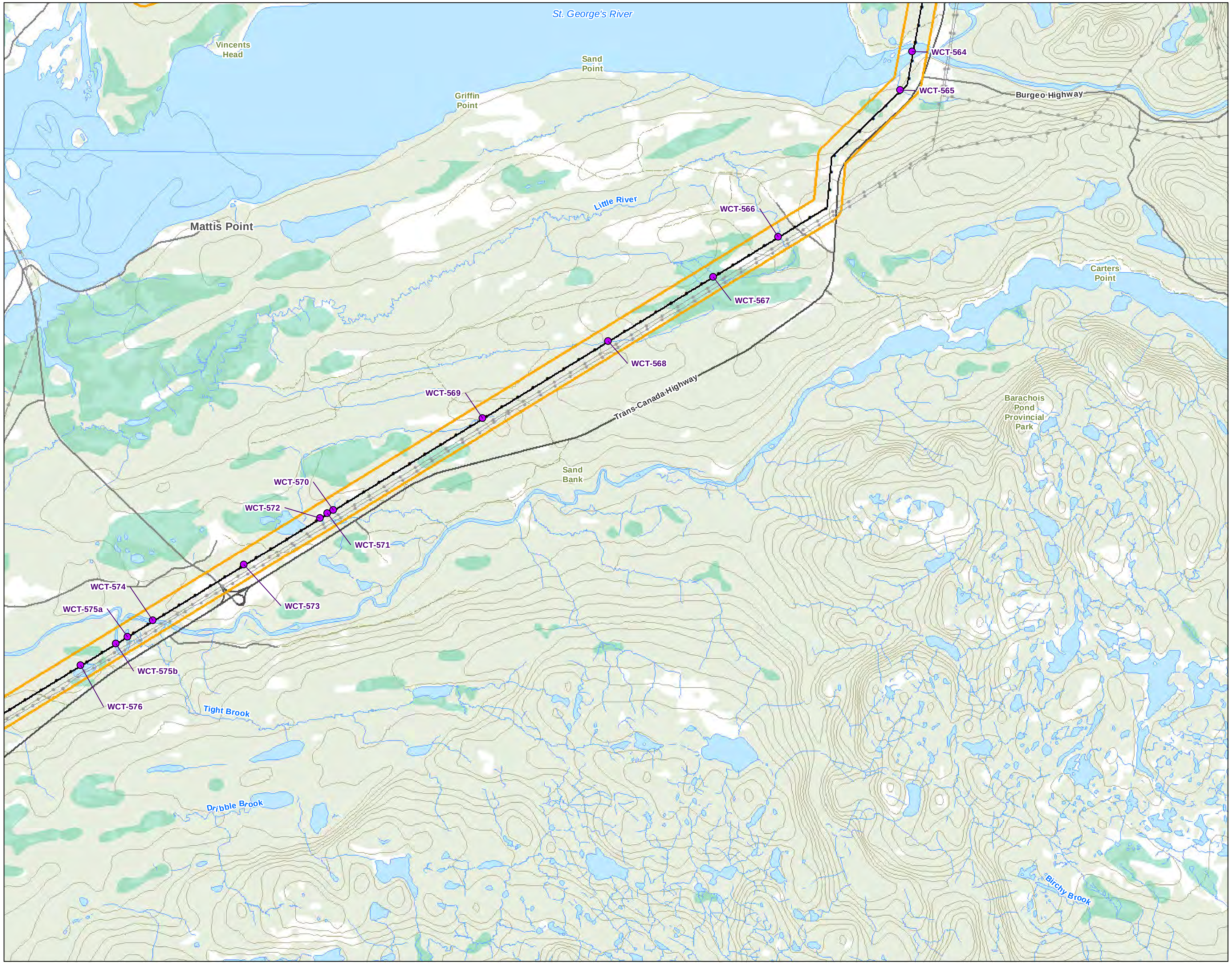

Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

●–● Transmission Line 230 kV (Proposed)

▭ Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Road / Highway

Resource Road / Trail

Watercourse

🟦 Waterbody

🟩 Wetland

▨ Forested Area

N

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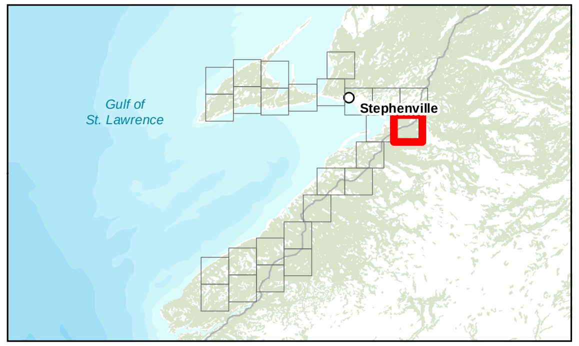

Project Location
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Client/Project

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World Energy GH2
Project Nujio’qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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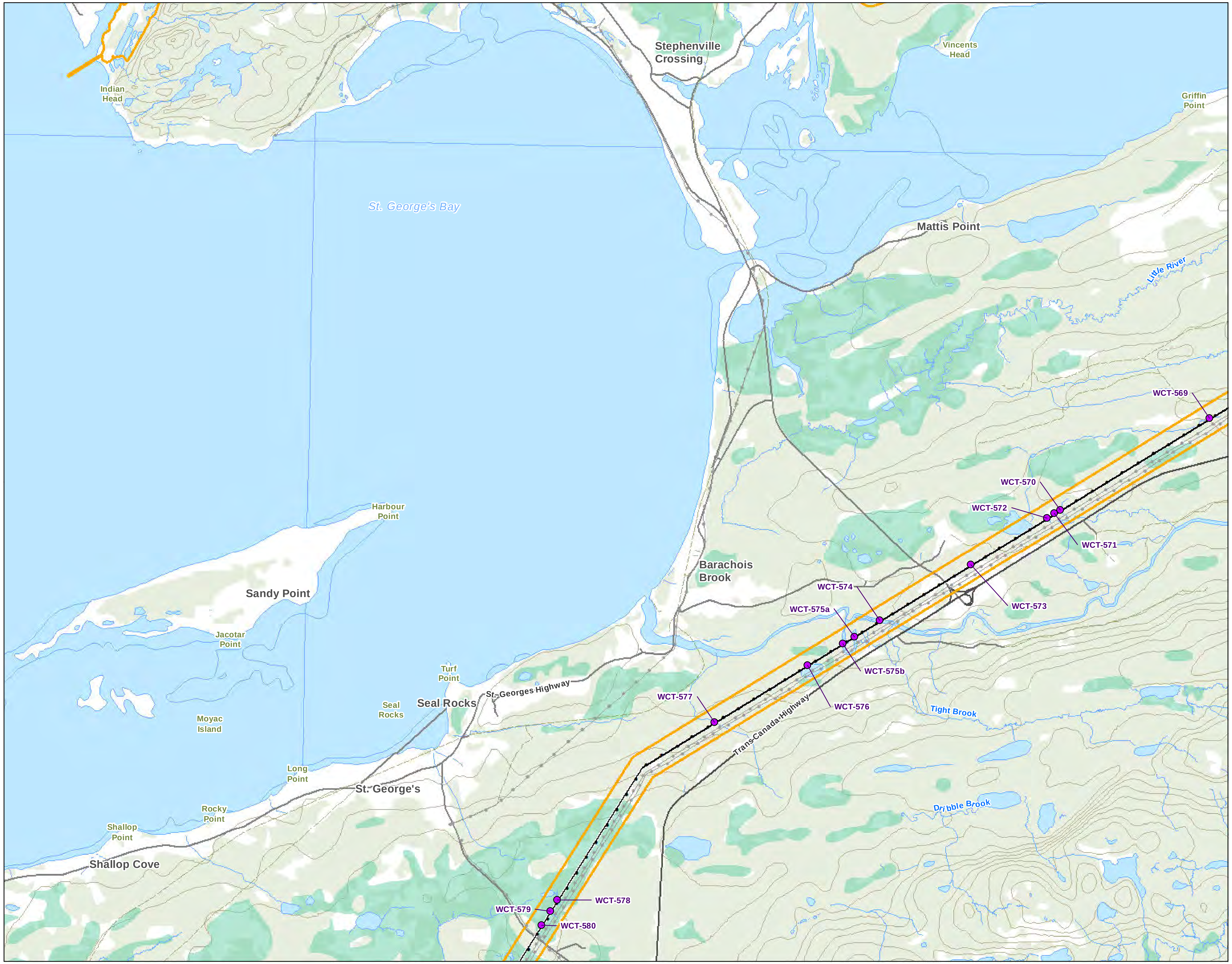

Stantec

Watercourse Crossings

- ● Transmission Line Crossing

Proposed Project Features

- Transmission Line 230 kV (Proposed)
- ▭ Project Area

Other Features

- Transmission Line, Existing
- Trans Canada Highway
- Road / Highway
- Resource Road / Trail
- Watercourse
- 🟦 Waterbody
- 🟩 Wetland
- ▨ Forested Area

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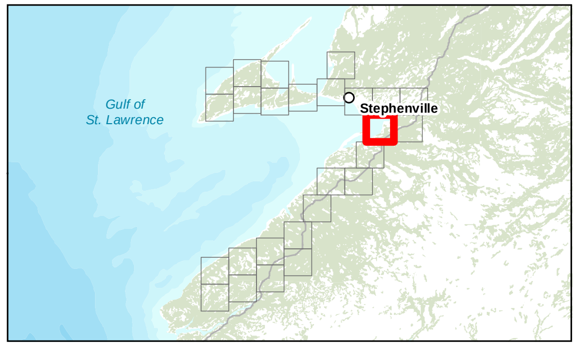

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World Energy GH2
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Figure No.

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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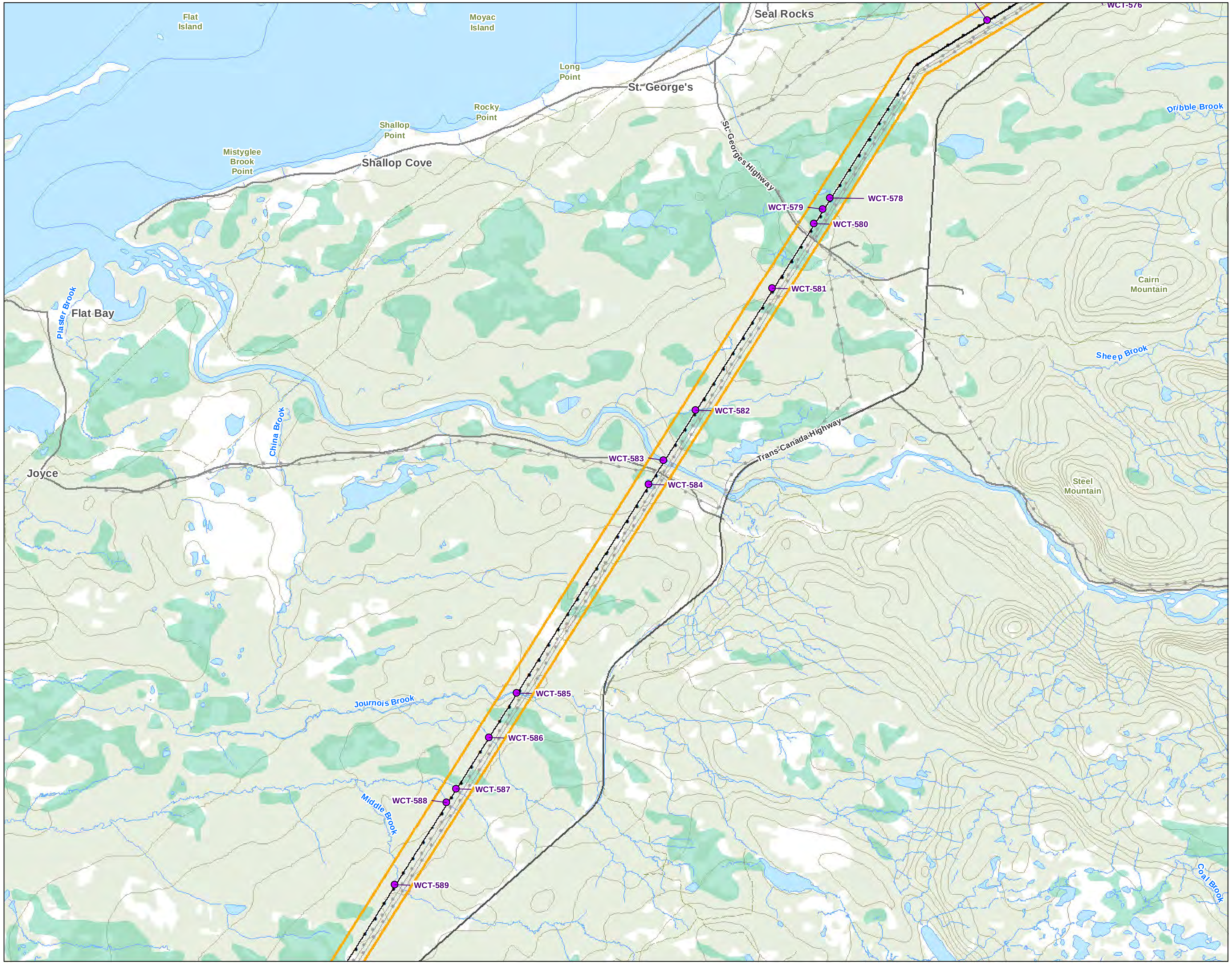

Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

Transmission Line 230 kV (Proposed)

▭ Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Road / Highway

Resource Road / Trail

Watercourse

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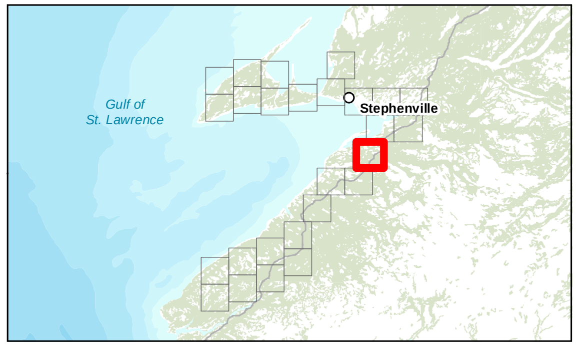

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World Energy GH2
Project Nujio'qonik

Figure No.
BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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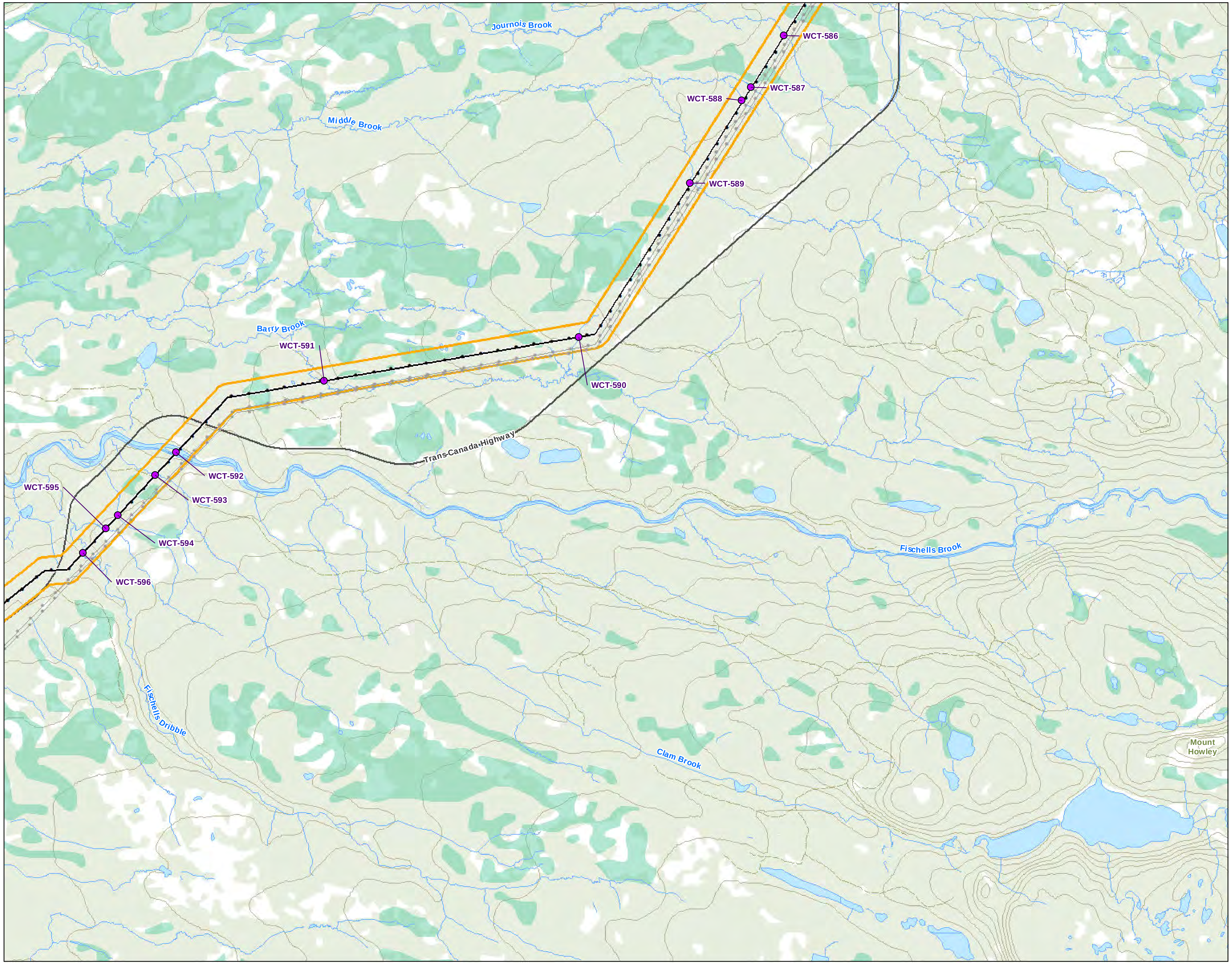

Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

Transmission Line 230 kV (Proposed)

Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Resource Road / Trail

Watercourse

Waterbody

Wetland

Forested Area

N

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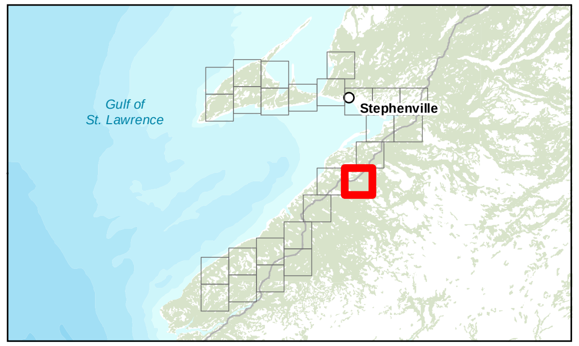

