

## ***THE CROSSING***

ENVIRONMENTAL IMPACT ASSESSMENT

Ashburn Road

Saint John, New Brunswick

Prepared for:

Horizon Management Ltd.  
% Mr. John Wheatley  
PO Box 1289  
479 Rothesay Avenue  
Saint John, New Brunswick  
E2L 4G7





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SAINT JOHN CLYDE RIVER HALIFAX



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## EXECUTIVE SUMMARY

*The Crossing* (i.e., the Project) is a proposed mixed commercial and residential development with a 10 to 20 year build-out located on 13 land parcels along Ashburn Road in east Saint John adjacent to the Saint John Throughway / McKay Highway with a total land area of 49 ha. The development is focused on attracting travelers of NB Route 1 (e.g., commuters, commercial vehicle traffic, regional, national, and international vacationers, etc. many that would not normally enter Saint John) to the east Saint John area by being a convenient stopover. A key feature of the lands between Ashburn Road and the McKay Highway is Little Marsh Creek and its contiguous 10.5 ha wetland.

*The Crossing* is an extension of Saint John's eastern commercial corridor and the eastern regional retail centres (i.e., McAllister Place, Smart Centre / Walmart, Lancaster Mall, and East Point); however, it will be unique in terms of shape, size, design, tenant mix, and function as it is a hybrid commercial business, highway services, retail, and residential mix development. The Project will complement rather than compete with the current retail offerings in Saint John.

The Project is being planned in three Phases based on floor space:

- Phase 1, ~ 35 000 m<sup>2</sup> with highway services being the proposed anchor;
- Phase 2, ~ 35 000 m<sup>2</sup> with a retail / entertainment focus; and
- Phase 3, ~ 44 500 m<sup>2</sup> including multi-family residential.



For Saint John, *The Crossing* is a unique mixed commercial and residential development. It will create new retail formats within the City, such as lifestyle centres, that are seen in other municipal centres. *The Crossing* will be a destination unrivaled in size, architectural quality, and visibility in Atlantic Canada.

Establishing a host of new businesses and services to the community will generate both direct and indirect employment positions. In addition to significant construction employment, considerable jobs will be created at stores and services established at the site and there would be considerable spinoff benefits to other businesses in the City benefitting from increased visitor traffic to the area.

Significant new property tax revenue will be generated from the proposed Project. The construction of new mixed use buildings will result in millions of dollars being added to the City's property tax base resulting in a very significant new revenue stream for the City. The site location, proximity of existing City services, and the concentrated nature of this Project will result in low incremental capital and operational costs to service this development while producing significant new revenue for the City.

Great strides have occurred in the Project design since the initial Environmental Impact Assessment EIA application was registered on 25 November 2016. *The Crossing* has undergone two major design iterations that took into consideration comments provided by the EIA Technical Review Committee (TRC) in order to reduce or avoid impact to environmental features. Little Marsh Creek and the contiguous wetland will now be central features of the development whereby impact to those features has been minimized.

As per Schedule A, item v) (*i.e.*, all enterprises, activities, projects, structures, works, or programs affecting two hectares or more of bog, marsh, swamp, or other wetland...) of the EIA Regulation [87-83] of the New Brunswick *Clean Environment Act* [S.N.B. 1989, c. C-6.1], the Project triggers EIA review. An EIA is a planning tool used by the proponent and regulatory authorities. The purpose of an EIA is to identify and evaluate the potential impacts that the Project may have on the environment. Best-management practices are also presented to mitigate any identified potential environmental impacts. The New Brunswick Department of the Environment and Local Government (NBDELG) oversees the EIA process.

In order for the TRC to have a document that provides specific and detailed information in an organized format, Horizon Management felt it was necessary to prepare a completely revised EIA document. This document replaces the original 25 November 2016 EIA registration document and incorporates information requested from the TRC during both rounds of questions. The final Appendix of this replacement EIA document addresses the 201 TRC questions and concerns previously made regarding the Project.

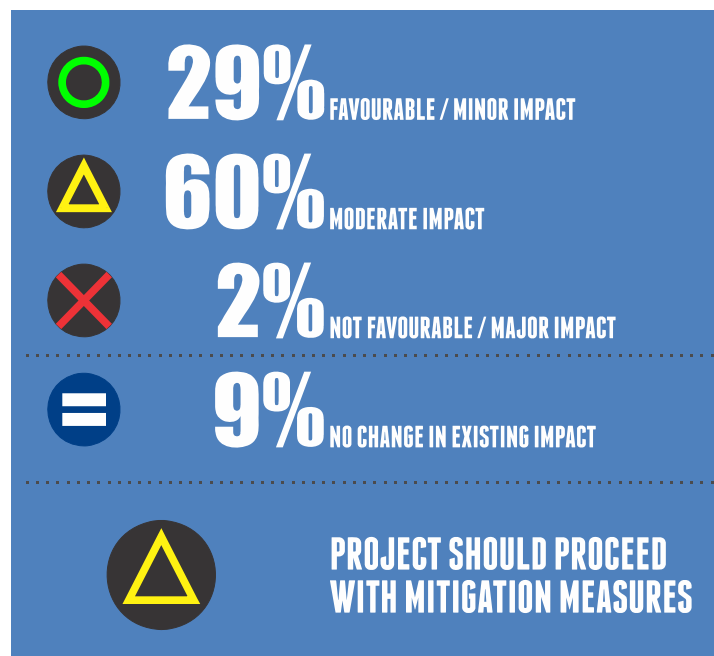
This EIA document provides a detailed Project description and a narrative on the baseline environment. Components of the existing environment that are described include the physio-chemical environment, the biological environment, and the socio-economic environment. The baseline environmental data was overlain by five Project stages (*i.e.*, environmental permitting, construction, operation and maintenance, decommissioning, and mishaps, errors, and / or unforeseen events) to recognize potential environmental interactions. Based on that process, 12 Valued Environmental Components (VECs) were identified. The VECs that were assessed in detail include:

- physio-chemical environment:
  - air quality;
  - sound emissions;
  - surface water quantity and quality; and

- groundwater quantity and quality;
- biological environment:
  - terrestrial flora and fauna; and
  - aquatic flora and fauna; and
- socio-economic environment:
  - labour and economy;
  - transportation network;
  - aesthetics;
  - land-use;
  - recreation and tourism; and
  - health and safety.

Within this EIA document, a visual impact assessment process analogous to a traffic light was used for characterizing potential environmental impacts. All told, 165 specific possible impacts were assessed. Of those, 79 % yielded either green ( $n = 48$ ) or yellow ( $n = 99$ ) lights. The three red lights were assigned to potential long-lasting impacts that could be realized to the groundwater system should a specific mishap, error, and / or unforeseen event occur (*i.e.*, severe hydrocarbon contamination). There is an extremely remote possibility of those impacts being realized considering the mitigation measures that have been identified. Therefore, those red lights are not considered Project showstoppers.

## VEC ASSESSMENT



As an ultimate overall VEC potential impact assessment (*i.e.*, based on the summation of all possible impacts for the 12 VECs), the proposed Project is expected to have moderate to little impact on the environment, especially in light of the mitigation measures developed. Therefore, **the Project should be permitted to proceed as detailed within this EIA document.**

A Project-specific Environmental Protection Plan (EPP) was developed to mitigate any identified potential impacts. The EPP dictates the importance of best-management practices that will be undertaken by all those associated with the Project to ensure environmental protection. It is a dynamic document to be used by Project personnel in the field and at the corporate level for ensuring commitments made in the EIA are implemented and monitored.

The EIA process is an open and transparent process. This is a public consultation process that ensures those individuals and / or groups that may potentially be affected by the Project are made aware of the registration, are able to obtain information on the registration, and are able to express any and / or all concerns they may have. Horizon Management held two Open Houses regarding the Project and has previously met with nearby residents and stakeholders and has responded in writing to resident concerns. The Proponent will respond to any questions and / or concerns that may arise with respect to this updated EIA document.

Comments, questions, and concerns regarding the EIA document can be forwarded to the Environmental Consultant:

Dr. Matt Alexander, *P.Geo., EP*  
Fundy Engineering & Consulting Ltd.  
27 Wellington Row  
Saint John, New Brunswick  
E2L 4S1

📞 506.635.1566  
📠 506.635.0206  
🌐 [www.fundyeng.com](http://www.fundyeng.com)  
✉ [matt.alexander@fundyeng.com](mailto:matt.alexander@fundyeng.com)

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## ACRONYMS

AAS:	Aboriginal Affairs Secretariat
Ab:	Absent
ACAP:	Atlantic Coastal Action Program
ACCDC:	Atlantic Canada Conservation Data Centre
AFW:	Amec Foster-Wheeler
AM:	Ante Meridiem
ANB:	Ambulance New Brunswick
AO:	Aesthetic Objective
ATO:	Approval To Operate
BMPs:	Best-Management Practices
%:	Care Of
CC:	Commercial Corridor
CCME:	Canadian Council of Ministers of the Environment
CDD:	Canadian Disaster Database
<i>c.f.:</i>	<i>(confer /conferatur)</i> compare
CH:	Caledonia Highlands
CLI:	Canada Land Inventory
cm:	centimeter
CMA:	Census Metropolitan Area
CN:	Canadian National
CSJ:	City of Saint John
Co.:	Corporation
CO:	Carbon monoxide
CO <sub>2</sub> :	Carbon dioxide
CO <sub>2eq</sub> :	Carbon dioxide equivalents
COSEWIC:	Committee On Status of Endangered Wildlife in Canada
dBA:	A-weighted deciBels ( <i>i.e.</i> , relative loudness)
DDT:	Dichloro-Diphenyl-Trichloroethane
DFO:	Department of Fisheries and Oceans
<i>e.g.:</i>	<i>(exempli gratia)</i> for example
ECCC:	Environment and Climate Change Canada
EIA:	Environmental Impact Assessment
<i>EP:</i>	Environmental Professional
EPP:	Environmental Protection Plan
ESA:	Environmentally Significant Area
<i>etc.:</i>	<i>(et cetera)</i> and so forth
fSARA:	federal <i>Species At Risk Act</i>
g:	gram or gravitational acceleration
GDP:	Gross Domestic Product
GHG:	GreenHouse Gases