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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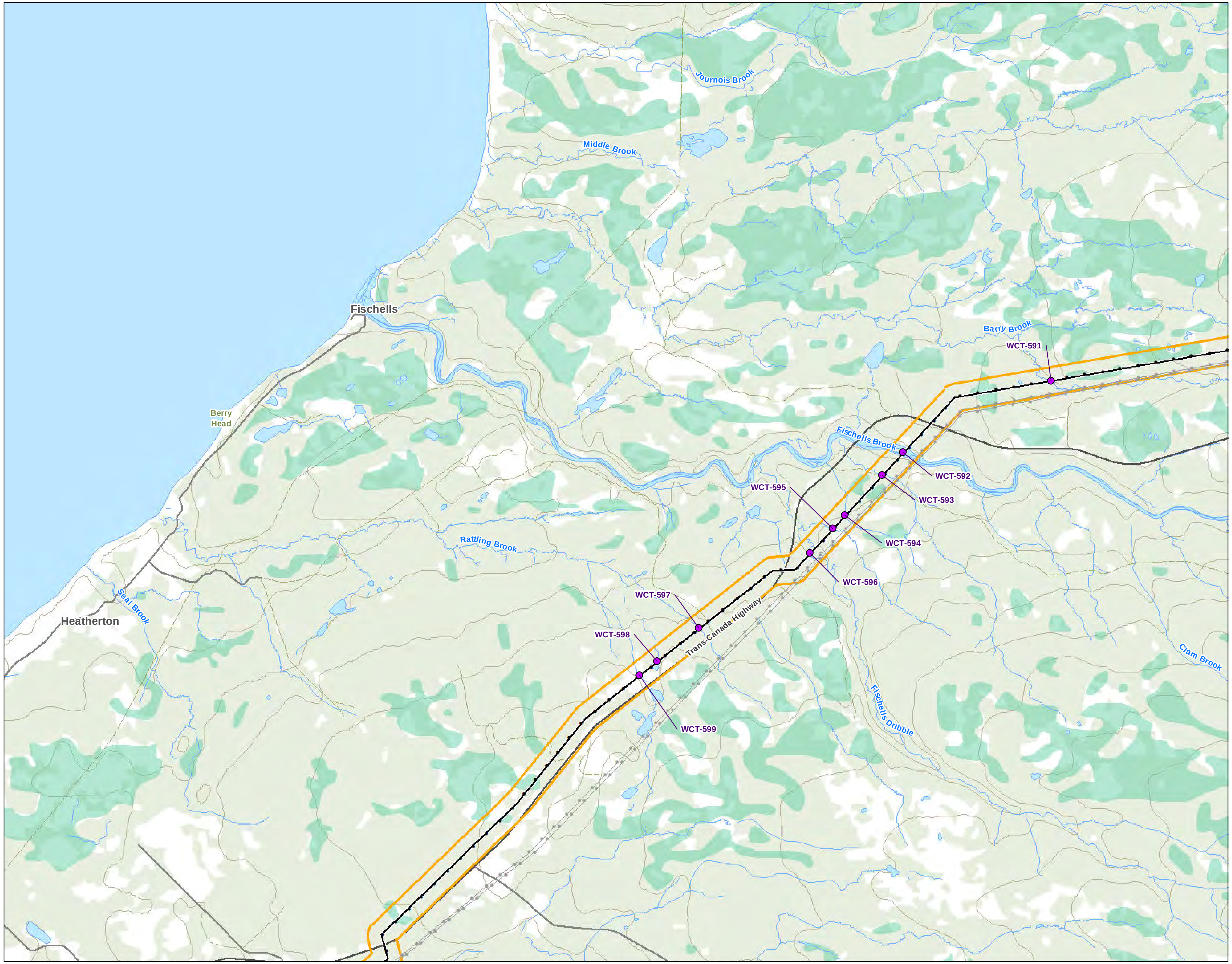

Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

Transmission Line 230 kV (Proposed)

Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Road / Highway

Resource Road / Trail

Watercourse

Waterbody

Wetland

Forested Area

N

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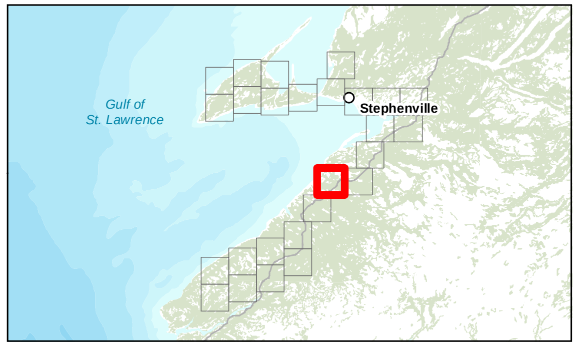

Project Location
Stephenville
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Client/Project

121417233_66d REVA

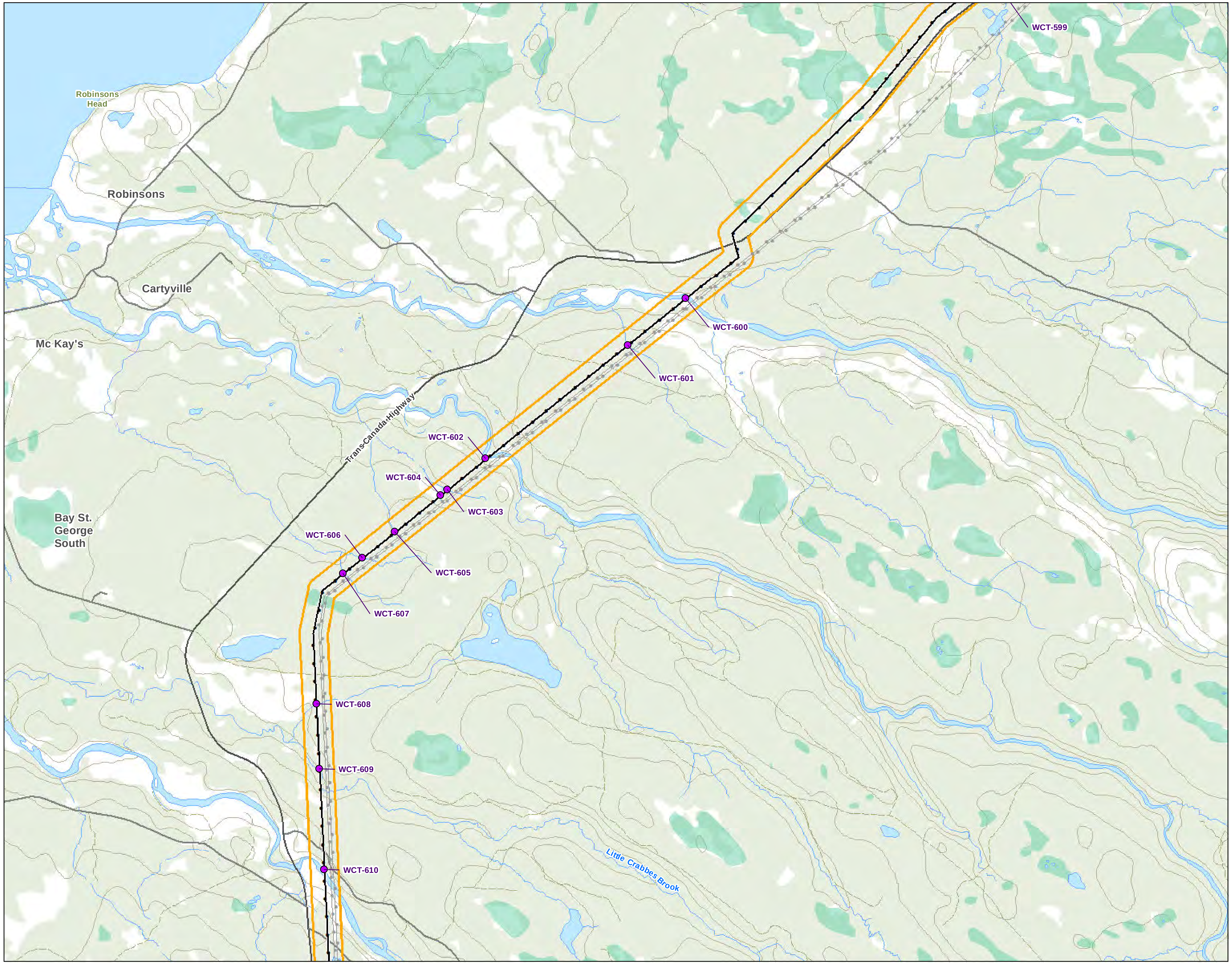
World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2



Stantec

Watercourse Crossings

● Transmission Line Crossing

Proposed Project Features

Transmission Line 230 kV (Proposed)

▭ Project Area

Other Features

Transmission Line, Existing

Trans Canada Highway

Road / Highway

Resource Road / Trail

Watercourse

Waterbody

Wetland

Forested Area

N

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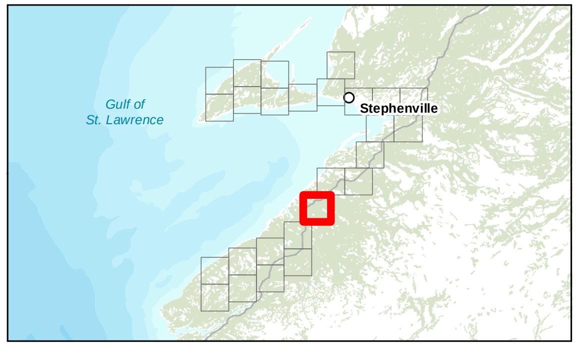

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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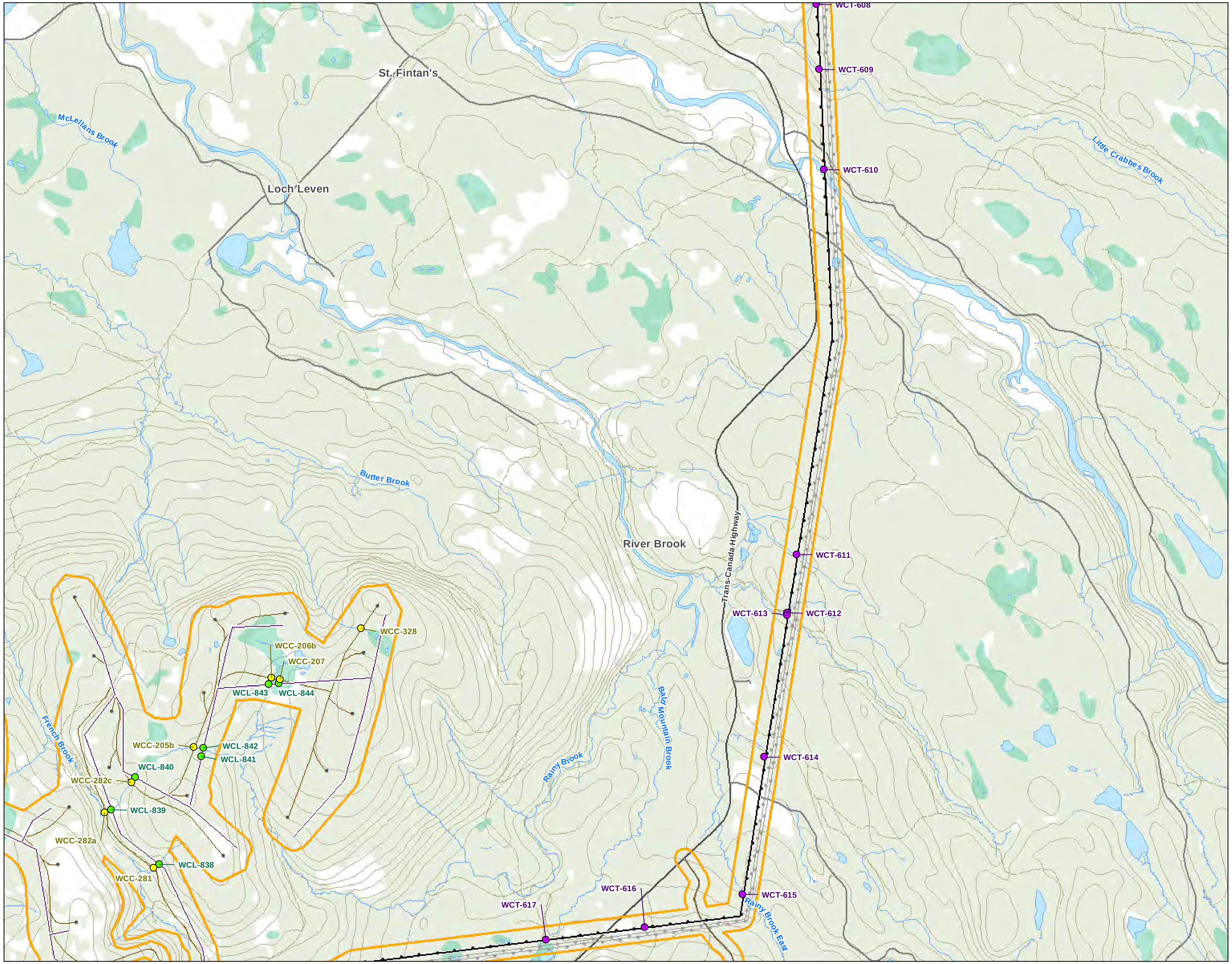

Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- ☐ Project Area

Other Features

- Transmission Line, Existing
- Trans Canada Highway
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

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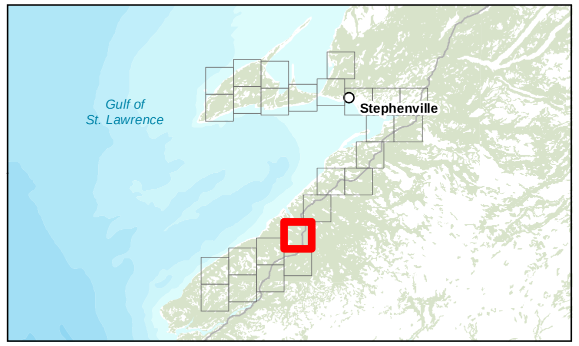

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Client/Project

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World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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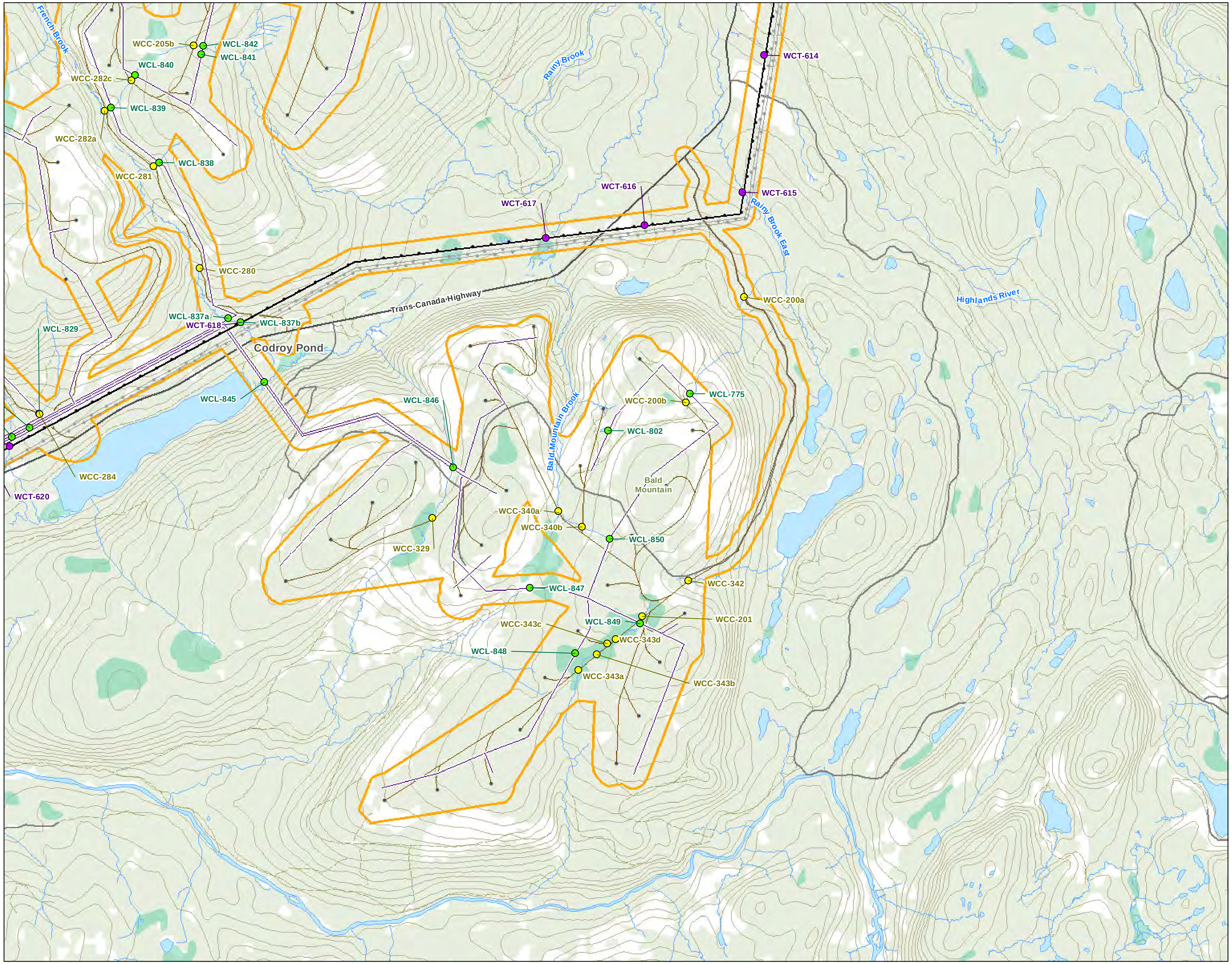

Stantec

Watercourse Crossings

- ● Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- ☐ Project Area

Other Features

- Transmission Line, Existing
- Trans Canada Highway
- Road / Highway
- Resource Road / Trail
- Watercourse
- ■ Waterbody
- ■ Wetland
- ■ Forested Area

N

0 1 2 Kilometers

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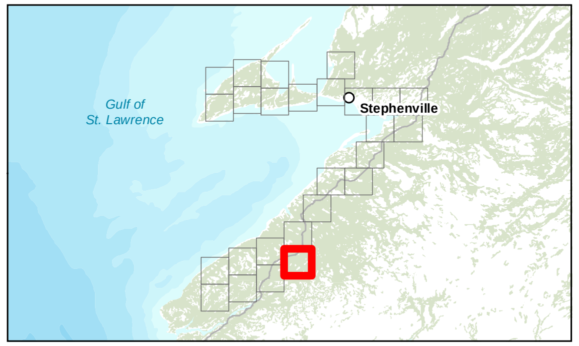

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World Energy GH2
Project Nujio'qonik

Figure No.

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Potential Watercourse Crossings for Project Nujio'qonik GH2

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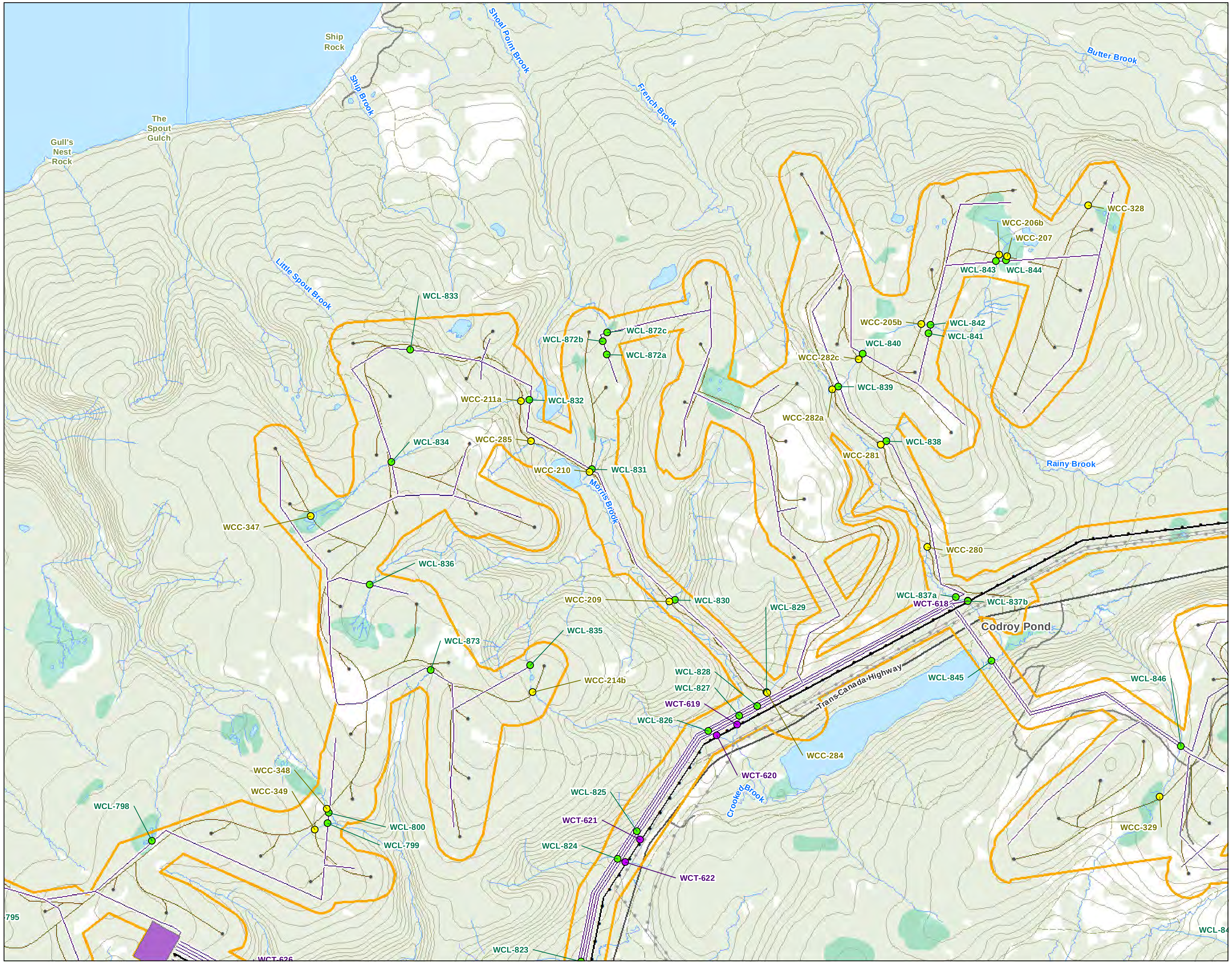

Stantec

Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing
- 🟣 Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- 🟪 Substation (Proposed)
- 🟧 Project Area

Other Features

- Transmission Line, Existing
- Trans Canada Highway
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

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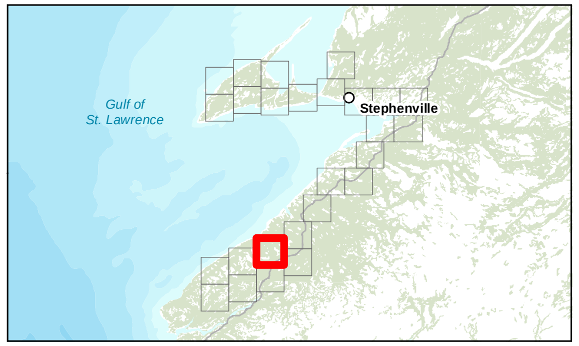

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World Energy GH2
Project Nujio'qonik

Figure No.
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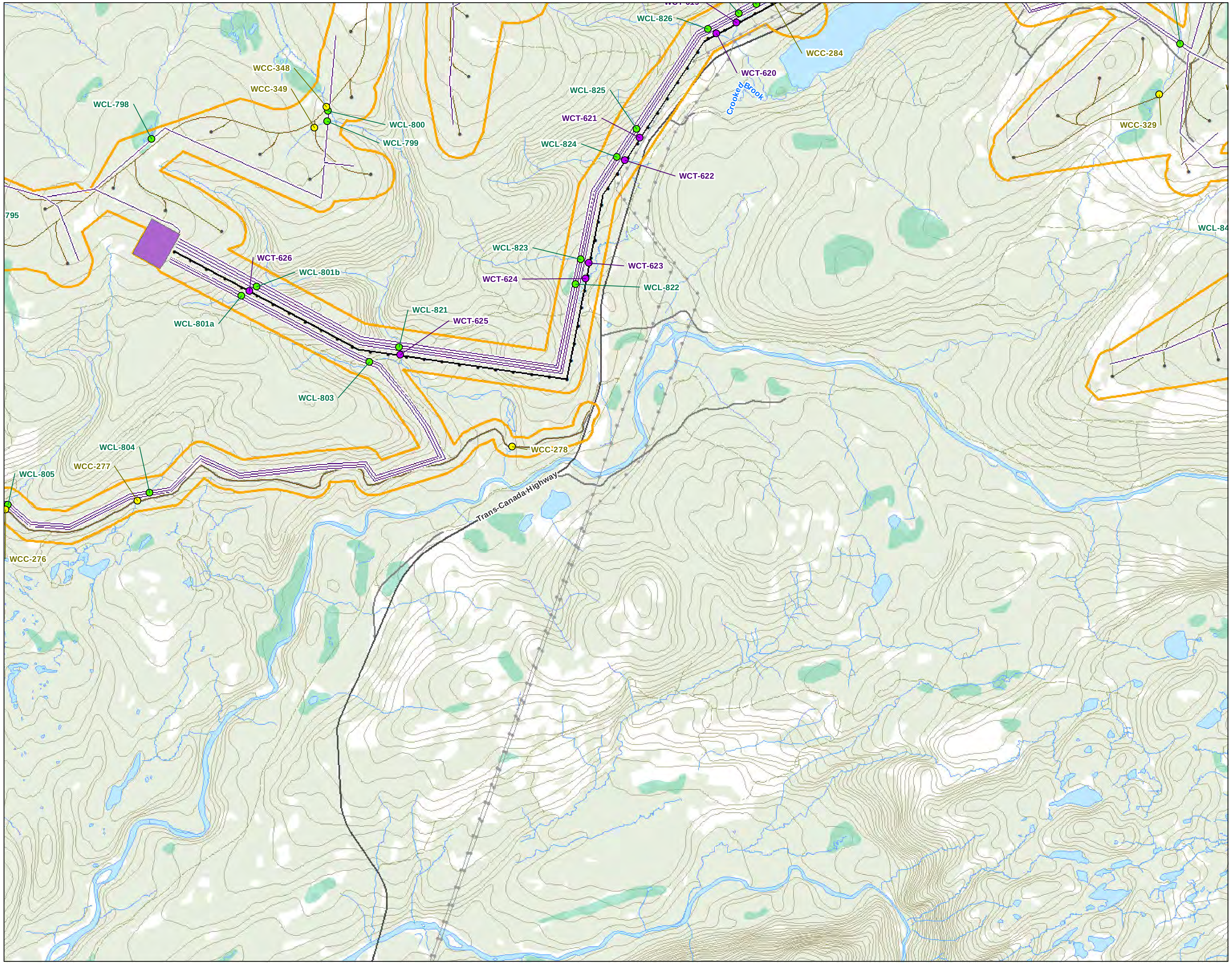

Stantec

Watercourse Crossings

●	Road Crossing
●	Collector Line Crossing
●	Transmission Line Crossing

Proposed Project Features

•	Turbine Location
—•	Transmission Line 230 kV (Proposed)
—	Collector Line (Proposed)
—	Access Road (Proposed)
■	Substation (Proposed)
☐	Project Area

Other Features

—	Transmission Line, Existing
—	Trans Canada Highway
—	Road / Highway
—	Resource Road / Trail
—	Watercourse
■	Waterbody
■	Wetland
■	Forested Area

N

0 1 2 Kilometers

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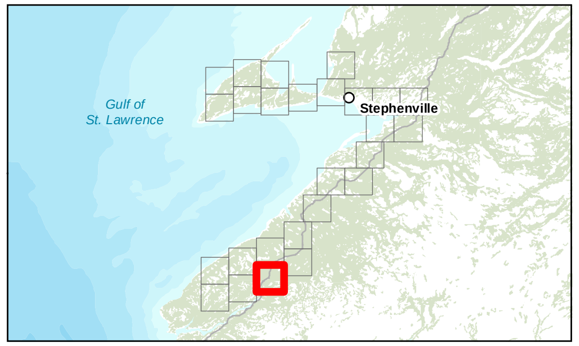

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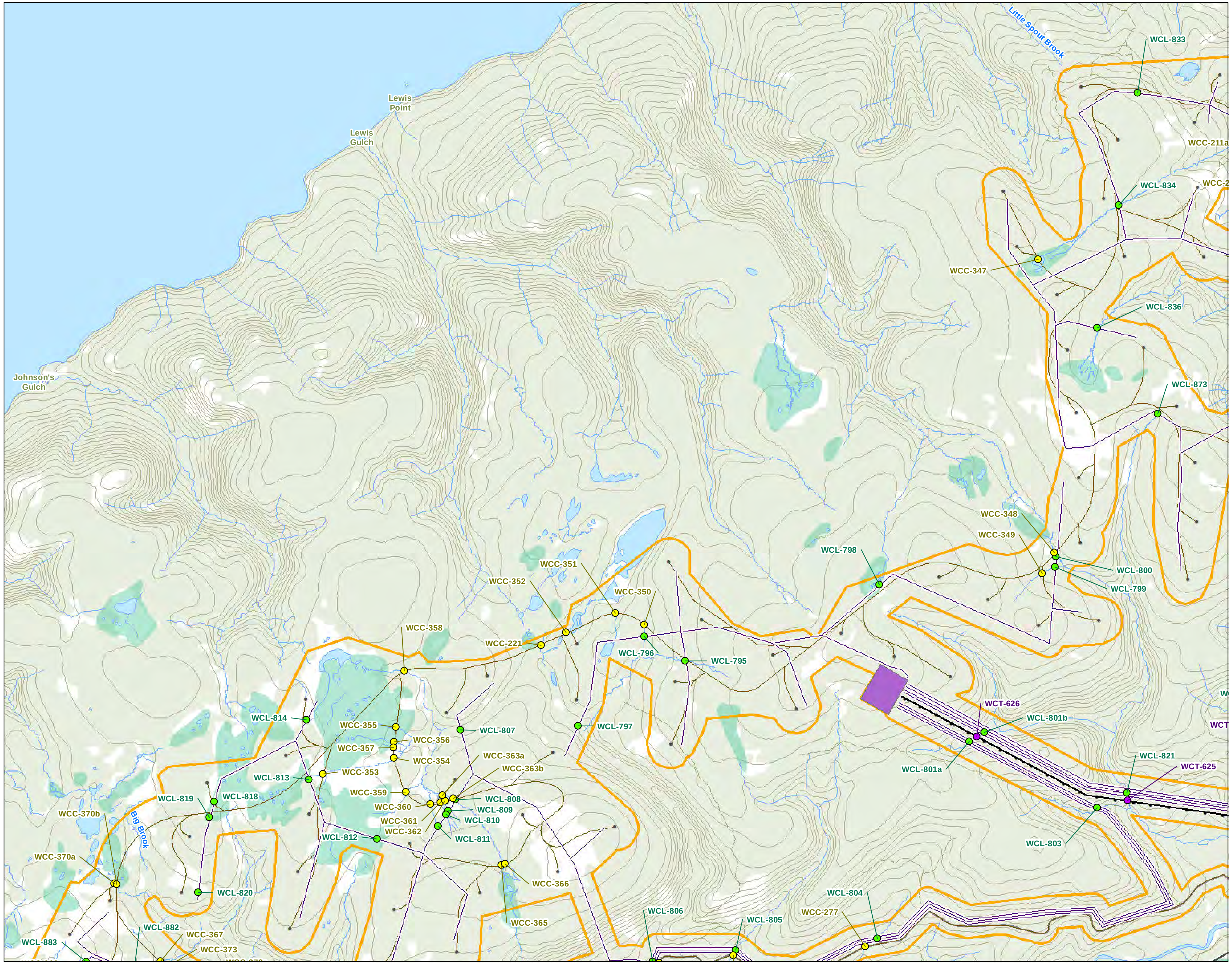

Stantec

Watercourse Crossings

- ○ Road Crossing
- ● Collector Line Crossing
- ● Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- ▨ Substation (Proposed)
- ☐ Project Area

Other Features

- Trans Canada Highway
- Road / Highway
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- Watercourse
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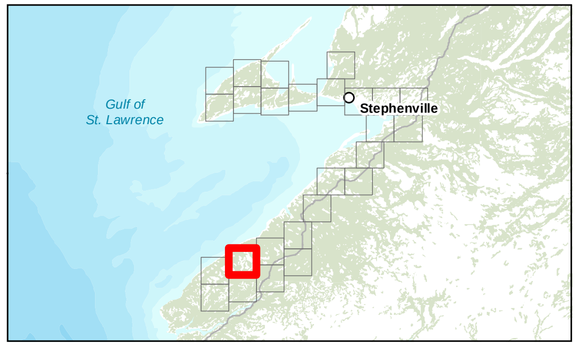

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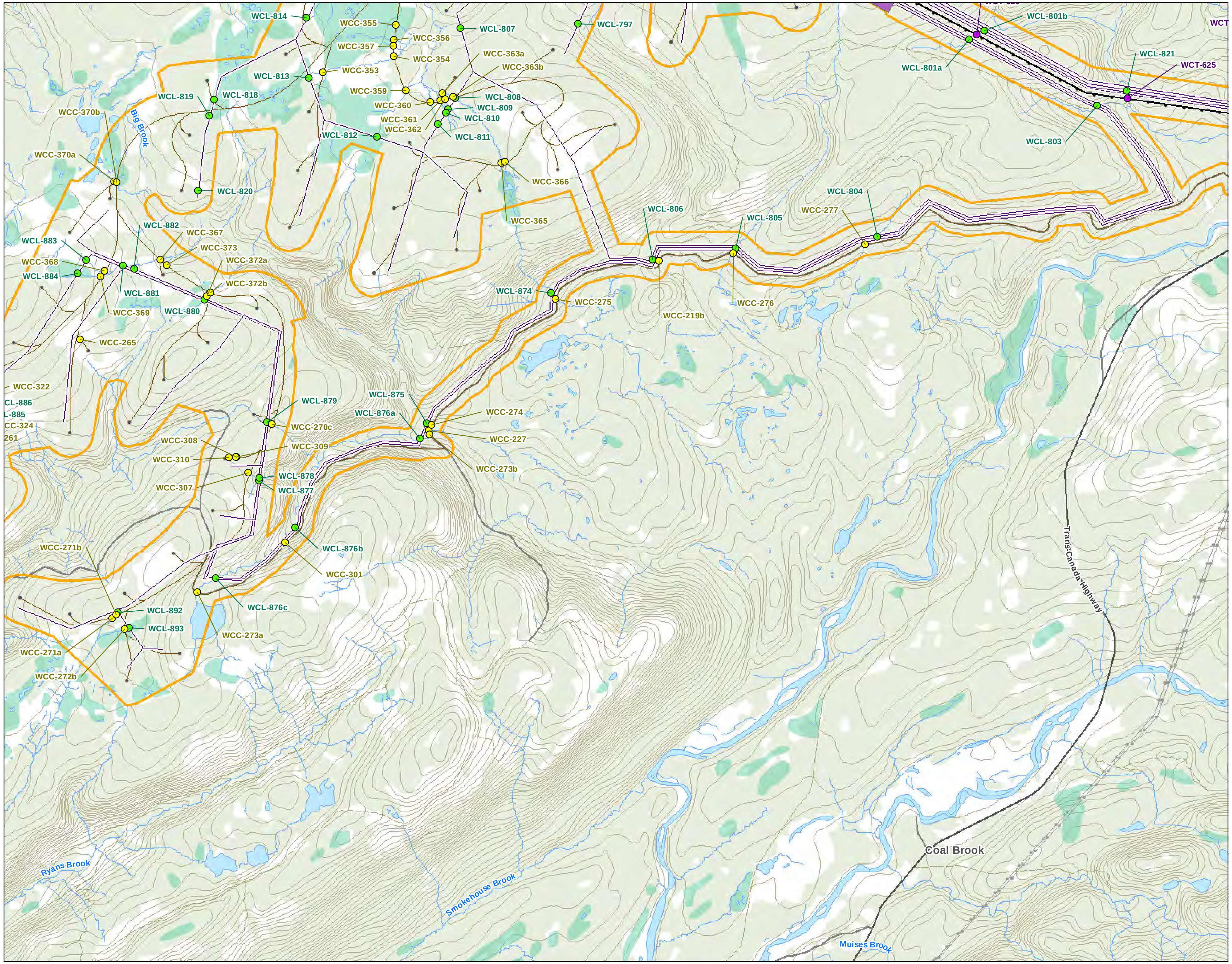


Stantec

Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing
- 🟣 Transmission Line Crossing

Proposed Project Features

- • Turbine Location
- Transmission Line 230 kV (Proposed)
- Collector Line (Proposed)
- Access Road (Proposed)
- 🟪 Substation (Proposed)
- 🟧 Project Area

Other Features

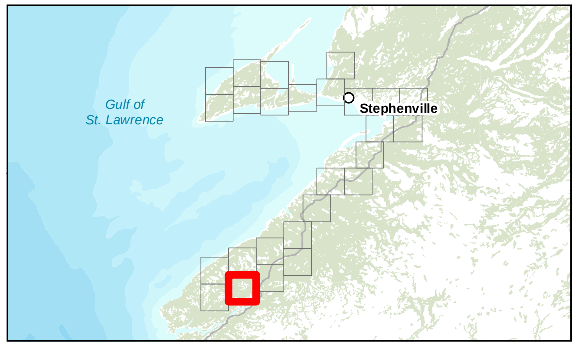
- Transmission Line, Existing
- Trans Canada Highway
- Road / Highway
- Resource Road / Trail
- Watercourse
- Waterbody
- Wetland
- Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
Revised by NW on 2023-07-23
QR by AW on 2023-07-31

Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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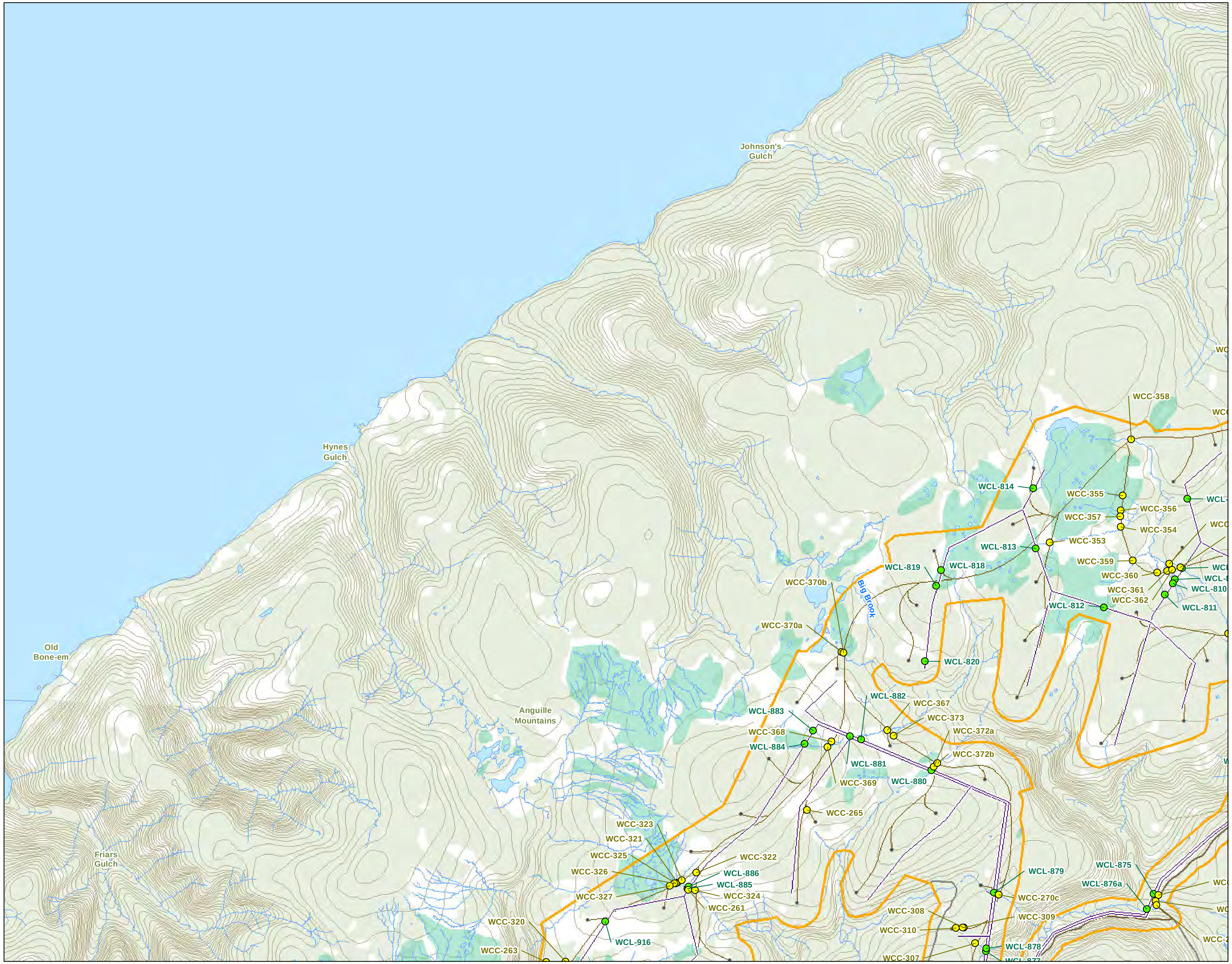


Stantec

Watercourse Crossings

○ Road Crossing

● Collector Line Crossing

Proposed Project Features

• Turbine Location

— Collector Line (Proposed)

— Access Road (Proposed)

▭ Project Area

Other Features

— Road / Highway

- - Resource Road / Trail

— Watercourse

🟦 Waterbody

🟩 Wetland

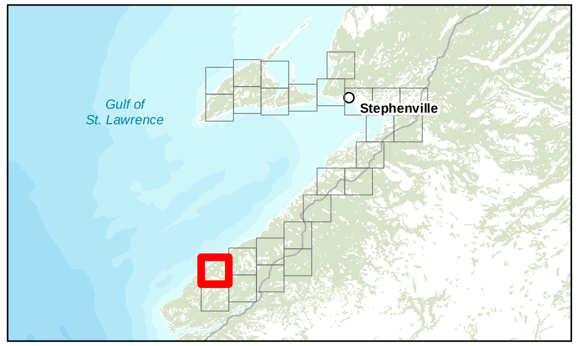
▨ Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
Revised by NW on 2023-07-23
QR by AW on 2023-07-31

Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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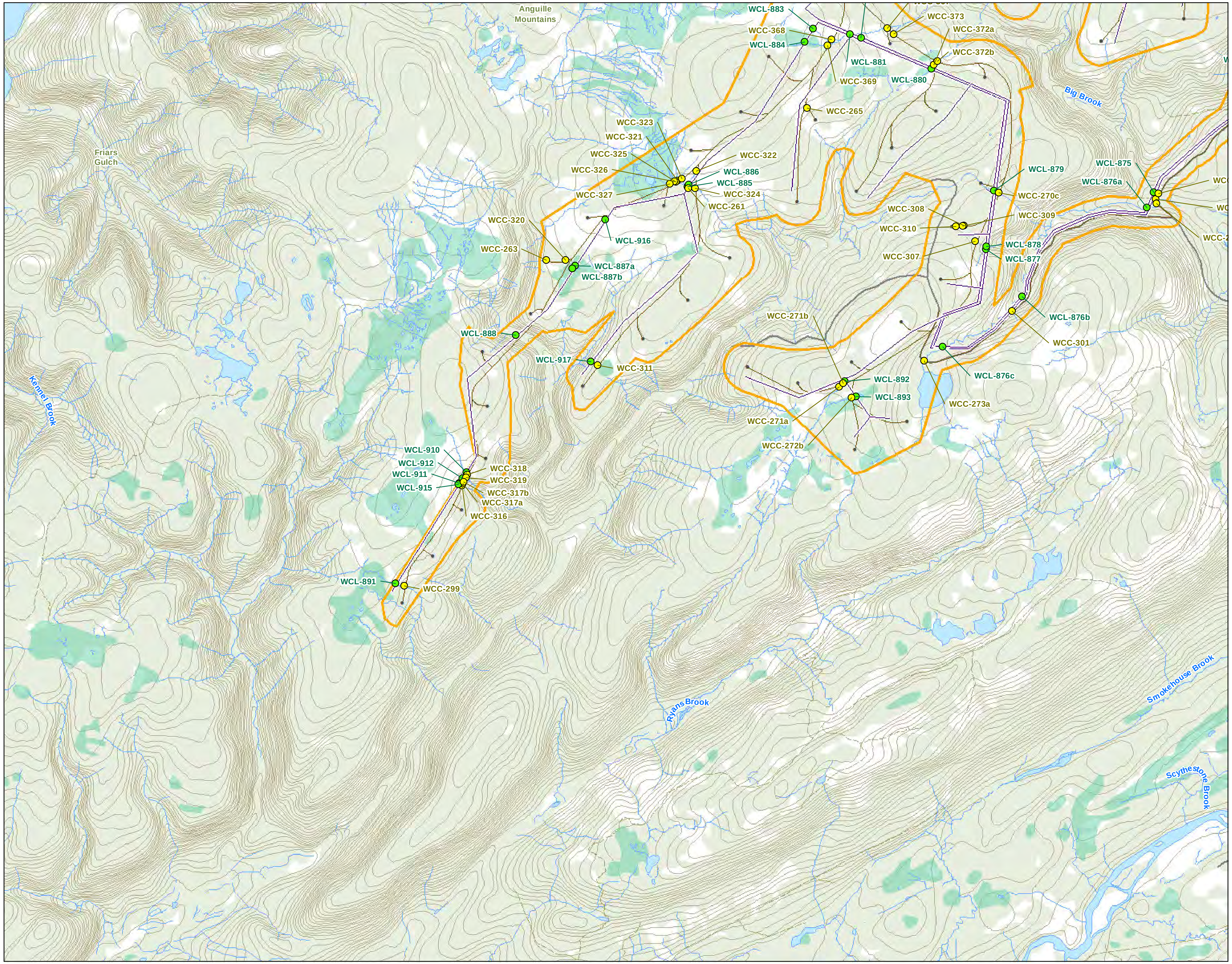


Stantec

Watercourse Crossings

- 🟡 Road Crossing
- 🟢 Collector Line Crossing

Proposed Project Features

- • Turbine Location
- — Collector Line (Proposed)
- — Access Road (Proposed)
- ▭ Project Area

Other Features

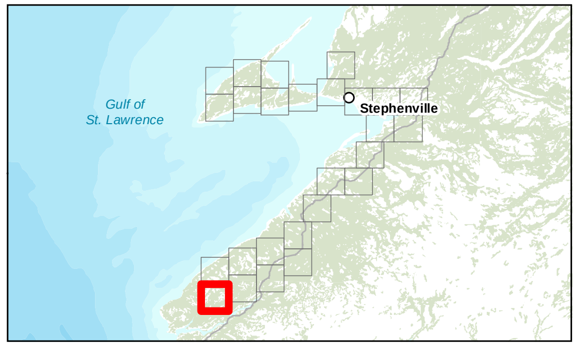
- — Road / Highway
- - - Resource Road / Trail
- — Watercourse
- ■ Waterbody
- ■ Wetland
- ■ Forested Area

N

0 1 2 Kilometers

(At original document size of 11x17)
1:50,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: World Energy GH2; NL ECC Water Resources Management Division; NL Fisheries, Forestry and Agriculture; NRCan CanVec
3. Background: NRCan CanVec



Project Location
Stephenville
NL

Prepared by NW on 2023-05-19
Revised by NW on 2023-07-23
QR by AW on 2023-07-31

Client/Project

121417233_66d REVA

World Energy GH2
Project Nujio'qonik

Figure No.

BSA-2 Appendix D

Title

Potential Watercourse Crossings for Project Nujio'qonik GH2

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Appendix E

Detailed Fish Habitat Information

PROJECT NUJIO’QONIK
Aquatic Environment Baseline Study
August 2023

Table E.1. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCA-132	343346	5379510	WSC-130	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCA-002	342288	5381066	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	0	Coarse	Moderate	Trees	Forestry road upstream	Unlikely - overland drainage
WCA-011a	343386	5379250	WSC-130	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Just north of Forest road	Fish habitat based on connectivity
WCA-011b	343469	5379161	WSC-130	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Just north of Forest road	Fish habitat based on connectivity
WCA-021	345916	5384891	WSC-171	Mapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Downstream of wetland/pond	Fish habitat based on connectivity to pond
WCA-022	348624	5386897	WSC-172	Unmapped	Desktop	Unnamed Tributary to Three Rock Cove Brook	Watercourse	Drainage channel	0	Overland Drainage	0	Coarse	Moderate	Trees	Downstream of pond. May be a ridge.	Unlikely - overland drainage
WCA-023	339769	5374899	WSC-140	Unmapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	24	Fines	Low	Wetland/shrubs	Bog hole may be connected to Red Brook	Unlikely - based on no connectivity
WCA-024	339742	5374860	WSC-140	Unmapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	15	Fines	Low	Wetland/shrubs	Bog hole may be connected to Red Brook	Unlikely - based on no connectivity
WCA-025	353981	5385880	WSC-105	Mapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Crosses existing road, which connects to Hwy 463	Fish habitat based on connectivity
WCA-026	353139	5385394	WSC-105	Unmapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	West of Hwy 463	Fish habitat based on connectivity
WCA-028c	354129	5384758	WSC-107	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCA-030a	355572	5382772	WSC-110	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	3	Riffle/run	4	Coarse	Low	Trees	South of Hwy 463	Fish habitat based on connectivity
WCA-030b	356023	5383530	WSC-110	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	3	Riffle/run	4	Coarse	Low	Trees	South of Hwy 463	Fish habitat based on connectivity
WCA-031	355791	5382671	WSC-116	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Unmapped tributary of mapped watercourse	Fish habitat based on connectivity
WCA-032	355924	5382649	WSC-116	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	South of Hwy 463	Fish habitat based on connectivity
WCA-051a	340728	5380917	WSC-114	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-051b	341115	5380932	WSC-114	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-053	344901	5379805	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Connects two bogholes within wetland	Unlikely - overland drainage
WCA-054	343491	5380071	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Fines	Low	Wetland	No connectivity between bog hole and stream channel through wetland	Unlikely - overland drainage
WCA-055	345321	5381917	WSC-130	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-057a	345398	5382323	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCA-057b	345418	5382358	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-057c	345428	5382374	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-057d	345461	5382426	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-057e	345513	5382509	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-058	345571	5382600	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-059a	345977	5382956	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-059b	346350	5383349	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-059c	346707	5383604	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCA-060	346681	5383576	WSC-130	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-061	346747	5384366	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Small tributary off of main	Fish habitat based on connectivity
WCA-062	347191	5384314	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Connected to pond.	Fish habitat based on connectivity
WCA-063	343309	5383040	WSC-130	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-064	344818	5384882	WSC-171	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-066	346746	5385240	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No

Table E.1. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCA-067	347066	5385469	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-069a	348771	5387197	WSC-172	Mapped	Desktop	Three Rock Cove Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland		No
WCA-069b	348918	5387206	WSC-172	Mapped	Desktop	Three Rock Cove Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	No
WCA-070	349433	5387978	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-071b	353067	5385995	WSC-157	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-071c	352132	5385690	WSC-157	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-071d	352381	5385735	WSC-157	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-072a	355122	5382952	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-072b	354905	5383822	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-073a	354827	5382955	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-073b	354854	5383372	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-074a	356211	5382614	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-074b	356165	5382773	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-075	356273	5382946	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-076	356289	5382979	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-077	356596	5383053	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-099	357410	5377619	WSC-152	Mapped	Desktop	South Brook	Watercourse	Watercourse visible	2	Riffle/run	3	Mixed	Low	Shrubs	Under proposed transmission line	Fish habitat based on connectivity
WCA-100	357190	5377577	WSC-152	Mapped	Desktop	Tributary to South Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Runs through existing transmission line RoW	Fish habitat based on connectivity
WCA-102	356372	5379605	WSC-119	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	1	erland Drain	1	Mixed	High	Shrubs/Tree	Headwaters of brook	Unlikely - based on no connectivity
WCA-103	356306	5379551	WSC-150	Unmapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs/Tree	Headwaters of brook. Likely within road RoW.	Unlikely - based on no connectivity
WCA-104	355346	5380628	WSC-116	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs/Tree	Headwaters of brook. Likely within road RoW.	Unlikely - based on no connectivity
WCA-105	355244	5380866	WSC-116	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	High	Shrubs/Tree	Headwaters of brook. Likely within road RoW.	Unlikely - based on no connectivity
WCA-106	354323	5381892	WSC-110	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-107	354441	5382094	WSC-110	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-110	356304	5383118	WSC-116	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs	Difficult to assess based on satellite imagery.	Unlikely - based on no connectivity
WCA-111a	355619	5383727	WSC-110	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs	If the road was a T one of these locations could be avoided	Unlikely - based on no connectivity
WCA-111b	355630	5383817	WSC-110	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs	If the road was a T one of these locations could be avoided	Unlikely - based on no connectivity
WCA-112	354835	5383980	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	2	Riffle/run	1	Mixed	Low	Shrubs	Difficult to assess based on satellite imagery.	Unlikely - based on no connectivity
WCA-115	354157	5384657	WSC-107	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCA-116	351963	5383528	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	These two crossings could be avoided	No
WCA-117	351798	5383468	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	These two crossings could be avoided	No
WCA-125	341806	5379919	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Crossing could be avoided it road moved to east	Unlikely - based on no connectivity
WCA-126	341796	5379944	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Crossing should be moved to east to avoid two crossings	Unlikely - based on no connectivity
WCA-127	342299	5379803	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCA-128	347191	5385810	WSC-172	Mapped	Desktop	Unnamed Tributary to Three Rock Cove Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	-	No
WCA-129a	343372	5384270	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-129b	343402	5384250	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-130	344284	5380660	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCA-131	343441	5379590	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCA-133	343053	5379580	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	Downstream of wetland	Fish habitat based on connectivity
WCA-134	343712	5379210	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Forest	-	No
WCA-135a	344197	5379250	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	-	No
WCA-135b	344223	5379200	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	-	No

Table E.1. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCA-136a	343513	5378370	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Forest	-	No
WCA-136b	343510	5378340	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Forest	-	No
WCA-137a	346092	5377050	WSC-137	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-137b	346023	5377170	WSC-137	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-138a	345925	5377630	WSC-137	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-138b	345869	5377660	WSC-137	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-139	346924	5377680	WSC-135	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCA-140a	345003	5379860	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	Drains low lying area	No
WCA-140b	345006	5379860	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	Drains low lying area	No
WCA-140c	345017	5379850	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	Drains low lying area	No
WCA-141	345156	5380190	WSC-130	Mapped	Desktop	Unnamed Tributary to Unnamed Pond	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	-	Shrubs	-	Unlikely - based on no connectivity
WCA-142	345841	5380720	WSC-130	Mapped	Desktop	Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	7	Mixed	-	Shrubs	Drains a large pond	Fish habitat based on connectivity
WCA-143	347719	5381480	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	-	Shrubs	Channel drains into bog hole. Not apparent connectivity.	No
WCA-144	348114	5381610	WSC-124	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Wetland	Bog	No
WCA-145	348915	5381860	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	-	Shrubs	-	Fish habitat based on connectivity
WCA-146	349145	5381900	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	2	Steady	10	Fines	Low	Wetland	Watercourse is not as mapped. Slightly east.	Fish habitat based on connectivity
WCA-147	351369	5381400	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	3	Riffle/run	11	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCA-148a	352288	5381460	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	1	erland Drain	1	Coarse	Low	Shrubs	-	Unlikely - overland drainage
WCA-148b	352428	5381440	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Drains two adjacent wetlands	Fish habitat based on connectivity
WCA-149	352608	5381480	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCA-150	353206	5381610	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCA-151	353522	5381680	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Drains from AML Mine Site	Fish habitat based on connectivity
WCA-152	353016	5386370	WSC-157	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	Drains through disturbed area	Unlikely - overland drainage
WCA-153	355330	5382920	WSC-110	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Low	Wetland	Appears to dissipate throug bog	Unlikely - overland drainage
WCA-155	356531	5377490	WSC-152	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Coarse	Low	Trees	-	Unlikely - overland drainage
WCA-154a	356317.6875	5377962.5	WSC-152	Unmapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Course	Low	Trees	No obvious flow path from imagery	
WCA-156	380654.5938	380654.5938	WSC-223	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	110	Fines	Low	Wetland	Does not appear to have connectivity	Unlikely fish habitat based on connectivity
WCA-157	381945.625	381945.625	WSC-223	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	55	Fines	Low	Wetland	Does not appear to have connectivity	Unlikely fish habitat based on connectivity
WCA-158	380126.8438	380126.8438	WSC-214	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Watercourse may not be as mapped	Fish habitat based on connectivity
WCA-159	380010.5	380010.5	WSC-214	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCA-160	379665.2813	379665.2813	WSC-214	Mapped	Desktop	-	Waterbody	Waterbody visible	na	Bog Hole	130	Fines	Low	Shrubs	Adjacent smaller bog holes	Unlikely - based on no connectivity
WCA-161a	379661.3125	379661.3125	WSC-235	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	1	Overland Drainage	1	Fines	Low	Wetland	Channel visible but appears to dissipate downstream	Unlikely - based on no connectivity
WCA-161b	379540.9063	379540.9063	WSC-235	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Shrub/Trees	Channel visible but appears to dissipate near crossing	Unlikely - based on no connectivity
WCA-162	378769.6563	378769.6563	WSC-218	Mapped	Desktop	Smelt Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Appears steep downstream	Fish habitat based on connectivity