GHGRP:	GreenHouse Gas Reporting Program
GIS:	Geographical Information System
GP:	General Partnership
H <sub>2</sub> S:	Hydrogen Sulfide
ha:	hectare
hr:	hour
HSAP:	Heritage Site Alteration Permit
HST:	Harmonized Sales Tax
<i>i.e.:</i>	<i>(id est)</i> namely / that is
ICLR:	Institute for Catastrophic Loss Reduction
ID:	IDentification
Inc.:	Incorporated
IMAC:	Interim Maximum Acceptable Concentration
IPCC:	Intergovernmental Panel on Climate Change
ISO:	International Standards Organization
JOHSC:	Joint Occupational Health and Safety Committee
kg:	kilogram
km:	kilometer
km <sup>2</sup> :	kilometers squared
kt:	kilotonne
kV:	kiloVolt
L:	Litre
L.P.:	Limited Partnership
LED:	Light Emitting Diode
LEED:	Leadership in Energy and Environmental Design
LNG:	Liquefied Natural Gas
Ltd.:	Limited
LUNA:	Labourers International Union of North America
m:	meters
m <sup>2</sup> :	square meters
m <sup>3</sup> :	cubic meters
M:	Magnitude
M <sub>FA</sub> :	Felt Area magnitude
M <sub>f</sub> (IV):	Modified Merccalli Intensity IV area
m <sub>N</sub> :	Nuttli body wave magnitude
MAC:	Maximum Acceptable Concentration
mg:	milligrams
min:	minutes
MLA:	Member of the Legislative Assembly
mm:	millimeter
MO:	MOncton

MR:	Mid-rise Residential
mya:	million years ago
<i>n</i> :	statistical value that refers to the number of observations
N:	North
<i>n.b.</i> :	( <i>nota bene</i> ) note well / take note
NAP:	Northern Appalachian Seismic Zone
NAPS:	National Air Pollution Surveillance
NB:	New Brunswick
NBCC:	National Building Code of Canada
NBDELG:	New Brunswick Department of Environment and Local Government
NBDERD:	New Brunswick Department of Energy and Resource Development
NBDNR:	New Brunswick Department of Natural Resources
NBDNRED:	New Brunswick Department of Natural Resources and Energy Development
NBDPSETL:	New Brunswick Department of Post-Secondary Education, Training, and Labour
NBDTHC:	New Brunswick Department of Tourism, Heritage, and Culture
NBDTI:	New Brunswick Department of Transportation and Infrastructure
NBEPC:	New Brunswick Electric Power Corporation
NBSR:	New Brunswick Southern Railway
NG:	No Guideline
NGO:	Non-Government Organization
NO <sub>2</sub> :	Nitrogen Oxides
NO <sub>x</sub> :	Oxides of Nitrogen
NPRI:	National Pollutant Release Inventory
NR:	No Rating
NTU:	Nephelometric Turbidity Units
O <sub>3</sub> :	Ozone
<i>OHSA</i> :	<i>Occupational Health and Safety Act</i>
<i>P.Eng.</i> :	Professional Engineer
<i>P.Geo.</i> :	Professional Geoscientist
PAC:	Planning Advisory Committee
PB:	Passamaquoddy Bay
<i>Ph.D.</i> :	Doctorate of Philosophy
PID:	Property Identifier
PM:	Particulate Matter or Post Meridiem
PM <sub>2.5</sub> :	Particulate Matter less than 2.5 microns
PM <sub>10</sub> :	Particulate Matter less than 10 microns
PNB:	Province of New Brunswick
PO:	Post Office
ppb:	parts per billion
PPE:	Personal Protective Equipment
ppm:	parts per million

Pr:	Present
pSARA:	provincial <i>Species At Risk Act</i>
PSC:	Public Safety Canada
RCP:	Regional Concentration Pathway
SARA:	<i>Species At Risk Act</i>
SCS:	Soil Conservation Service
sic:	quoted as is
SJPF:	Saint John Police Force
Std. Dev.:	Standard Deviation
SO <sub>2</sub> :	Sulfur Dioxide
sq. ft.:	square foot
t:	tonnes
™:	Trade Mark
TRC:	Technical Review Committee
TSS:	Total Suspended Solids
µg:	micrograms
µS:	microSiemens
VEC:	Valued Environmental Component
VOCs:	Volatile Organic Compounds
yr:	year
YSJ:	Saint John Airport
W:	West
WATCM:	Work Area Traffic Control Manual
WAWA:	Watercourse And Wetland Alteration
WMO:	World Meteorological Organization
°:	degrees
°C:	degrees Celsius
′:	minutes
″:	seconds
\$:	dollars
%:	percent
®:	registered
>:	greater than
≥:	greater than or equal to
<:	less than
≤:	less than or equal to
~:	approximately
±:	plus or minus



## 1.0 PROPONENT

### 1.1 PROPONENT NAME

The proponent for this Project is Horizon Management Ltd. (*i.e.*, Horizon Management; Horizon).

### 1.2 PROPONENT ADDRESS

PO Box 1289  
479 Rothesay Avenue  
Saint John, New Brunswick  
E2L 4G7

### 1.3 PROPONENT CONTACT

Mr. John Wheatley, *P.Eng.*  
Business Development  
Horizon Management Ltd.  
PO Box 1289  
479 Rothesay Avenue  
Saint John, New Brunswick  
E2L 4G7

① 506.634.5717

✉ [jwheatley@northrupgroup.ca](mailto:jwheatley@northrupgroup.ca)

### 1.4 PRINCIPAL CONTACT FOR PURPOSES OF ENVIRONMENTAL IMPACT ASSESSMENT

Fundy Engineering & Consulting Ltd. (Fundy Engineering) prepared this Environmental Impact Assessment (EIA) Registration Document. The principal contact at Fundy Engineering with respect to this EIA is:

Dr. Matt Alexander, *P.Geo., EP*  
Fundy Engineering & Consulting Ltd.  
27 Wellington Row  
Saint John, New Brunswick  
E2L 4S1

① 506.635.1566

✉ [matt.alexander@fundyeng.com](mailto:matt.alexander@fundyeng.com)

### 1.5 PROPERTY OWNERSHIP

The proposed Project will occur along Ashburn Road in east Saint John, New Brunswick (Figure 1). The Project will incorporate 14 land parcels with an overall area of 66.31 hectares (ha); 13 of the properties, with a total area of 49.02 ha are located along Ashburn Road while one property, with an area of 17.29 ha is located along Rothesay Avenue. All of the properties are owned by the Proponent and its affiliates. A summary

of the properties and their sizes is provided in Table 1. New Brunswick Geomatics Information Centre database Property IDentification (PID) reports are included in Appendix I. There is a 69 kiloVolt (kV) transmission line owned by the New Brunswick Electric Power Corporation (NBEP) that traverses some of the properties. An 18.3 m wide right-of-way agreement exists between the property owner and the NBEP for that transmission line.

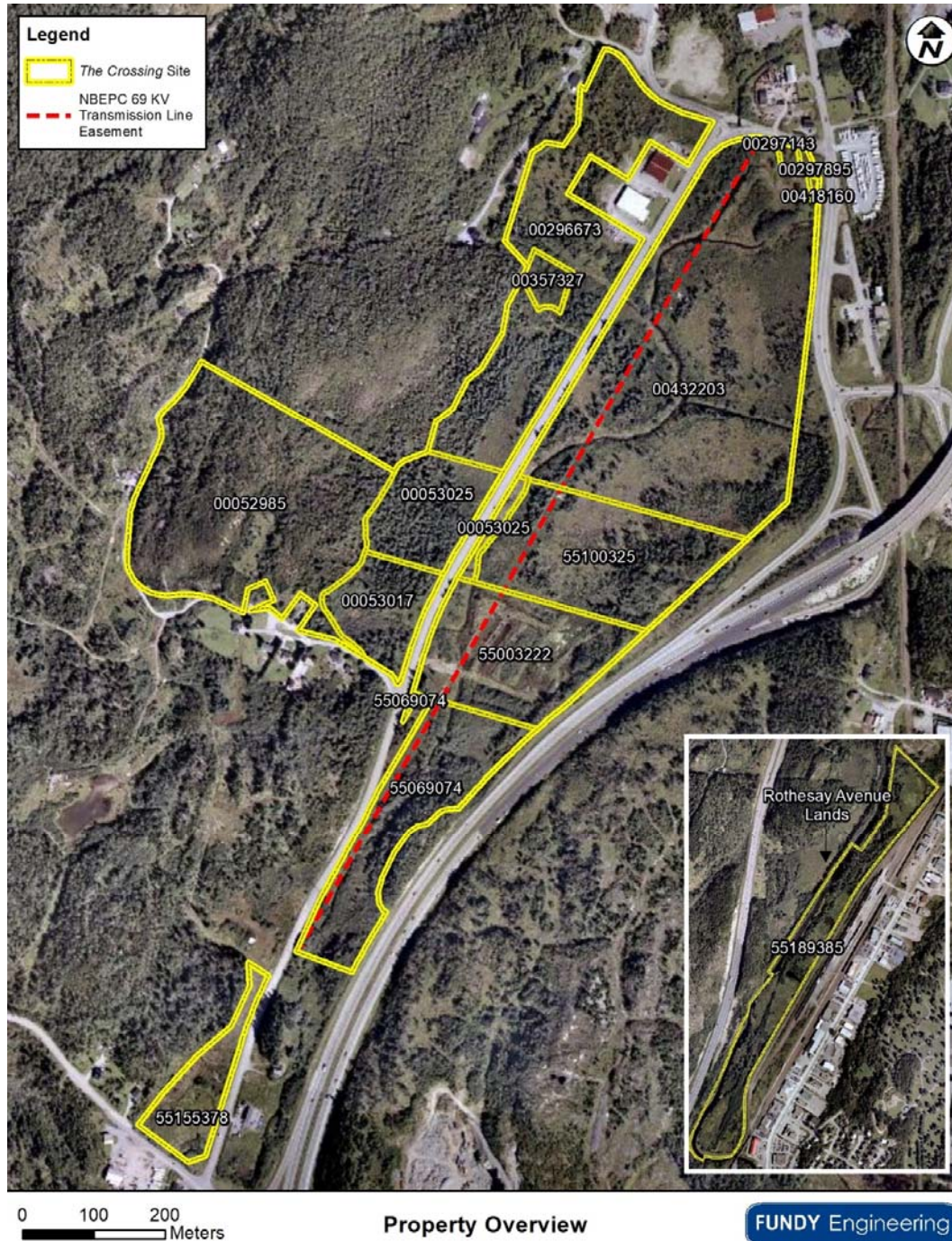


Figure 1. Aerial photograph, circa 2004, showing the lands in east Saint John, New Brunswick proposed for development as *The Crossing*.