Table E.2. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-704a	**341517**	**5380593**	**WSC-114**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	String bog	No
WCL-704b	**341275**	**5380917**	**WSC-114**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-704c	**340685**	**5380953**	**WSC-114**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-706	**342987**	**5379547**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	Downstream of wetland	Fish habitat based on connectivity
WCL-707a	**342895**	**5379855**	**WSC-130**	Mapped	Desktop	Unnamed Stringbog	Waterbody	Waterbody visible	na	Bog Hole	80	Fines	Low	Wetland	Stringbog no connectivity to watercourse	Unlikely - based on no connectivity
WCL-707b	**342914**	**5379791**	**WSC-130**	Mapped	Desktop	Unnamed Stringbog	Watercourse	Drainage channel	na	Overland Drainage	17	Fines	Low	Wetland	Stringbog no connectivity to watercourse	Unlikely - based on no connectivity
WCL-707c	**342819**	**5379765**	**WSC-130**	Mapped	Desktop	Unnamed Stringbog	Watercourse	Drainage channel	na	Overland Drainage	12	Fines	Low	Wetland	Stringbog no connectivity to watercourse	Unlikely - based on no connectivity
WCL-708	**342691**	**5380482**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse Visible	2	Riffle/run	1	Coarse	Low	Trees	Skidder trail marks	Fish habitat based on connectivity
WCL-709	**342615**	**5380852**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-710	**343504**	**5382627**	**WSC-130**	Mapped	Desktop	Mainland Brook	Watercourse	Watercourse visible	3	Riffle/run	9	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCL-711a	**342626**	**5380989**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Old logging load downstream	Fish habitat based on connectivity
WCL-711b	**342652**	**5381297**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Old logging load upstream	Fish habitat based on connectivity
WCL-711c	**342893**	**5382263**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	3	Riffle/run	10	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCL-712a	**342700**	**5382173**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	East of HWY 463 (coast)	Unlikely - overland drainage
WCL-712b	**342714**	**5382091**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Redesign - shift east to avoid watercourse	Unlikely - overland drainage
WCL-712c	**342711**	**5382048**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Redesign - shift east to avoid watercourse	Unlikely - overland drainage
WCL-713	**342079**	**5382601**	**WSC-130**	Mapped	Desktop	Mainland Brook	Watercourse	Watercourse visible	4	Riffle/run	13	Coarse	Low	Trees	East of HWY 463 (coast)	Fish habitat based on connectivity
WCL-714	**345486**	**5384891**	**WSC-171**	Mapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	East of HWY 463 (coast)	Fish habitat based on connectivity
WCL-715a	**343502**	**5378897**	**WSC-130**	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Just north of Forest road. 3 collector lines run paralell	Fish habitat based on connectivity
WCL-715b	**343548**	**5378667**	**WSC-130**	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Just north of Forest road	Fish habitat based on connectivity
WCL-715c	**343537**	**5378580**	**WSC-130**	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Just north of Forest road	Fish habitat based on connectivity
WCL-716	**344423**	**5380629**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Downstream of wetland	Unlikely - overland drainage
WCL-717	**344883**	**5381610**	**WSC-130**	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	ROW may contain additional tributaries	Fish habitat based on connectivity to pond
WCL-718	**345406**	**5382608**	**WSC-130**	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near watershed divide	Fish habitat based on connectivity
WCL-719	**347026**	**5384094**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-720	**347033**	**5384127**	**WSC-130**	Mapped	Desktop	Unnamed Channel	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Channel visible downstream of two inflowing tributaries	Unlikely - based on no connectivity
WCL-721	**347074**	**5384295**	**WSC-130**	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Connected to pond	Fish habitat based on connectivity
WCL-722	**349567**	**5387280**	**WSC-172**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-726	**344901**	**5379703**	**WSC-130**	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	70	Fines	Low	Shrubs	3 of 5 collector lines intersect the pond, likely not fish bearing since no connectivity to WC	Unlikely - based on no connectivity
WCL-727	**345367**	**5380801**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-728	**345478**	**5381185**	**WSC-130**	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	downstream of two bog ponds, upstream of WCL-717	Fish habitat based on connectivity
WCL-729	**345639**	**5381694**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-730	**345752**	**5382058**	**WSC-130**	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Connects to small pond an can see a bit of channelization	Fish habitat based on connectivity to pond
WCL-739	**351330**	**5383397**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-740a	**353356**	**5386158**	**WSC-157**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-740b	**352242**	**5385719**	**WSC-157**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-741a	**352007**	**5383066**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Victor's Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Mixed	Moderate	Trees	3 collector lines intersect 82 m of watercourse	Fish habitat based on connectivity
WCL-742	**352653**	**5383265**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-743	**352937**	**5383224**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-744	**351797**	**5383527**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No

Table E.2. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-745a	**353715**	**5383135**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Victor's Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Moderate	Trees	Just east of Victors brook channel	Fish habitat based on connectivity
WCL-745b	**353780**	**5383119**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Victor's Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Moderate	Trees	Just east of Victors brook channel	Fish habitat based on connectivity
WCL-746	**353868**	**5383082**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Victor's Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	Just east of Victors brook channel	Fish habitat based on connectivity
WCL-747	**354220**	**5382933**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-748	**354523**	**5382807**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-749	**354842**	**5382920**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-750	**355089**	**5383213**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-751	**355604**	**5383462**	**WSC-110**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-752	**355245**	**5382663**	**WSC-110**	Mapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Shrubs	-	Fish habitat based on connectivity
WCL-753	**355403**	**5382641**	**WSC-110**	Mapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Moderate	Shrubs	-	Unlikely - based on no connectivity
WCL-754	**355458**	**5382630**	**WSC-110**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-755	**355721**	**5382587**	**WSC-116**	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	South of Hwy 462	Fish habitat based on connectivity
WCL-756	**355919**	**5382560**	**WSC-116**	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	South of Hwy 463	Fish habitat based on connectivity
WCL-757	**355967**	**5382551**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-758	**356199**	**5382513**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-759	**356403**	**5382575**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-760	**356567**	**5382728**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-761	**356707**	**5382858**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-762	**352954**	**5383668**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-763	**353120**	**5383714**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-764a	**353790**	**5383677**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Channel not visible due to trees but pattern suggests channel is possible	Unlikely - overland drainage
WCL-764b	**353753**	**5383678**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Channel not visible due to trees but pattern suggests channel is possible	Unlikely - overland drainage
WCL-765b	**354340**	**5384108**	**WSC-124**	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	5	Coarse	Low	Trees	sw of HWY 464	Fish habitat based on connectivity
WCL-765c	**354253**	**5384019**	**WSC-124**	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	7	Coarse	Low	Trees	sw of HWY 465	Fish habitat based on connectivity
WCL-765d	**353916**	**5383668**	**WSC-124**	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	4	Coarse	Low	Trees	Channel braids/ has flooded side channel	Fish habitat based on connectivity
WCL-766	**353389**	**5384588**	**WSC-107**	Mapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	Crosses existing logging road, which connects to Hwy 463	Fish habitat based on connectivity
WCL-767	**352839**	**5382962**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Moderate	Trees	Collector line intersects 23 m of watercourse.	Fish habitat based on connectivity
WCL-768c	**352718**	**5382783**	**WSC-124**	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	10	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCL-768e	**353032**	**5382936**	**WSC-124**	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	7	Coarse	Moderate	Trees	Two collector lines span this location	Fish habitat based on connectivity
WCL-768f	**353388**	**5383171**	**WSC-124**	Mapped	Desktop	Victor's Brook	Watercourse	Watercourse visible	4	Riffle/run	6	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCL-769	**352966**	**5382926**	**WSC-124**	Mapped	Desktop	Unnamed Tributary of Harry Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Moderate	Trees	Two collector lines span this location	Unlikely - overland drainage
WCL-771b	**353141**	**5382903**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Two collector lines span this location	Fish habitat based on connectivity
WCL-772	**353364**	**5382684**	**WSC-124**	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCL-773	**353634**	**5382331**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Three collector lines span at this location	No
WCL-774a	**353676**	**5382277**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Three collector lines span at this location	No
WCL-774b	**353745**	**5382167**	**WSC-124**	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Drainage channel	2	Overland Drainage	1	Coarse	Low	Trees	Watercourse originates in the footprint of an existing mine, unclear how or if it connects to Harry's Brook	Unlikely - overland drainage
WCL-776	**354143**	**5381834**	**WSC-110**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-777	**355010**	**5380489**	**WSC-116**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Three collector lines span at this location	No
WCL-778	**354904**	**5379060**	**WSC-150**	Mapped	Desktop	Three Ponds Pond 1	Waterbody	Waterbody visible	na	Pond	122	Fines	Low	Trees	-	Fish habitat based on connectivity
WCL-779	**354900**	**5378723**	**WSC-150**	Mapped	Desktop	Three Ponds Pond 2	Waterbody	Waterbody visible	na	Pond	34	Fines	Low	Trees	-	Fish habitat based on connectivity

Table E.2. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-780	**355166**	**5377895**	**WSC-151**	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	1	Overland Drainage	2	Coarse	Moderate	Trees	Flooded skidder trail/logging road. Channel is visible upstream but does not appear to have connectivity. Three collector lines cross this location.	Unlikely - overland drainage
WCL-852	**353780**	**5382111**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-855	**354113**	**5382988**	**WSC-124**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-856	**346866**	**5381368**	**WSC-124**	Unmapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	0	Bog Hole	67	Fines	Low	Wetland	-	No
WCL-857	**346750**	**5381208**	**WSC-124**	Unmapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	0	Bog Hole	26	Fines	Low	Wetland	-	No
WCL-858	**346599**	**5381151**	**WSC-130**	Unmapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	0	Bog Hole	55	Fines	Low	Wetland/Tree	-	No
WCL-861	**342336**	**5379846**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	-	-
WCL-862	**341884**	**5380058**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	2	Overland Drainage	1	Mixed	Low	Shrubs	-	-
WCL-863	**340075**	**5375691**	**WSC-143**	Unmapped	Desktop	-	Waterbody	Waterbody visible	na	Bog Hole	26	Fines	Low	Wetland	No visible connectivity	Unlikely - based on no connectivity
WCL-864	**339990**	**5375636**	**WSC-143**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-865	**339676**	**5374930**	**WSC-140**	Unmapped	Desktop	-	Waterbody	Waterbody visible	na	Bog Hole	22	Fines	Low	Wetland	No visible connectivity	Unlikely - based on no connectivity
WCL-866	**344893**	**5381615**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-868	**350757**	**5388149**	**WSC-148**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Within RoW	No
WCL-869	**343236**	**5382471**	**WSC-130**	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-870	**341576**	**5382341**	**WSC-130**	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Dissipates into forested wetland. Within RoW.	Unlikely - based on no connectivity
WCL-894	349482	5387300	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Maybe at watershed divide	No
WCL-895	343718	5384040	WSC-130	Mapped	Desktop	-	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCL-896b	344192	5379280	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Moderate	Trees	-	Unlikely - overland drainage
WCL-896c	344166	5379300	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Moderate	Trees	-	No
WCL-896d	344197	5379220	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Moderate	Trees	-	No
WCL-897a	343518	5378420	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-897b	343515	5378390	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-898	345940	5377610	WSC-137	Unmapped	Desktop	-	Watercourse	Drainage channel	0	Overland Drainage	1	Coarse	Moderate	Trees	-	Unlikely - overland drainage
WCL-899	347197	5377450	WSC-135	Unmapped	Desktop	-	Watercourse	Drainage channel	0	erland Drain	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCL-900	344703	5378320	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	0	erland Drain	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCL-901	343212	5377230	WSC-140	Unmapped	Desktop	-	Watercourse	Drainage channel	0	erland Drain	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCL-902a	345053	5379790	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-902b	345090	5379740	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-902c	345120	5379730	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-903a	346057	5380490	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Skidder trail marks	No
WCL-903b	346068	5380540	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Appears to drain a low lying area	No
WCL-903c	346057	5380610	WSC-130	Unmapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Appears to drain a low lying area	No
WCL-903d	346015	5380660	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Appears to drain a low lying area	No
WCL-904a	347525	5381860	WSC-124	Unmapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	Appears to be crossed by and old logging road/skidder trail	Unlikely - overland drainage
WCL-904b	347621	5381780	WSC-124	Unmapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	Appears to be crossed by and old logging road/skidder trail	Unlikely - overland drainage
WCL-904c	347578	5381820	WSC-124	Unmapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Coarse	Low	Trees	Appears to be crossed by and old logging road/skidder trail	Unlikely - overland drainage
WCL-905a	348772	5381910	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCL-905b	348878	5381940	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCL-905c	349021	5382000	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrub/Tree	-	Fish habitat based on connectivity
WCL-905d	349061	5382000	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrub/Tree	-	Fish habitat based on connectivity
WCL-905e	349076	5381970	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Glide	3	Fines	Low	Wetland	-	Fish habitat based on connectivity

Table E.2. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Port au Port Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-905f	349063	5381940	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Glide	3	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCL-905g	349113	5381930	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	2	Steady	6	Fines	Low	Wetland	Watercourse is not as mapped. Slightly east.	Fish habitat based on connectivity
WCL-905h	349142	5381900	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	2	Steady	10	Fines	Low	Wetland	Watercourse is not as mapped. Slightly east.	Fish habitat based on connectivity
WCL-905i	348960	5381970	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrub/Tree	-	Fish habitat based on connectivity
WCL-906	351143	5383080	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCL-907a	352950	5386350	WSC-157	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	Drains through disturbed area	Unlikely - overland drainage
WCL-907b	352994	5386360	WSC-157	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	Drains through disturbed area	Unlikely - overland drainage
WCL-908	356318	5377760	WSC-152	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
WCL-909	354865	5378660	WSC-150	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-918	350350	5387850	WSC-148	Mapped	Desktop	Lourdes Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	-	Trees	-	Fish habitat based on connectivity
WCL-919	343708	5379240	WSC-130	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No

Table E.3. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Substations, Wind Turbines and the Plant Site for the Port au Port Wind Farm

Crossing Type	Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
Plant	WCS-402	387879	5376470	WSC-232	Mapped	Desktop	Outlet of Gull Pond	Watercourse	Watercourse visible	3	Riffle/run	1	Mixed	Low	Shrubs	Beaver impoundment	Fish habitat based on connectivity
Plant	WCS-403	387962	5376778	WSC-232	Mapped	Desktop	Outlet of Gull Pond	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
Plant	WCS-404	388090	5376851	WSC-232	Mapped	Desktop	Outlet of Gull Pond	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
Plant	WCS-405	388182	5376956	WSC-232	Mapped	Desktop	Outlet of Gull Pond	Watercourse	Watercourse visible	2	Riffle/run	3	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
Plant	WCS-406	388310	5376894	WSC-232	Mapped	Desktop	Outlet of Gull Pond	Watercourse	Watercourse visible	1	Riffle/run	3	Mixed	Low	Shrubs	May not be as mapped	Fish habitat based on connectivity
Sub station	WCS-400	351654	5383183	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Moderate	Trees	Substation potentially overprints stream	Fish habitat based on connectivity
Sub station	WCS-401	351732	5383172	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	Substation potentially overprints stream	Fish habitat based on connectivity
Turbine Footprint	WCA-132	356313	5377900	WSC-152	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Mixed	Low	Shrubs	-	Unlikely - overland drainage
Turbine Footprint	WCF-1000	354116	5384230	WSC-124	Mapped	Desktop	Unnamed Tributary to Harry Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field	Unlikely - overland drainage
Turbine Footprint	WCF-1001	354860	5383332	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1002	354540	5382938	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field. Footprint within 15 m buffer of mapped watercourse.	No
Turbine Footprint	WCF-1003	356349	5382686	WSC-116	Mapped	Desktop	Unnamed Tributary	Watercourse	Drainage channel	2	erland Drain	1	Mixed	Low	Tree/Shrub	Need to confirm if fish habitat in the field. Footprint within 15 m buffer of mapped watercourse.	No
Turbine Footprint	WCF-1004	356606	5383019	WSC-116	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1005	360323	5378775	WSC-169	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1006	347079	5385237	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1007	347213	5384328	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Connected to pond. Need to confirm if fish habitat in the field.	Fish habitat based on connectivity
Turbine Footprint	WCF-1008	346778	5383624	WSC-130	Mapped	Desktop	Tributary to Mainland Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Need to confirm if fish habitat in the field. Footprint within 15 m buffer of watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1009	346115	5386166	WSC-172	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1010	344988	5384941	WSC-171	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1011	342503	5381930	WSC-130	Mapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Need to confirm not fish habitat in the field. Footprint on mapped watercourse.	Unlikely - overland drainage
Turbine Footprint	WCF-1031	345298	5380310	WSC-130	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Need to confirm no visible channel in the field	No
Turbine Footprint	WCF-1032	356318	5377960	WSC-152	Unmapped	Desktop	Tributary of Unnamed Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Inlet to pond. Need to confirm if fish habitat in the field.	Fish habitat based on connectivity