Table 1. List of properties in east Saint John, New Brunswick proposed for development as *The Crossing*.

PID	Owner	Size (ha)	Description	Zoning	Proposed Use
00296673	Ashburn Holdings Inc.	6.87	Vacant land	Corridor commercial	Commercial
00357327	Ashburn Holdings Inc.	0.37	Vacant lot	Corridor commercial	Commercial
00053025	Ashburn Holdings Inc.	2.34	Vacant land	Corridor commercial	Residential / Commercial
00053017	Clear View Mobile Homes Ltd.	1.71	Vacant lot	Mid-rise residential	Residential
00052985	Ashburn Holdings Inc.	8.73	Vacant land	Mid-rise residential	Residential
55155378	Ashburn Holdings Inc.	1.45	Vacant land	Corridor commercial	Commercial
55069074	Ashburn Holdings Inc.	3.77	Vacant land	Corridor commercial	Commercial
55003222	Clear View Mobile Homes Ltd.	4.01	Vacant land	Corridor commercial	Commercial
55100325	Ashburn Holdings Inc.	4.6	Vacant land	Corridor commercial	Commercial
00432203	Ashburn Holdings Inc.	14.99	Vacant land	Corridor commercial	Commercial
00418160	Ashburn Holdings Inc.	0.04	Vacant lot	Corridor commercial	Commercial
00297895	Ashburn Holdings Inc.	0.06	Vacant land	Corridor commercial	Commercial
00297143	Ashburn Holdings Inc.	0.08	Vacant lot	Corridor commercial	Commercial
55189385*	Ashburn Holdings Inc.	17.29	Vacant land	Park	Compensatory flood storage

## NOTES:

\*If required, this property is proposed for the construction of compensatory storage ponds connected directly to Marsh Creek. In the original EIA document, this property was identified as being an Eco-Park.

## 2.0 PROJECT DESCRIPTION

### 2.1 PROJECT NAME

For the purposes of this EIA, the Project is referred to as:

#### *THE CROSSING*

### 2.2 PROJECT OVERVIEW

*The Crossing* is a proposed mixed commercial and residential development with a 10 to 20 year build-out located along Ashburn Road in east Saint John adjacent to the Saint John Throughway / McKay Highway (i.e., NB Route 1; Figure 2). Although the overall development mix will depend on market conditions, the proposed mixture at full build-out is summarized in Table 2. The development is focused on attracting travelers of NB Route 1 (e.g., commuters, commercial vehicle traffic, regional, national, and international vacationers, etc. many that would not normally enter Saint John) to the east Saint John area by being a convenient stopover. A key feature of the lands between Ashburn Road and the McKay Highway is Little Marsh Creek and its contiguous wetland. Little Marsh Creek and its contiguous wetland will remain largely untouched and become central features of the development.



Figure 2. Rendering showing *The Crossing* in east Saint John, New Brunswick and what it may look like at full build-out.

Table 2. Summary of the development mix proposed for *The Crossing* at full build-out in east Saint John, New Brunswick.

Development Category	Development Types	Floor Area (m <sup>2</sup> )
Anchor retail / entertainment	Stores, entertainment, <i>etc.</i>	6 000
Retail / restaurant	Dining restaurants	8 000
Office	Business office, support services, <i>etc.</i>	5 000
Highway services	Gas station, convenience retail, fast food, car wash, <i>etc.</i>	4 000
Cultural	Tourism space, health and fitness, medical clinic, <i>etc.</i>	1 500
Commercial / industrial	Warehouse, distribution facility, self-storage facility, <i>etc.</i>	5 000
Hospitality	Hotels, bar, lounge, <i>etc.</i>	11 000
Residential	Apartments and / or condominiums	74 000
<b>TOTAL</b>		<b>114 500</b>

## 2.3 PURPOSE OF THIS ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of an EIA is to identify and evaluate the potential impacts that the proposed Project may have on the environment. As per Schedule A, item v) (*i.e.*, all enterprises, activities, projects, structures, works, or programs affecting two hectares or more of bog, marsh, swamp, or other wetland...) of the Environmental Impact Assessment Regulation [87-83] of the New Brunswick *Clean Environment Act* [S.N.B. 1989, c. C-6.1], the Project triggers EIA review. This EIA was prepared by Fundy Engineering & Consulting Ltd. (Fundy Engineering) on behalf of Horizon Management (% Mr. John Wheatley). The EIA identifies any potential environmental impacts this Project may pose and presents measures to mitigate those potential environmental impacts. In New Brunswick, EIA review is administered by the New Brunswick Department of the Environment and Local Government (NBDELG). This EIA meets the requirements of the NBDELG [2018] guide to EIAs.

### 2.3.1 Notes on this EIA Registration Document

Horizon Management registered *The Crossing* for EIA review on 25 November 2016 (*i.e.*, refer to Appendix II for a copy of that document). Since that time, two rounds of questions have been issued by the Technical Review Committee (TRC). To respond to those questions, the Proponent has conducted several ancillary studies; however, the original EIA document has never been formally updated. Instead, compiled information has been forwarded on to the Regulator for review. Table 3 provides a high-level summary of the activities completed on this file since the Project was first conceived in the early 2000s and announced through an Open House in March 2016.

In order for the TRC to have a document that provides specific and detailed information in an organized format, Horizon Management felt it was necessary to prepare a completely revised EIA document. This document is intended to replace the original EIA registration document and incorporates information requested from the TRC during both rounds of questions (*i.e.*, responding to the 201 questions / concerns).

Table 3. High-level summary of environmental impact assessment activities completed with respect to *The Crossing* proposed for east Saint John, New Brunswick.

Date	Details	Further Information
19 July 2005	Geotechnical investigation letter report issued by Fundy Engineering	Appendix III
28 July 2005	Preliminary watercourse and wetland assessment report issued by TAP Environmental Resources Inc.	Appendix IV
6 March 2008	Hydraulics and hydrology report issued by Terrain Group Inc.	Appendix V
7 March 2016	Retail advisory report issued by JC Williams Group	Appendix VI
7, 8 March 2016	Open House for the Project in association with Planning Advisory Committee (PAC) application for re-zoning approval	
15 March 2016	PAC municipal plan amendment and re-zoning application	Appendix VII
18 July 2016	Proponent meeting with NBDELG representatives	
4 August 2016	Proponent meeting with Aboriginal Affairs Secretariat representatives	
16 September 2016	Rare plant survey issued by WSP	Appendix VIII
25 November 2016	<i>The Crossing</i> registered for EIA review (NBDELG File No: 4561-3-1450)	Appendix II
22 December 2016	TRC issued 62 questions as part of first round of questions	Appendix IX
20 January 2017	TRC issued 12 questions as part of first round of questions	Appendix IX
9 February 2017	TRC issued 11 questions as part of first round of questions	Appendix IX
22 March 2017	Proponent meeting with NBDELG representatives	
22 April 2017	Public notice of EIA registration placed in the <i>Telegraph Journal</i>	
27 June 2017	Traffic impact study issued by exp Services Inc.	Appendix X
30 June 2017	Wetland delineation and functional assessment report issued by Dillon Consulting	Appendix XI
19 September 2017	Environmental management manual issued by Horizon Management	Appendix XII
26 September 2017	<i>The Crossing</i> water and sanitary servicing conceptual design report issued by exp Services Inc.	Appendix XIII
26 September 2017	Storm water management strategy and stream hydraulics and hydrology conceptual design report issued by exp Services Inc.	Appendix XIV

Date	Details	Further Information
29 September 2017	Proponent submitted response to first round of TRC questions	Appendix XV
25 October 2017	Proponent meeting with TRC for question and answer session	
1 November 2017	TRC issued 93 questions as part of second round of questions	Appendix IX
16 January 2018	TRC issued 20 questions as part of second round of questions	Appendix IX
20 April 2018	Archaeological impact assessment report issued by Amec Foster Wheeler	Appendix XVI
9 May 2018	TRC issued 2 questions as part of second round of questions	Appendix IX
1 June 2018	Proponent meeting with NBDELG representatives	
17 July 2018	Little Marsh Creek watercourse assessment report issued by ACAP Saint John	Appendix XVII
12 September 2018	Proponent meeting with NBDELG representative	
13 September 2018	TRC issued 3 questions as part of second round of questions	Appendix IX
21 February 2019	Proponent teleconference with NBDELG representative	
31 May 2019	Proponent meeting with NBDELG representatives	
8 August 2019	Breeding bird and wildlife field study issued by Stantec	Appendix XVIII
17 December 2019	Proponent prepares revised EIA document for review that incorporates information requested from the TRC during both rounds of questions	Appendix XXV



The two rounds of questions issued by the TRC along with original answers to the first round of questions, amended and updated answers, answers to the second round of questions, and locations of where the information is found within this revised EIA document are provided in the final Appendix (*i.e.*, XXV). The disposition table is designed to help TRC reviewers more easily identify the information related to their questions / concerns.

## 2.4 PROJECT PURPOSE / RATIONALE / NEED

The primary functions for *The Crossing* development are predicated on its central, visible, and accessible location to service the Greater Saint John region. *The Crossing* is ideally situated to be used by traffic accessing and exiting Saint John. Equally as important is the ability to easily direct traffic to any destination in the Greater Saint John region from this site.

Development of this highway centric site within the City of Saint John will provide the opportunity to capitalize on a site similar to types of development seen in other municipal centres that does not currently exist in Saint John. *The Crossing* will create a destination unrivaled in size, content, quality, and visibility in Atlantic Canada.