Table E.4. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCC-200a	367463	5326551	WSC-312	Mapped	Desktop	Tributary to Rainy Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	Appears to dissapate into wetlands in a few places	Fish habitat based on connectivity
WCC-200b	366724	5325210	WSC-312	Mapped	Desktop	Tributary to Rainy Brook	Watercourse	Drainage Channel	1	erland Drain	1	Mixed	Low	Shrubs	Overland drainage to Rainy Brook	Unlikely - based on no connectivity
WCC-201	366172	5322504	WSC-312	Unmapped	Desktop	Tributary to Grand Codroy River	Watercourse	Watercourse visible	0	Riffle/run	1	Coarse	Low	Trees	Small tributary	Fish habitat based on connectivity
WCC-205b	360493	5329735	WSC-312	Mapped	Desktop	Unnamed Tributary to Rainy Brook	Watercourse	Drainage channel	1	erland Drain	1	Coarse	Moderate	Trees	Drains wetland into Tributary to Rainy Brook	Unlikely - overland drainage
WCC-206b	361479	5330617	WSC-312	Mapped	Desktop	Rainy Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Outlet of pond through wetland (Rainy Brook)	Fish habitat based on connectivity
WCC-207	361584	5330595	WSC-312	Unmapped	Desktop	Unnamed Tributary to Rainy Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Flows through a wetland. Possible second outlet of pond during high flow conditions.	Fish habitat based on connectivity
WCC-209	357301	5326221	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCC-210	356290	5327861	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Inlet to Morris Pond, connected to Morris Brook	Fish habitat based on connectivity
WCC-211a	355425	5328760	WSC-307	Mapped	Desktop	Shoal Point Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	Inlet to Shoal Point Pond	Fish habitat based on connectivity
WCC-214b	355572	5325070	WSC-315	Mapped	Desktop	Unnamed Tributary to Morris Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs/Trees	-	Fish habitat based on connectivity
WCC-219b	347959	5318393	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	12	Coarse	Moderate	Trees	Channel flows into North Branch	Fish habitat based on connectivity
WCC-221	346467	5322419	WSC-315	Unmapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	0	Riffle/run	3	Mixed	Low	Shrubs	Outlet of pond. Channel braids through wetland.	Fish habitat based on connectivity
WCC-227	345043	5316246	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-261	339122	5316386	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	2	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCC-263	337323	5315473	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	-	Fish habitat based on connectivity
WCC-265	340628	5317401	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Old logging trail to west	Fish habitat based on connectivity
WCC-270c	343056	5316327	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs	Located on sub-watershed divide	Fish habitat based on connectivity
WCC-271a	341034	5313868	WSC-315	Mapped	Desktop	Unnamed Triubutary to Ryans Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCC-271b	341084	5313916	WSC-315	Mapped	Desktop	Unnamed Triubutary to Ryans Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCC-272b	341193	5313732	WSC-315	Mapped	Desktop	Unnamed Triubutary to Ryans Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCC-273a	342111	5314198	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	Outlet of Wedding Pond	Fish habitat based on connectivity
WCC-273b	345054	5316193	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	Outlet of Wedding Pond	Fish habitat based on connectivity
WCC-274	345079	5316319	WSC-315	Mapped	Desktop	Big Brook	Watercourse	Watercourse visible	3	Riffle/run	6	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCC-275	346650	5317914	WSC-315	Mapped	Desktop	Unnamed Tributary to Woodpecker Pond	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCC-276	348898	5318491	WSC-315	Mapped	Desktop	Tributary to Big Brook	Watercourse	Watercourse visible	2	Riffle/run	5	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCC-277	350574	5318602	WSC-315	Mapped	Desktop	Unnamed Tributary to Unnamed Brook connected North Brand Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	Tributary off larger tributary	Fish habitat based on connectivity
WCC-278	355316	5319289	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	10	Coarse	Moderate	Trees	Tributary just off North Branch. North of TCH	Fish habitat based on connectivity
WCC-280	360569	5326913	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-281	359981	5328207	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-282a	359365	5328908	WSC-306	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-282c	359703	5329291	WSC-306	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-284	358541	5325064	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-285	355551	5328253	WSC-315	Mapped	Desktop	Tributary to Codroy River	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Parallels existing access road	Fish habitat based on connectivity
WCC-299	335524	5311347	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Fines	Low	Shrubs	Connected to Brooms Brook	Fish habitat based on connectivity
WCC-301	343225	5314831	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCC-307	342760	5315713	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	2	Fines	Low	Wetland	Drains pool in wetland	Fish habitat based on connectivity
WCC-308	342613	5315910	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity

Table E.4. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCC-309	342602	5315910	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Low	Wetland	-	Unlikely - overland drainage
WCC-310	342511	5315904	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCC-311	337976	5314144	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Fines	Low	Wetland	Headwater that flows down steep slope below crossing	Unlikely - based on no connectivity
WCC-316	336259	5312621	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-317a	336269	5312643	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-317b	336278	5312664	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-318	336325	5312759	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-319	336307	5312721	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-320	337571	5315477	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-321	338989	5316479	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	2	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-322	339228	5316605	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-323	339041	5316508	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-324	339208	5316382	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	3	Glide	2	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-325	338968	5316467	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	2	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-326	338949	5316471	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-327	338889	5316440	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-328	362609	5331242	WSC-316	Unmapped	Desktop	Butter Brook	Watercourse	Watercourse visible	0	Glide	1	Mixed	Low	Shrubs	Drains a bog	Fish habitat based on connectivity
WCC-329	363512	5323748	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Drainage channel	1	erland Drain	1	Coarse	Moderate	Trees	Very close to existing bog hole	Unlikely - overland drainage
WCC-340a	365111	5323833	WSC-312	Mapped	Desktop	Unnamed Tributary to Bald Mountain Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs/Trees	Adjacent watercourse nearby	Fish habitat based on connectivity
WCC-340b	365409	5323636	WSC-312	Mapped	Desktop	Unnamed Tributary to Bald Mountain Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs/Trees	-	Fish habitat based on connectivity
WCC-342	366755	5322959	WSC-312	Mapped	Desktop	Unnamed Tributary to an Unnamed Pond	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs/Trees	-	Fish habitat based on connectivity
WCC-343a	365363	5321823	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-343b	365599	5322023	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-343c	365730	5322160	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-343d	365834	5322213	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-347	352762	5327304	WSC-318	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	1	Pond	100	Fines	Low	Wetland	Road crosses pond	Fish habitat based on connectivity
WCC-348	352966	5323593	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-349	352813	5323329	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-350	347773	5322674	WSC-315	Unmapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Skidder/ATV trail upstream of crossing. Watercourse appears to be slightly to the east.	Fish habitat based on connectivity
WCC-351	347405	5322823	WSC-315	Unmapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Skidder/ATV trail downstream of crossing.	Fish habitat based on connectivity
WCC-352	346782	5322580	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	5	Mixed	Low	Shrubs	Flows between two ponds	Fish habitat based on connectivity

Table E.4. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Roads for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCC-353	343701	5320786	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-354	344602	5320987	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	Watercourse is slightly to the north. Not as mapped.	Fish habitat based on connectivity
WCC-355	344626	5321382	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Moderate	Shrubs	-	Fish habitat based on connectivity
WCC-356	344603	5321194	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Watercourse is slightly to the north. Not as mapped.	Fish habitat based on connectivity
WCC-357	344595	5321120	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Moderate	Shrubs	-	Fish habitat based on connectivity
WCC-358	344733	5322092	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	4	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-359	344752	5320557	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCC-360	345063	5320405	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Watercourse slightly to west. Not as mapped.	Fish habitat based on connectivity
WCC-361	345191	5320427	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-362	345251	5320444	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-363a	345217	5320520	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-363b	345356	5320474	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-365	345965	5319634	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-366	346010	5319650	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCC-367	341646	5318411	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCC-368	340939	5318268	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Potentially braided at crossing	Fish habitat based on connectivity
WCC-369	340889	5318195	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-370a	341063	5319401	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-370b	341091	5319390	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-372a	342232	5317948	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Watercourse slightly to west. Not as mapped.	Fish habitat based on connectivity
WCC-372b	342279	5317995	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCC-373	341724	5318339	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity

Table E.5. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-775	366776	5325326	WSC-312	Mapped	Desktop	Tributary to Rainy Brook	Watercourse	Drainage Channel	1	Overland Drainage	1	Coarse	Low	Trees	Overland drainage to Rainy Brook	Unlikely - based on no connectivity
WCL-795	348290	5322221	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Glide	1	Fines	Moderate	Wetland	Branching channels through wetland connect with North Brand Grand Codroy	Fish habitat based on connectivity
WCL-796	347770	5322530	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Moderate	Shrubs	Braided through wetland	Fish habitat based on connectivity
WCL-797	346935	5321398	WSC-315	Mapped	Desktop	US Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	11	Coarse	Moderate	Trees/Wetland	Channel flows into North Branch just bfore confluence with South Branch	Fish habitat based on connectivity
WCL-798	350750	5323186	WSC-318	Mapped	Desktop	Tributary to Unnamed Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Fines	Low	Wetland	Channelizes in wetland but looks like not fully connected to brook	Unlikely - based on no connectivity
WCL-799	352976	5323410	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs	Drains wetland, large valley with high slope	Fish habitat based on connectivity
WCL-800	352988	5323543	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Watercourse	1	Mixed	Moderate	Shrubs	Braided at proposed crossing location	Unlikely - overland drainage
WCL-801a	351890	5321200	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	Three collector lines associated with this location	Fish habitat based on connectivity
WCL-801b	352083	5321314	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	Five collector lines associated with proposed crossing	Fish habitat based on connectivity
WCL-802	365741	5324859	WSC-312	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	42	Fines	Low	Shrubs	Does not appear to be connected to a watercourse	Unlikely fish habitat based on connectivity
WCL-803	353510	5320361	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Overland Drainage	1	Coarse	Moderate	Trees	3 collector lines intersecting 83 m of watercourse	Fish habitat based on connectivity
WCL-804	350723	5318702	WSC-315	Mapped	Desktop	Unnamed Tributary to Unnamed Brook connected North Brand Grand Codroy River	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	3 collector lines intersecting 83 m of watercourse	Fish habitat based on connectivity
WCL-805	348932	5318553	WSC-315	Mapped	Desktop	Tributary to Big Brook	Watercourse	Watercourse visible	2	Riffle/run	5	Coarse	Moderate	Trees	3 collector lines intersecting 83 m of watercourse	Fish habitat based on connectivity
WCL-806	347878	5318410	WSC-315	Mapped	Desktop	US Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	11	Coarse	Moderate	Trees	Channel flows into North Branch just bfore confluence with South Branch	Fish habitat based on connectivity
WCL-807	345447	5321344	WSC-315	Mapped	Desktop	Unnamed Triubutary to North Branch Codroy Brook	Watercourse	Watercourse visible	3	Riffle/run	7	Coarse	Moderate	Shrubs	Drains wetlands into main channel	Fish habitat based on connectivity
WCL-808	345379	5320461	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Glide	3	Mixed	Low	Wetland	Channelizes through wetland, may drain a pond	Fish habitat based on connectivity
WCL-809	345286	5320318	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Channelizes through wetland	Fish habitat based on connectivity
WCL-810	345261	5320272	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	2	Glide	2	Fines	Low	Wetland	Channelizes through wetland	Fish habitat based on connectivity
WCL-811	345160	5320126	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Drainage channel	1	erland Drain	2	Fines	Low	Wetland	Channelizes through wetland	Unlikely - based on no connectivity
WCL-812	344388	5319964	WSC-315	Unmapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Moderate	Wetland	Channelization but not connected to watercourse	Unlikely - based on no connectivity
WCL-813	343523	5320713	WSC-315	Mapped	Desktop	Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Glide	5	Fines	Low	Wetland	Channelizes through wetland	Fish habitat based on connectivity
WCL-814	343492	5321473	WSC-315	Mapped	Desktop	Unnamed Tributary to Unnamed Brook	Watercourse	Watercourse visible	1	Glide	3	Fines	Low	Wetland	Channelizes through wetland and flows as inlet to pond	Fish habitat based on connectivity
WCL-818	342325	5320436	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Unclear if connected to watercourse	Fish habitat based on connectivity
WCL-819	342266	5320237	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Riffle/run	15	Mixed	Low	Shrubs	Unclear if connected to watercourse, flooded wetland	Fish habitat based on connectivity
WCL-820	342121	5319286	WSC-315	Unmapped	Desktop	Drainage to Big Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Moderate	Wetland	Wetland adjacent but potentially not permanently connected to Big Brook	Unlikely - based on no connectivity
WCL-821	353886	5320548	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Just downstream of TCH, 4 collector lines transect 100m of watercourse	Fish habitat based on connectivity
WCL-822	356122	5321343	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	1	Glide	2	Fines	Low	Wetland	Five collector lines associated with proposed crossing	Fish habitat based on connectivity
WCL-823	356185	5321659	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No

Table E.5. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-824	356646	5322958	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Just downstream of TCH, 4 collector lines intersects 100 m of watercourse	Fish habitat based on connectivity
WCL-825	356892	5323311	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Just downstream of TCH, 4 collector lines intersects 120 m of watercourse	Fish habitat based on connectivity
WCL-826	357798	5324580	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Connected to brook just downstream of Codroy Pond, 4 collector lines intersects 135 m of watercourse	Fish habitat based on connectivity
WCL-827	358188	5324773	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Connected to brook just downstream of Codroy Pond, 4 collector lines intersects 110 m of watercourse	Fish habitat based on connectivity
WCL-828	358414	5324893	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-829	358535	5325072	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-830	357375	5326241	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Morris brook flows into Crooked Brook after Codroy Pond Outlet	Fish habitat based on connectivity
WCL-831	356321	5327895	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Inlet to Morris Pond, connected to Morris Brook	Fish habitat based on connectivity
WCL-832	355528	5328776	WSC-307	Mapped	Desktop	Shoal Point Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Moderate	Trees	Inlet to Shoal Point Pond	Fish habitat based on connectivity
WCL-833	354023	5329413	WSC-321	Mapped	Desktop	Unnamed Tributary to Ship Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Moderate	Trees	Likely drains into Unnamed pond which is likely connected to Ship Brook	Fish habitat based on connectivity
WCL-834	353782	5327991	WSC-307	Mapped	Desktop	Shoal Point Brook	Watercourse	Watercourse visible	2	Riffle/run	3	Coarse	Moderate	Trees	Inlet to Shoal Point Pond	Fish habitat based on connectivity
WCL-835	355542	5325411	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Fines	Moderate	Shrubs	Drains wetland into Morris Brook	Fish habitat based on connectivity
WCL-836	353508	5326435	WSC-315	Mapped	Desktop	Tributary to Morris Brook	Watercourse	Watercourse visible	3	Riffle/run	1	Fines	Moderate	Wetland	Drains wetland into Morris Brook	Fish habitat based on connectivity
WCL-837a	360929	5326278	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Connected to Codroy Pond	Fish habitat based on connectivity
WCL-837b	361084	5326227	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Connected to Codroy Pond	Fish habitat based on connectivity
WCL-838	360053	5328254	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-839	359445	5328946	WSC-306	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-840	359751	5329359	WSC-306	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-841	360587	5329621	WSC-312	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-842	360611	5329728	WSC-312	Mapped	Desktop	Unnamed Tributary to Rainy Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Moderate	Trees	Drains wetland into Tributary to Rainy Brook	Unlikely - overland drainage
WCL-843	361441	5330537	WSC-312	Mapped	Desktop	Rainy Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Outlet of pond through wetland (Rainy Brook)	Fish habitat based on connectivity
WCL-844	361567	5330545	WSC-312	Unmapped	Desktop	Unnamed Tributary to Rainy Brook	Watercourse	Watercourse visible	0	Riffle/run	1	Fines	Low	Wetland	Second outlet of pond? Goes through wetland	Fish habitat based on connectivity
WCL-845	361386	5325471	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Inlet to Codroy Pond	Fish habitat based on connectivity
WCL-846	363781	5324388	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Mixed	Low	Shrubs	Flows into Codroy Pond which flows into Crooked Brook	Fish habitat based on connectivity
WCL-847	364747	5322865	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	2	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCL-848	365322	5322036	WSC-315	Unmapped	Desktop	Unnamed Tributary to Grand Codroy River	Watercourse	Watercourse visible	0	Glide	1	Mixed	Low	Shrubs	Very small tributary of the north brand of the Gran Codroy.	Fish habitat based on connectivity
WCL-849	366147	5322415	WSC-312	Unmapped	Desktop	Unnamed Tributary to Grand Codroy River	Watercourse	Watercourse visible	0	Glide	1	mixed	Low	Shrubs	Very small tributary of the north brand of the Gran Codroy.	Fish habitat based on connectivity
WCL-850	365759	5323487	WSC-312	Mapped	Desktop	Unnamed Tributary to Bald Mountain Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Bald Mountain Brook Headwaters	Fish habitat based on connectivity
WCL-872a	356512	5329351	WSC-307	Unmapped	Desktop	Unnamed Tributary to Shoal Point Brook	Watercourse	Watercourse visible	0	Glide	2	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCL-872b	356458	5329517	WSC-307	Unmapped	Desktop	Unnamed Tributary to Shoal Point Brook	Watercourse	Watercourse visible	0	Glide	2	Fines	Low	Wetland	-	Fish habitat based on connectivity

Table E.5. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Collector Lines for the Codroy Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCL-872c	356518	5329631	WSC-307	Unmapped	Desktop	Unnamed Tributary to Shoal Point Brook	Watercourse	Watercourse visible	0	Glide	2	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCL-873	354278	5325350	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCL-874	346596	5317991	WSC-315	Mapped	Desktop	Unnamed Tributary to Woodpecker Pond	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	Two collector lines span this location	Fish habitat based on connectivity
WCL-875	345018	5316336	WSC-315	Mapped	Desktop	Big Brook	Watercourse	Watercourse visible	3	Riffle/run	6	Coarse	Moderate	Trees	Big Brook System	Fish habitat based on connectivity
WCL-876a	344930	5316143	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	Outlet of Wedding Pond. Two collector lines span this location.	Fish habitat based on connectivity
WCL-876b	343350	5315015	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	Outlet of Wedding Pond into Big Brook. Redesign - watercourse runs through collector line RoW for 1200 m. Move to east.	Fish habitat based on connectivity
WCL-876c	342348	5314378	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	3	Coarse	Low	Trees	Outlet of Wedding Pond into Big Brook. Two collector lines span this location.	Fish habitat based on connectivity
WCL-877	342894	5315611	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Drainage channel	1	Riffle/run	1	Coarse	Moderate	Trees	Headwater	Fish habitat based on connectivity
WCL-878	342902	5315648	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	2	Mixed	Low	Shrubs	Drains pool in wetland	Fish habitat based on connectivity
WCL-879	342994	5316353	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs	Located on sub-watershed divide	Fish habitat based on connectivity
WCL-880	342203	5317901	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Big Brook System	Fish habitat based on connectivity
WCL-881	341173	5318336	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Two collector lines span this location	Fish habitat based on connectivity
WCL-882	341312	5318291	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Two collector lines span this location	Fish habitat based on connectivity
WCL-883	340702	5318407	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Drainage Channel	1	erland Draina	1	Fines	Low	Wetland	Big Brook System	Unlikely - overland drainage
WCL-884	340596	5318238	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Big Brook System	Fish habitat based on connectivity
WCL-885	339115	5316405	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	3	Glide	2	Fines	Low	Wetland	Brooms Brook system	Fish habitat based on connectivity
WCL-886	339132	5316429	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCL-887a	337693	5315402	WSC-315	Unmapped	Desktop	-	Waterbody	Waterbody visible	0	Bog Hole	37	Fines	Low	Shrubs	-	Unlikely based on lack of connectivity
WCL-887b	337655	5315367	WSC-315	Unmapped	Desktop	-	Waterbody	Waterbody visible	0	Bog Hole	17	Fines	Low	Shrubs	-	Unlikely based on lack of connectivity
WCL-888	336941	5314524	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	4	Riffle/run	10	Coarse	Moderate	Shrubs	-	Fish habitat based on connectivity
WCL-891	335416	5311382	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Fines	Low	Shrubs	Connected to Brooms Brook	Fish habitat based on connectivity
WCL-892	341107	5313942	WSC-315	Mapped	Desktop	Unnamed Triubutary to Ryans Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Ryans Brook system	Fish habitat based on connectivity
WCL-893	341247	5313745	WSC-315	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	1	Bog Hole	10	Fines	Low	Wetland	Ryans Brook system	Unlikely - based on no connectivity
WCL-910	336314	5312788	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCL-911	336223	5312651	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCL-912	336261	5312711	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCL-915	336215	5312637	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	-	Fish habitat based on connectivity
WCL-916	338075	5315989	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Low	Wetland	Appears to dissipate through bog	Unlikely - overland drainage
WCL-917	337891	5314191	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	High	Trees	Headwater that flows down steep slope below crossing	Unlikely - based on no connectivity