Establishing a host of new businesses and services to the community will generate both direct and indirect employment positions. Considerable jobs will be created at stores and services established at the site and there will be considerable spinoff benefits to other businesses in the City benefitting from increased visitor traffic to the area.

Significant new property tax revenue will be generated from the proposed Project. The construction of new mixed use buildings will result in millions of dollars being added to the City's property tax base resulting in a very significant new revenue stream for the City. The site location, proximity of existing City services, and the concentrated nature of this Project will result in low incremental capital and operational costs to service this development while producing significant new revenue for the City.

## 2.5 PROJECT LOCATION

Logistically, it is necessary to site *The Crossing* in close proximity to an interchange of the McKay Highway / Saint John Throughway as the Project is designed to attract travelers of NB Route 1 (*e.g.*, commuters, commercial vehicle traffic, regional, national, and international vacationers, *etc.*). The area proposed for *The Crossing* is a greenfield site located along Ashburn Road in east Saint John adjacent to the Saint John Throughway / McKay Highway (Figure 3). The location is visible from the existing highway interchange and with some improvements (*n.b.*, some, such as the installation of traffic lights at the intersection of Rothesay Avenue and Rothesay Road, are currently being undertaken) will be convenient. There are no other lands available within the City of Saint John that provide a unique development opportunity such as this. The Proponent believes *The Crossing* will strategically transform Saint John's image from a "drive by" to a "drive in" location and serve as a gateway for visitors travelling into Atlantic Canada from the northeastern United States; it will capture travelers before they reach other service centres like those located in the Kennebecasis Valley, Salisbury, and Moncton.

According to the J.C. Williams Group (*i.e.*, refer to Market Report in Appendix VI), there are no other locations within the City of Saint John where this development could be

situated. That is because it is critical to the success of this type of Project that there is direct highway access, large land available, and visibility to attract the types of businesses needed to thrive.

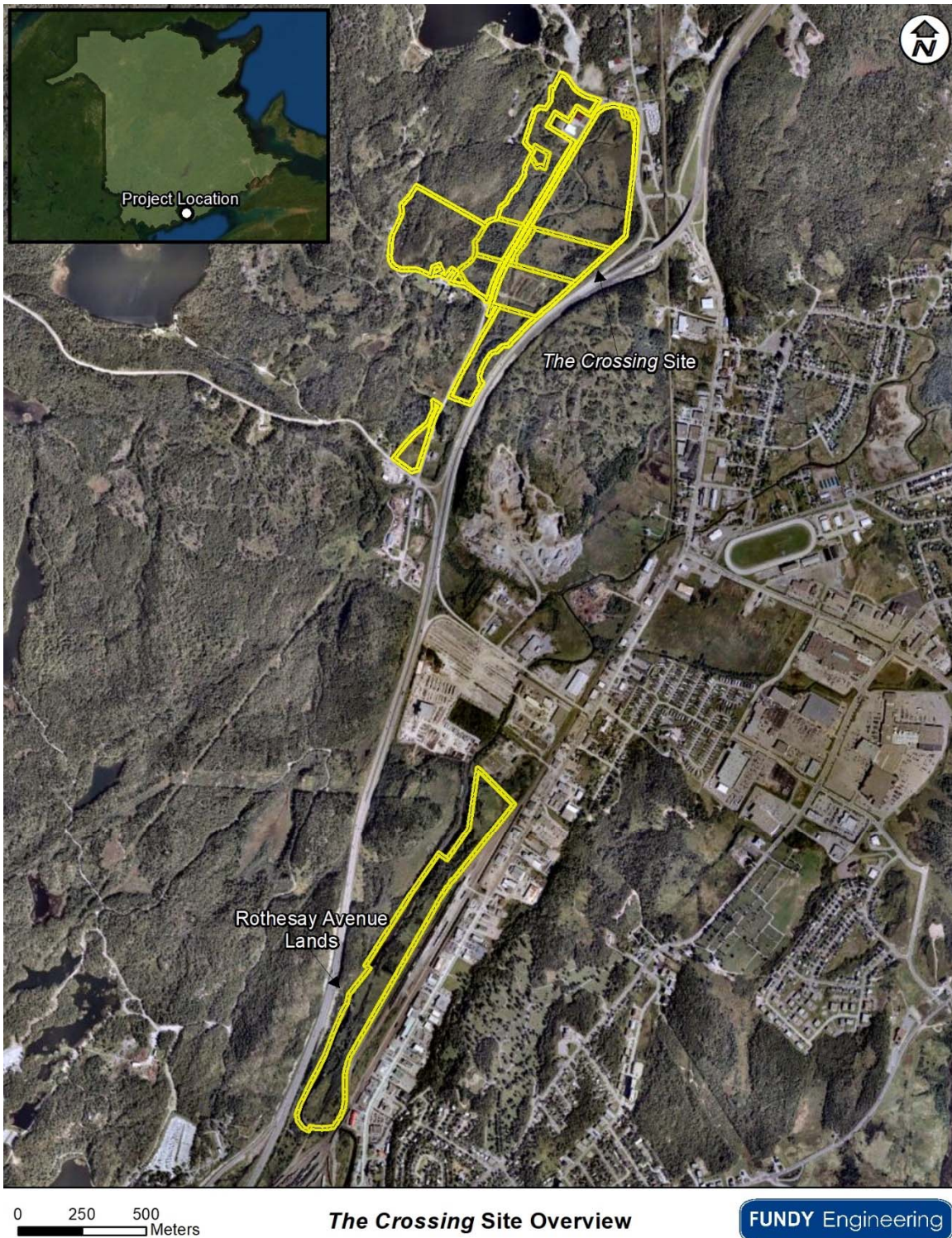


Figure 3. *The Crossing* site in east Saint John, New Brunswick.