Table E.6. Desktop Analysis of Watercourse/Waterbody Crossings Associated With Wind Turbines for the Codroy Wind Farm

Crossing Type	Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
Turbine Footprint	WCF-1017	346903	5322463	WSC-315	Unmapped	Desktop	Unnamed Tributary to Mainland Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Need to confirm not fish habitat in the field. Footprint on mapped watercourse.	Unlikely - overland drainage
Turbine Footprint	WCF-1018	345395	5318527	WSC-315	Unmapped	Desktop	Unnamed Tributary	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Need to confirm if fish habitat in the field. Footprint on potential watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1019	344347	5318237	WSC-315	Mapped	Desktop	Tributary to Grand Codroy River	Watercourse	Watercourse visible	1	Glide	1	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field. Footprint on mapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1020	365678	5325164	WSC-312	Mapped	Desktop	Tributary to Grand Codroy River	Watercourse	Watercourse visible	1	Glide	1	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field. Footprint on mapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1021	348089	5321155	WSC-315	Unmapped	Desktop	Unnamed	Watercourse	Watercourse visible	0	Glide	1	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field. Footprint on unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1022	348118	5321137	WSC-315	Unmapped	Desktop	Unnamed	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field. Footprint on potential watercourse.	Unlikely - overland drainage
Turbine Footprint	WCF-1023	342813	5316462	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs	Need to confirm if fish habitat in the field. Footprint on mapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1024	342488	5315880	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Low	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1025	342488	5315881	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1026	340978	5319220	WSC-315	Unmapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1027	337105	5314770	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1028	337087	5314824	WSC-315	Unmapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1029	337277	5315470	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	0	Glide	1	Fines	Moderate	Wetland	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity
Turbine Footprint	WCF-1030	335480	5311100	WSC-315	Mapped	Desktop	Unnamed Tributary to Brooms Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Need to confirm if fish habitat in the field. Footprint on potentially mapped watercourse (not as mapped).	Fish habitat based on connectivity
Turbine Footprint	WCF-1033	342828	5316452	WSC-315	Mapped	Desktop	Unnamed Tributary to Big Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Moderate	Shrubs	Need to confirm if fish habitat in the field. Footprint on potentially unmapped watercourse.	Fish habitat based on connectivity

Table E.7. Desktop Analysis of Watercourse/Waterbody Transmission Line Crossings Associated With the Project Nujio'Qonik GH2 Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCT-500	352219	5382838	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	3	Riffle/run	2	Coarse	Moderate	Trees	May be intermittent in low flow conditions	Fish habitat based on connectivity
WCT-501a	352722	5382782	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	6	Coarse	Low	Trees	Old logging north of brook	Fish habitat based on connectivity
WCT-501b	352642	5382790	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Steady	18	Mixed	Low	Trees	Large pool	Fish habitat based on connectivity
WCT-501c	352511	5382806	WSC-124	Mapped	Desktop	Harry Brook	Watercourse	Watercourse visible	4	Riffle/run	8	Coarse	Low	Trees	Old cut line near brook	Fish habitat based on connectivity
WCT-502	352744	5382780	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Old cut line near brook	Fish habitat based on connectivity
WCT-503	353072	5382740	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCT-504	353316	5382613	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Channelization is more pronounced upstream	Fish habitat based on connectivity
WCT-505	353705	5382119	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-506	353733	5382084	WSC-124	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-507	353746	5382069	WSC-124	Mapped	Desktop	Tributary to Harry Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Watercourse originates in the footprint of an existing mine	Fish habitat based on connectivity
WCT-508	354833	5379043	WSC-150	Mapped	Desktop	Three Ponds Pond	Waterbody	Waterbody visible	na	Pond	26	Fines	Low	Shrubs	Adjacent to large pond.	Fish habitat based on connectivity
WCT-509	355113	5377825	WSC-151	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	1	Overland Drainage	2	Coarse	Moderate	Trees	Flooded skidder trail/logging road. Flooding in clearcut. Channel is visible upstream but dissipates into forest below RoW.	Unlikely - overland drainage
WCT-510	357183	5377581	WSC-152	Mapped	Desktop	South Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Skidder trail marks	Unlikely - overland drainage
WCT-511	357354	5377563	WSC-152	Mapped	Desktop	South Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Crosses existing clearcut	Fish habitat based on connectivity
WCT-512	365999	5378084	WSC-133	Mapped	Desktop	-	-	No Visible Channel	-	-	-	-	-	-	-	No
WCT-513	368418	5379112	WSC-122	Mapped	Desktop	Jack of Clubs Brook	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Drains Unnamed pond into ocean.	Fish habitat based on connectivity
WCT-514	376602	5380829	WSC-223	Mapped	Desktop	Tributary to Romaine's Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Small tributary to large brook	Fish habitat based on connectivity
WCT-515	376781	5380809	WSC-223	Mapped	Desktop	Tributary to Romaine's Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Small tributary to large brook	Fish habitat based on connectivity
WCT-516	377132	5380682	WSC-223	Mapped	Desktop	Tributary to Romaine's Brook	Watercourse	Watercourse visible	3	Riffle/run	2	Coarse	Low	Trees	Located near quarry	Fish habitat based on connectivity
WCT-517	377553	5380484	WSC-223	Mapped	Desktop	Romaine's Brook	Watercourse	Watercourse visible	4	Riffle/run	33	Coarse	Low	Trees	A little over 2km from ocean	Fish habitat based on connectivity
WCT-518	380312	5380025	WSC-237	Mapped	Desktop	Tributary to Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Connected to several Unnamed ponds	Fish habitat based on connectivity
WCT-519	381604	5379826	WSC-238	Mapped	Desktop	Gadon's Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Mixed	Low	Shrubs	Outlet of pond	Fish habitat based on connectivity
WCT-520	381824	5379789	WSC-238	Mapped	Desktop	Tributary to Gadon's Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	Cuts across clearcut after watercrossing	Fish habitat based on connectivity
WCT-521	382757	5380737	WSC-224	Mapped	Desktop	Blanche Brook	Watercourse	Watercourse visible	4	Riffle/run	51	Coarse	Low	Trees	Crosses at an island. Large gravel bar at low flows.	Fish habitat based on connectivity
WCT-522	383787	5380903	WSC-224	Mapped	Desktop	Unnamed Tributary to Blanche Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Inlet to Ned's Ponds. Flows through highway culvert downstream.	Fish habitat based on connectivity
WCT-523	383966	5380862	WSC-224	Mapped	Desktop	Unnamed Tributary to Blanche Brook	Watercourse	Watercourse visible	2	Steady	14	Fines	Low	Wetland	Inlet to Ned's Ponds	Fish habitat based on connectivity
WCT-524	383998	5380855	WSC-224	Mapped	Desktop	Unnamed Tributary to Blanche Brook	Watercourse	Watercourse visible	2	Glide	1	Fines	Low	Wetland	Inlet to Ned's Ponds	Fish habitat based on connectivity
WCT-525	384218	5380801	WSC-224	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-526	384684	5380684	WSC-224	Mapped	Desktop	Unnamed Tributary to Blanche Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Inlet to Ned's Ponds	Fish habitat based on connectivity
WCT-527	386527	5380726	WSC-224	Mapped	Desktop	Tributary to Warm Creek	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Very small inlet to pond, unlikely to be permanent but connectivity with pond suggests fish habitat	Fish habitat based on connectivity
WCT-528a	386714	5380715	WSC-224	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Between Hwy 460 and pond	Fish habitat based on connectivity
WCT-528b	386726	5380714	WSC-224	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Between Hwy 460 and pond	Fish habitat based on connectivity
WCT-528c	386803	5380709	WSC-224	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Between Hwy 460 and pond	Fish habitat based on connectivity
WCT-528d	386867	5380705	WSC-224	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Between Hwy 460 and pond	Fish habitat based on connectivity
WCT-529	387310	5380197	WSC-226	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Connected to pond just north of larger Noel's Pond	Fish habitat based on connectivity
WCT-530	387600	5380005	WSC-226	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-531	388403	5379485	WSC-226	Mapped	Desktop	Warm Creek	Watercourse	Watercourse visible	4	Glide	9	Mixed	Low	Shrubs	Just off gravel road	Fish habitat based on connectivity
WCT-532	388482	5379401	WSC-226	Mapped	Desktop	Unnamed Tributary to Warm Creek	Watercourse	Watercourse visible	2	Glide	1	Fines	Low	Wetland	Channelises through wetland, connected to pond	Fish habitat based on connectivity

Table E.7. Desktop Analysis of Watercourse/Waterbody Transmission Line Crossings Associated With the Project Nujio'Qonik GH2 Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCT-533	388530	5379258	WSC-226	Mapped	Desktop	Unnamed Tributary to Warm Creek	Watercourse	Watercourse visible	2	Glide	3	Fines	Low	Wetland/Shrubs	Difficult to tell if actual channelization or just edge of flooded wetland.	Fish habitat based on connectivity
WCT-534	388633	5378962	WSC-226	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	240	Fines	Low	Trees	Part of series of interconnected ponds that are connected to Warm Creek	Fish habitat based on connectivity
WCT-535	388678	5378422	WSC-232	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	98	Fines	Low	Trees	Part of series of interconnected pond, not clear which watercourse is connected to	Fish habitat based on connectivity
WCT-536	388626	5378255	WSC-232	Mapped	Desktop	Unnamed Tributary to Unnamed Brook	Watercourse	Watercourse visible	1	Glide	2	Fines	Low	Wetland	Connects two ponds	Fish habitat based on connectivity
WCT-537	388576	5378100	WSC-232	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	260	Fines	Low	Wetland	Flows into Unnamed Brook	Fish habitat based on connectivity
WCT-538	388457	5377720	WSC-232	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	18	Fines	Low	Wetland	Area of flooded wetland in close proximity to watercourse	Unlikely, based on lack of connectivity
WCT-539	388379	5377189	WSC-232	Mapped	Desktop	Unnamed Tributary to Unnamed Brook	Watercourse	Watercourse visible	2	Glide	4	Fines	Low	Shrubs	Connects (Gull Mine) Pond to Ocean	Fish habitat based on connectivity
WCT-540	388460	5376916	WSC-232	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	89	Fines	Low	Shrubs	Flows into Unnamed Brook	Fish habitat based on connectivity
WCT-541	389625	5376218	WSC-231	Mapped	Desktop	Unnamed Inlet to Gull Pond	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Inlet to Gull (Mine) Pond	Unlikely - overland drainage
WCT-542	390106	5376239	WSC-231	Mapped	Desktop	Inlet to Oxback Pond	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	-	Fish habitat based on connectivity
WCT-543	390773	5376304	WSC-231	Mapped	Desktop	Unnamed Inlet to Oxback Pond	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Cleared	Unlikely - overland drainage
WCT-544	392529	5375927	-	Mapped	Desktop	Whites Brook	Watercourse	Watercourse visible	3	Riffle/run	2	Coarse	Low	Trees	Just north of clearcut/transmission line	Fish habitat based on connectivity
WCT-545	392730	5375837	-	Mapped	Desktop	Unnamed Tributary to Whites Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Just north of clearcut/transmission line	Unlikely - overland drainage
WCT-546	393112	5375788	-	Mapped	Desktop	Unnamed Tributary to Whites Brook	Watercourse	Watercourse visible	3	Riffle/run	2	Mixed	Low	Shrubs	Edge of wetland	Fish habitat based on connectivity
WCT-547	393541	5375850	-	Mapped	Desktop	Unnamed Tributary to Pelleys Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Disconnected channelization through wetland, not likely connected	Unlikely - overland drainage
WCT-548	394050	5375927	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-549	394362	5375984	-	Mapped	Desktop	Unnamed Tributary to Pelleys Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Mixed	Low	Shrubs	Edge of wetland	Fish habitat based on connectivity
WCT-550	394764	5376007	-	Mapped	Desktop	Unnamed Tributary to Pelleys Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Fines	Low	Wetland	Disconnected channelization through wetland, not likely connected	Unlikely - overland drainage
WCT-551	395343	5375913	-	Mapped	Desktop	Unnamed Tributary to Harrys River	Watercourse	Watercourse visible	1	Riffle/run	5	Coarse	Low	Trees	Braid off main channel	Fish habitat based on connectivity
WCT-552	395456	5375874	-	Mapped	Desktop	Unnamed Tributary to Harrys River	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Braid off main channel	Fish habitat based on connectivity
WCT-553	395552	5375824	-	Mapped	Desktop	Harrys River	Watercourse	Watercourse visible	5	Riffle/run	51	Coarse	Low	Trees	main channel	Fish habitat based on connectivity
WCT-554	395904	5375549	-	Mapped	Desktop	Unnamed Tributary to Bras Mort Brook	Watercourse	Drainage channel	1	Overland Drainage	22	Fines	Low	Wetland	Small pond, appears to dissipate through wetland	Unlikely - based on no connectivity
WCT-555	395945	5375465	-	Mapped	Desktop	Bras Mort Brook	Watercourse	Watercourse visible	4	Riffle/run	15	Fines	Low	Shrubs	Main branch of tributary	Fish habitat based on connectivity
WCT-556	395970	5375411	-	Mapped	Desktop	Unnamed Tributary to Bras Mort Brook	Watercourse	Watercourse visible	1	Steady	23	Mixed	Low	Trees	Side channel of tributary that is flooded	Fish habitat based on connectivity
WCT-557	400274	5375814	-	Mapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Some channelization upstream in existing RoW	Unlikely - overland drainage
WCT-558	401856	5376233	-	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Mixed	Low	Shrubs	Disconnected channelization through wetland, not likely connected	Unlikely - overland drainage
WCT-559	402183	5376187	-	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	2	Overland Drainage	2	Mixed	Low	Shrubs	Disconnected channelization through wetland, not likely connected	Unlikely - overland drainage
WCT-560	402505	5376146	-	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	1	erland Drain	1	Mixed	Low	Shrubs	Channelized upstream and downstream of crossing	Unlikely - overland drainage
WCT-561	404770	5376127	-	Mapped	Desktop	Tributary to Unnamed Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Slightly west of where mapped.	Fish habitat based on connectivity
WCT-562	404912	5376033	-	Mapped	Desktop	Unnamed Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	Channelized through clearcut to north	Fish habitat based on connectivity
WCT-563a	405404	5375728	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563b	405598	5375627	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563c	405615	5375630	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563d	405692	5375648	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity

Table E.7. Desktop Analysis of Watercourse/Waterbody Transmission Line Crossings Associated With the Project Nujio'Qonik GH2 Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCT-563e	405753	5375661	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563f	405827	5375678	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563g	405900	5375694	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-563h	405947	5375633	-	Mapped	Desktop	Wheeler Brook	Watercourse	Watercourse visible	4	Riffle/run	3	Coarse	Low	Trees	Main channel, drains large wetland	Fish habitat based on connectivity
WCT-564	405975	5374083	-	Mapped	Desktop	Southwest Brook	Watercourse	Watercourse visible	3	Riffle/run	224	Coarse	Low	Trees	Delta. May be estuarine	Fish habitat based on connectivity
WCT-565	405821	5373597	-	Mapped	Desktop	Unnamed Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Small overland drainage channel connected to flooded wetland	Unlikely - overland drainage
WCT-566	404277	5371736	-	Mapped	Desktop	Tributary to Little River	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Drains wetland, headwaters of brook	Fish habitat based on connectivity
WCT-567	403452	5371230	-	Mapped	Desktop	Tributary to Little River	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Headwaters of brook	Unlikely - based on no connectivity
WCT-568	402124	5370413	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	No channel in existing RoW	No
WCT-569	400533	5369437	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Channelizes downstream of RoW	No
WCT-570	398642	5368274	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-571	398567	5368233	-	Unmapped	Desktop	Unnamed Inlet to Unnamed Pond	Watercourse	Watercourse visible	0	Riffle/run	1	Mixed	Low	Shrubs	Inlet through wetland to pond/ flooded wetland	Fish habitat based on connectivity
WCT-572	398474	5368176	-	Mapped	Desktop	Unnamed Inlet to Unnamed Pondd	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Inlet through wetland to pond/ flooded wetland	Fish habitat based on connectivity
WCT-573	397510	5367585	-	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	280	Fines	Low	Shrubs	No obvious outlet, relatively large shallow pond	Unlikely - based on no connectivity
WCT-574	396357	5366880	-	Mapped	Desktop	Barachois Brook	Watercourse	Watercourse visible	4	Riffle/run	56	Coarse	Low	Trees	Just northwest of TCH	Fish habitat based on connectivity
WCT-575a	396034	5366670	-	Mapped	Desktop	Unnamed Tributary (Oxbow) to Barachois Brook	Watercourse	Watercourse visible	1	Steady	31	Mixed	Low	Shrubs	Old oxbow, now flooded wetland	Fish habitat based on connectivity
WCT-575b	395887	5366585	-	Mapped	Desktop	Unnamed Tributary (Oxbow) to Barachois Brook	Watercourse	Watercourse visible	1	Steady	48	Mixed	Low	Shrubs	Old oxbow, now flooded wetland	Fish habitat based on connectivity
WCT-576	395441	5366311	-	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	109	Fines	Low	Shrubs	Does not appear connected	Unlikely - based on no connectivity
WCT-577	394262	5365589	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-578	392272	5363339	-	Mapped	Desktop	Unnamed Tributary to Dribble Brook	Watercourse	Watercourse visible	2	Glide	1	Fines	Low	Shrubs	Small tributary off main channel	Fish habitat based on connectivity
WCT-579	392182	5363195	-	Mapped	Desktop	Unnamed Tributary to Dribble Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Small tributary off main channel	Fish habitat based on connectivity
WCT-580	392070	5363014	-	Unmapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	Headwater of tributary assocaited with bog hole	No
WCT-581	391541	5362194	-	Mapped	Desktop	Dribble Brook	Watercourse	Watercourse visible	3	Riffle/run	11	Coarse	Low	Trees	Southwest of Steel Mountain Rd	Fish habitat based on connectivity
WCT-582	390570	5360649	-	Mapped	Desktop	Tributary to Flat Bay Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Tributary skirts wetland	Fish habitat based on connectivity
WCT-583	390162	5360017	-	Mapped	Desktop	Flat Bay Brook	Watercourse	Watercourse visible	5	Riffle/run	51	Coarse	Low	Trees	Main channel	Fish habitat based on connectivity
WCT-584	389976	5359710	-	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Bog Hole	112	Fines	Low	Shrubs	Bog Hole. No connectivity.	Unlikely - based on no connectivity
WCT-585	388302	5357070	-	Mapped	Desktop	Unnamed Tributary to Middle Brook	Watercourse	Watercourse visible	4	Riffle/run	7	Coarse	Low	Trees	West of clearcut and TCH	Fish habitat based on connectivity
WCT-586	387952	5356505	-	Mapped	Desktop	Unnamed Tributary to Middle Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	West of clearcut and TCH	Fish habitat based on connectivity
WCT-587	387536	5355853	-	Mapped	Desktop	Unnamed Tributary to Middle Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	West of clearcut and TCH	Fish habitat based on connectivity
WCT-588	387417	5355682	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-589	386761	5354639	-	Mapped	Desktop	Unnamed Tributary to Middle Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	West of clearcut and TCH	Fish habitat based on connectivity
WCT-590	385355	5352688	-	Mapped	Desktop	Unnamed Tributary to Barry Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Fish habitat based on connectivity
WCT-591	382130	5352134	-	Mapped	Desktop	Unnamed Tributary to Barry Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Mixed	Low	Shrubs	North of clearcut and TCH	Fish habitat based on connectivity
WCT-592	380251	5351227	-	Mapped	Desktop	Fischells Brook	Watercourse	Watercourse visible	5	Riffle/run	92	Coarse	Low	Trees	Upstream of TCH and braided part of channel	Fish habitat based on connectivity
WCT-593	379990	5350938	-	Mapped	Desktop	Unnamed Tributary to Fischells Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-594	379516	5350428	-	Mapped	Desktop	Unnamed Tributary to Fischells Brook	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Upstream of TCH	Unlikely - based on no connectivity
WCT-595	379361	5350262	-	Mapped	Desktop	Unnamed Tributary to Fischells Dribble	Watercourse	Watercourse visible	1	Riffle/run	1	Mixed	Low	Shrubs	Braided through wetland just downstream of clearcut, but clearly channelized US and DS of the crossing	Fish habitat based on connectivity
WCT-596	379072	5349952	-	Mapped	Desktop	Fischells Dribble	Watercourse	Watercourse visible	3	Riffle/run	13	Coarse	Low	Trees	Upstream of TCH. Flows into Fischells Brook	Fish habitat based on connectivity

Table E.7. Desktop Analysis of Watercourse/Waterbody Transmission Line Crossings Associated With the Project Nujio'Qonik GH2 Wind Farm

Watercourse	Easting (UTM 21)	Northing (UTM 21)	Watershed	Mapping	Survey Type	Name	Source	Status	Stream Order	Habitat Type	Estimated Width (m)	Predicted Dominant Substrate	Slope	Riparian Vegetation	Relevant Features	Fish Habitat?
WCT-597	377667	5349000	-	Mapped	Desktop	Unnamed Tributary to Rattling Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Downstream of TCH	Fish habitat based on connectivity
WCT-598	377137	5348581	-	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	89	Mixed	Low	Trees	Downstream of TCH, connected to tributary to Rattling Brook	Fish habitat based on connectivity
WCT-599	376912	5348402	-	Mapped	Desktop	Unnamed Tributary to Rattling Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Mixed	Low	Shrubs	Downstream of TCH	Fish habitat based on connectivity
WCT-600	373054	5344288	-	Mapped	Desktop	Robinsons River	Watercourse	Watercourse visible	5	Riffle/run	30	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-601	372320	5343693	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-602	370518	5342259	-	Mapped	Desktop	Middle Barachois River	Watercourse	Watercourse visible	4	Riffle/run	22	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-603	370036	5341866	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-604	369947	5341792	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-605	369369	5341333	-	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-606	368959	5341001	-	Mapped	Desktop	Unnamed Tributary to Middle Barachois River	Watercourse	Watercourse visible	1	Riffle/run	2	Mixed	Low	Shrubs	Upstream of TCH	Fish habitat based on connectivity
WCT-607	368715	5340802	-	Mapped	Desktop	Unnamed Tributary to Middle Barachois River	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-608	368376	5339149	-	Mapped	Desktop	Unnamed Tributary to Crabbe's River	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Upstream of TCH, Outlet of Mitchell's Pond	Fish habitat based on connectivity
WCT-609	368415	5338326	-	Mapped	Desktop	Little Crabbe's River	Watercourse	Watercourse visible	3	Riffle/run	7	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-610	368474	5337054	-	Mapped	Desktop	Crabbe's River	Watercourse	Watercourse visible	5	Riffle/run	90	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-611	368130	5332179	WSC-312	Mapped	Desktop	Unnamed tributary to Highlands River	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-612	368009	5331441	WSC-312	Mapped	Desktop	Unnamed tributary to Highlands River	Watercourse	Watercourse visible	2	Riffle/run	3	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-613	368005	5331410	WSC-312	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-614	367719	5329613	WSC-312	Mapped	Desktop	Highlands River	Watercourse	Watercourse visible	4	Riffle/run	48	Coarse	Low	Trees	Large braid with island between two channels	Fish habitat based on connectivity
WCT-615	367442	5327875	WSC-312	Mapped	Desktop	Unnamed tributary to Highlands River	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Upstream of TCH	Fish habitat based on connectivity
WCT-616	366204	5327456	WSC-312	Unmapped	Desktop	Unnamed brook/ wetland	Watercourse	Drainage channel	0	Overland Drainage	1	Fines	Low	Shrubs	Small channelization in wetland connected to small bog hole	Unlikely - overland drainage
WCT-617	364953	5327297	WSC-312	Mapped	Desktop	Unnamed Pond	Waterbody	Waterbody visible	na	Pond	16	Fines	Low	Shrubs	Connected to Bald Mountain Brook	Fish habitat based on connectivity
WCT-618	361085	5326231	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Connected to brook upstream of Codroy Pond	Fish habitat based on connectivity
WCT-619	358160	5324659	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	3	Riffle/run	3	Coarse	Low	Trees	Connected to brook just downstream of Codroy Pond	Fish habitat based on connectivity
WCT-620	357905	5324521	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	2	Coarse	Low	Trees	Connected to brook just downstream of Codroy Pond	Fish habitat based on connectivity
WCT-621	356932	5323200	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Just downstream of TCH	Fish habitat based on connectivity
WCT-622	356745	5322917	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	2	Riffle/run	1	Coarse	Low	Trees	Just downstream of TCH	Fish habitat based on connectivity
WCT-623	356290	5321616	WSC-315	Mapped	Desktop	-	Watercourse	No Visible Channel	-	-	-	-	-	-	-	No
WCT-624	356250	5321417	WSC-315	Mapped	Desktop	Unnamed Tributary to Crooked Brook	Watercourse	Watercourse visible	1	Glide	1	Fines	Low	Wetland	Just downstream of TCH	Fish habitat based on connectivity
WCT-625	353898	5320452	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	3	Riffle/run	2	Coarse	Low	Trees	Just downstream of TCH	Fish habitat based on connectivity
WCT-626	351988	5321261	WSC-315	Mapped	Desktop	Unnamed Tributary to North Branch Grand Codroy	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Moderate	Trees	-	Fish habitat based on connectivity
WCT-627	354805	5378630	WSC-150	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCT-628	356390	5377680	WSC-152	Unmapped	Desktop	-	Watercourse	No Visible Channel	0	-	-	-	-	Shrubs	-	No
WCT-629	369731	5380195	WSC-179	Mapped	Desktop	-	Watercourse	Drainage channel	1	Overland Drainage	1	Coarse	Low	Trees	Drains through quarry to ocean	No
WCT-630	370603	5379886	WSC-155	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Flows into ocean	Yes
WCT-631	371239	5380002	-	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	-	Yes
WCT-632	371516	5379998	-	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Near ocean	Yes
WCT-633	373957	5380210	-	Mapped	Desktop	Unnamed Tributary to Atlantic Ocean	Watercourse	Watercourse visible	1	Riffle/run	1	Coarse	Low	Trees	Adjacent to road	Yes

Appendix F

Land and Resource Use Responses

PROJECT NUJIO’QONIK
Aquatic Environment Baseline Study
August 2023

Appendix F Land and Resource Use Responses

Marine Harvesting in or Around Port au Port Bay

Q56 Marine Fish and/or Aquatic Species harvesting in or around the Port au Port Bay

Fifty-six participants skipped Q56, and 459 participants provided a response. Of the 459 participants, approximately 34.9% (n=160) reported that they, or a member of their family, catch marine fish and/or aquatic species in or around the Port au Port Bay. Approximately 65.1% (n=299) indicated they did not catch marine fish and/or aquatic species in this area.

Q57 Purpose of marine fish and/or aquatic species harvesting in and around the Port au Port Bay

Q57 allowed participants to identify one or more of the purposes for harvesting marine fish and/or aquatic species. Recreation and/or food was identified as the most common purpose for harvesting marine fish and/or aquatic species in and around the Port au Port Bay (83.3%; n=130). Traditional and/or cultural purposes was identified as the second most common purpose for harvesting marine fish and/or aquatic species (46.8%; n=73). Traditional/cultural purposes for harvesting marine fish and/or aquatic species would include use for food, bait, ceremonies, and other purposes.

- Approximately 26.3% (n=41) indicated they harvest for commercial purposes, and 3.9% (n=6) indicated they harvest marine fish and/or aquatic species for “other” purposes. However, the participants that selected “other” did not provide new purposes for harvesting marine fish and/or aquatic species. Open-ended responses received for Q57 include “work”, “do not apply”, “food is a necessity”, “food only”, “fisherperson”, and “food to augment household budget”. Except for the “do not apply” response, the other responses can be categorized as either “food/recreation” or “commercial” purposes. These open-ended responses indicated that marine fish and/or aquatic species are an important and economically viable food source for some of the participants.

Q58 Marine fish and/or aquatic species harvested in and around the Port au Port Bay

- 58 allowed participants to identify one or more marine fish and/or aquatic species that they, or a member of their family, catch in and around the Port au Port Bay. The most harvested marine fish and/or aquatic species in and around the Port au Port Bay identified by the participants include Atlantic cod (87.2%; n=136), capelin (69.9%; n=109), mackerel (67.3%; n=105), lobster (59%; n=92), halibut (55.1%; n=86), mussels (49.4%; n=77), herring (44.9%; n=70), snow crab (37.2%; n=58), and scallop (33.3%; n=52).
- Other species harvested by 22% or less of the participants (in order of frequency) include flounder, haddock, seal, turbot, lumpfish, skate, redfish, pollock, hake, hagfish, swordfish, and monkfish.
- Approximately 4.5% (n=7) reported harvesting “other” marine fish and/or aquatic species not listed. Species identified in the “other” category include sea-trout (n=1), squid (n=1), herring (n=2; was included in the list), and salmon (n=1). Participants also shared the following responses: “what ever fish is in season”, “illegal to dig for mussels on west bay beach”, and “do not apply”.

Q59 Frequency of marine fish and/or aquatic species harvesting in and around the Port au Port Bay

- Q59 allowed participants to select only one option. Approximately 34.6% (n=54) of the participants reported that they, or a member of their family, catch marine fish and/or aquatic species in and around the Port au Port Bay once or twice a week. Approximately 32.1% (n=50) reported catching marine fish and/or aquatic species daily, 13.5% (n=21) reported catching marine fish and/or aquatic species once every few months, and 9% (n=14) reported catching marine fish and/or aquatic species once a month. Approximately 9.6% (n=15) reported that they did not know the frequency at which they or a family member catch marine fish and/or aquatic species in and around the Port au Port Peninsula. Two participants (1.3%) indicated they never catch marine fish and/or aquatic species in and around the Port au Port Peninsula.

Q60 Frequency of consumption of marine fish and/or aquatic species harvested in and around the Port au Port Bay

Q60 allowed participants to select only one option. Approximately 60.3% (n=94) of the participants reported consuming marine fish and/or aquatic species harvested in or around the Port au Port Bay once or twice a week and 19.2% (n=30) reported consuming marine fish and/or aquatic species once a month. Approximately 7.1% (n=11) reported consuming marine fish and/or aquatic species once every few months and 6.4% (n=10) reported consuming marine fish and/or aquatic species daily. Approximately 5.1% (n=8) reported not knowing the frequency at which they consume marine fish and/or aquatic species, and 1.9% (n=3) reported never consuming marine fish and/or aquatic species harvested in or around the Port au Port Bay.

Marine Harvesting within Bay St. George

Q61 Marine Fish and/or Aquatic Species harvesting within Bay St. George

- Sixty-four participants skipped Q61 and 451 participants provided a response. Of the 451 participants, only 34.2% (n=154) reported that they, or a member of their family, catch marine fish and/or aquatic species within Bay St. George. Most of the participants 65.9% (n=297) indicated they did not catch marine fish and/or aquatic species in this area.

Q62 Purpose of marine fish and/or aquatic species harvesting within Bay St. George

- Q62 allowed participants to identify one or more of the purposes for harvesting marine fish and/or aquatic species. Recreation and/or food was identified as the most common purpose for harvesting marine fish and/or aquatic species within Bay St. George (92.1%; n=140). Traditional and/or cultural purposes was identified as the second most common purpose for harvesting marine fish and/or aquatic species (42.8%; n=65). Traditional/cultural purposes for harvesting marine fish and/or aquatic species would include use of for food, bait, ceremonies, and other purposes. Approximately 21.7% (n=33) indicated they harvest for commercial purposes, and 2% (n=3) indicated they harvest marine fish and/or aquatic species for "other" purposes. However, the participants that selected "other" did not provide new purposes for harvesting marine fish and/or aquatic species. Open-ended responses received for Q62 include "food only not recreational"; "food to augment my household"; and "occupation".Q63 Marine fish and/or aquatic species harvested within Bay St. George

- Q63 allowed participants to identify one or more marine fish and/or aquatic species that they, or a member of their family, catch within Bay St. George. The most harvested marine fish and/or aquatic species within Bay St. George identified by the participants include Atlantic cod (84.5%; n=136), capelin (63.8%; n=81), mackerel (53.3%; n=81), lobster (48.7%; n=74), halibut (38.8%; n=59), mussels (33.6%; 51), herring (30.9%; n=47), scallop (30.9%; n=47), and snow crab (29%; n=44).
- Other species harvested by 20% (n=30) or less of the participants (in order of frequency) include turbot, haddock, flounder, seal, redfish, lumpfish, pollock, hake, skate, plaice, hagfish, monkfish, and swordfish. Approximately 5.3% (n=8) reported harvesting "other" marine fish and/or aquatic species not listed. Species identified in the "other" category include catfish (n=1), smelt (n=1), squid (n=1) and salmon (n=1). Participants also shared the following responses: "you must come talk to our fishers"; "Some species are not caught by us but other fishermen fish it and we buy it and eat it"; and "what ever is in season".

Q64 Frequency of marine fish and/or aquatic species harvesting within Bay St. George

- Q64 allowed participants to select only one option. Approximately 37.5% (n=57) of the participants reported that they, or a member of their family, catch marine fish and/or aquatic species within Bay St. George once or twice a week and 26.3% (n=40) reported catching marine fish and/or aquatic species every day. Approximately 15.1% (n=23) reported catching marine fish and/or aquatic species once every few months, and 113.8% (n=21) reported catching marine fish and/or aquatic species once a month. Approximately 6.6% (n=10) reported they did not know the frequency at which they or a family member catch marine fish and/or aquatic species within Bay St. George. One participant (0.7%) indicated they never catch marine fish and/or aquatic species within Bay St. George.

Q65 Frequency of consumption of marine fish and/or aquatic species harvested within Bay St. George

- Q65 allowed participants to select only one option. Approximately 59.9% (n=91) of the participants reported consuming marine fish and/or aquatic species harvested within Bay St. George once or twice a week, 19.1% (n=29) reported consuming marine fish and/or aquatic species once a month, 12.5% (n=19) reported consuming marine fish and/or aquatic species once every few months, and 4% (n=6) reported consuming marine fish and/or aquatic species daily. Approximately 4% (n=6) reported not knowing the frequency at which they consume marine fish and/or aquatic species harvested within Bay St. George and 0.7%(n=1) reported never consuming marine fish and/or aquatic species harvested from this area.

Marine Harvesting Within or Near the Port of Stephenville

Q66 Marine Fish and/or Aquatic Species harvesting within or near the Port of Stephenville

- Sixty-seven participants skipped Q66, and 448 participants provided a response. Most of the participants (84.4%; n=378) indicated that they, or members of their family, do not catch marine fish and/or aquatic species within or near the Port of Stephenville. Only 15.6% (n=70) of the participants indicated that they or a member of their family catch marine fish and/or aquatic species in this area.

Q67 Purpose of marine fish and/or aquatic species harvesting within or near the Port of Stephenville

- Q67 allowed participants to identify one or more of the purposes for harvesting marine fish and/or aquatic species. Recreation and/or food was identified as the most common purpose for harvesting marine fish and/or aquatic species within or near the Port of Stephenville (88.6%; n=62). Traditional and/or cultural purposes was identified as the second most common purpose for harvesting marine fish and/or aquatic species (54.3%; n=38). Traditional/cultural purposes for harvesting marine fish and/or aquatic species would include use of for food, bait, ceremonies, and other purposes. Approximately 24.3% (n=17) indicated they harvest for commercial purposes, and 2.9% (n=2) indicated they harvest marine fish and/or aquatic species for "other" purposes. However, the participants that selected "other" did not provide new purposes for harvesting marine fish and/or aquatic species. Open-ended responses received for Q67 include "food only not recreational" and "food to augment my household".

Q68 Marine fish and/or aquatic species harvested within or near the Port of Stephenville

- Q68 allowed participants to identify one or more marine fish and/or aquatic species that they, or a member of their family, catch within or near the Port of Stephenville. The most harvested marine fish and/or aquatic species within or near the Port of Stephenville identified by the participants include Atlantic cod (84.3%; n=59), capelin (61.4%; n=43), lobster (55.7%; n=39), mackerel (54.3%; n=38), halibut (48.6%; n=34), herring (41.4%; n=29), mussels (38.6%; n=27), scallop (34.3%; n=24), snow crab (30%; n=21), and turbot (22.9%; n=16).
- Other species harvested by 16% (n=11) or less of the participants (in order of frequency) include flounder, haddock, seal, lumpfish, redfish, skate, pollock, and swordfish. Approximately 5.7% (n=4) reported harvesting "other" marine fish and/or aquatic species not listed. Species identified in the "other" category include squid (n=1) and mackerel (n=1; was included in the list). Participants also shared the following responses: "Some species are not caught here in BSG but are bought and we eat it. Only certain specifies can be fished here" and "what ever is in season". Note that BSG means Bay St. George and that this participant may have been confused about the area in question (i.e., the Port of Stephenville).

Q69 Frequency of marine fish and/or aquatic species harvesting within or near the Port of Stephenville

- Q69 allowed participants to select only one option. Approximately 50% (n=35) of the participants reported that they, or a member of their family, catch marine fish and/or aquatic species within or near the Port of Stephenville once or twice a week. Approximately 21.4% (n=15) reported catching marine fish and/or aquatic species daily, 15.7% (n=11) reported catching marine fish and/or aquatic species once every few months, and 8.6% (n=6) reported catching marine fish and/or aquatic species once a month. Approximately 4.3% (n=3) reported they did not know the frequency at which they or a family member catch marine fish and/or aquatic species within or near the Port of Stephenville.

Q70 Frequency of consumption of marine fish and/or aquatic species harvested within or near the Port of Stephenville

- Q70 allowed participants to select only one option. Approximately 61.4% (n=43) of the participants reported consuming marine fish and/or aquatic species harvested within or near the Port of Stephenville once or twice a week and 21.4% (n=15) reported consuming marine fish and/or aquatic species once a month. Approximately 7.1% (n=5) reported consuming marine fish and/or aquatic species once every few months and 5.7% (n=4) reported consuming marine fish and/or aquatic species daily. Approximately 4.3% (n=3) reported not knowing the frequency at which they consume marine fish and/or aquatic species harvested within or near the Port of Stephenville.