Because there will be some impact to flood storage as a result of the Project, there is a requirement to compensate for that loss. The Proponent owns lands, also in east Saint John and near the Project site, that are available to be transformed into compensatory flood storage (*i.e.*, to provide enhanced flood storage). Those lands are located along the NB Southern Railway adjacent to Rothesay Avenue. Lands proposed for *The Crossing* are located entirely within the Marsh Creek watershed. Approximate central coordinates for *The Crossing* along Ashburn Road are 45°18'05"N and 66°2'25.1"W and for the lands along Rothesay Avenue are 45°19'24.46"N and 66°2'0.8"W.

## 2.6 PROJECT ALTERNATIVES

Several Project alternatives were considered as described below.

### 2.6.1 Null Alternative

The null alternative (*i.e.*, the do-nothing approach) was considered in order to provide a baseline against which to compare other alternatives for the various Project components (*n.b.*, the baseline environment represents the null alternative). Under this alternative, the Project would not be undertaken. Not completing this Project would mean the following potential benefits would not likely be realized:

- considerable local and regional employment opportunities for a wide variety of positions including skilled trades (*i.e.*, construction jobs and full-time permanent retail service, management, and maintenance jobs);
- increased local and tourist retail and services spending;
- new property, income, and Harmonized Sales Tax (HST) revenues;
- an increase in the provincial Gross Domestic Product (GDP);
- establishing a gateway location to draw both commercial and visitor traffic from the highway to do business in the Saint John area;
- transforming the City of Saint John from a “drive by” location to a “drive in” destination;
- providing a wide range of new and / or enhanced services to the Saint John area; and
- creating an increased sense of community pride.

For the above reasons, the null alternative is not a desirable option for the Proponent and was not considered further.

### 2.6.2 Environmental Features Impact Reduction / Avoidance

Great strides have occurred in the Project design since the initial EIA application was submitted. *The Crossing* has undergone two major design iterations that took into consideration comments provided by the EIA TRC in order to reduce or avoid impact to environmental features. The initial proposal, the modified proposal (*i.e.*, iteration one), and the current proposal (*i.e.*, iteration two) are described in the sections below.

### 2.6.2.1 Initial Proposal

The initial proposal, which was registered for EIA review on 25 November 2016, envisioned about 80 % of the overall Project site being developed (Figure 4). Although the Proponent planned to “green up” the development through newly established features, it would have been at the loss of important natural features. For example, development would have involved a major realignment of Little Marsh Creek (*i.e.*, eliminating the large natural meander on the Project site) and resulted in the considerable loss of on-site wetlands, particularly in the area where previous flood compensatory storage ponds had been developed (Figure 5).



Figure 4. Initial conceptual build-out plan for *The Crossing* proposed for east Saint John, New Brunswick.



Figure 5. Aerial photograph showing two key environmental features at *The Crossing* site in east Saint John, New Brunswick.

After consultations with representatives with the NBDELG and other regulatory agencies, the Proponent felt there were advantages of retaining the entire regulated wetland and its regulated 30 m buffer on the Project site. Horizon Management went back to their architecture, planning, and design firm to recreate conceptual build-out plans for *The Crossing*.

#### 2.6.2.2 Modified Proposal

On 14 February 2019, the Proponent submitted a modified proposal to the NBDELG for the overall site development. That proposal envisioned retaining the regulated portion of the on-site wetland and its regulated 30 m buffer (Figure 6), but still saw Little Marsh Creek being realigned. Overall, the proposal anticipated a total building development footprint of 115 000 m<sup>2</sup> (Table 4).



Figure 6. Modified conceptual build-out plan for *The Crossing* proposed for east Saint John, New Brunswick.

Table 4. Characteristics of the modified conceptual build-out plan for *The Crossing* proposed for east Saint John, New Brunswick.

Component	Floor Area (m <sup>2</sup> )
Retail and entertainment	7 000
Tourist facilities	2 000
Retail / restaurant	8 000
Hotels	12 000
Office	5 000
Highway services	4 000
Warehouse and storage	TBD
Equipment dealership	5 000
Multi-family residential	72 000

NOTES:

TBD = To Be Determined

Following extensive consultations with various local stakeholders, consultants, and professionals, the Proponent was encouraged to retain the natural channel of Little Marsh Creek on the Project site. Horizon Management again went back to their architecture, planning, and design firm to recreate conceptual build-out plans for *The Crossing*.

### 2.6.2.3 Current Proposal

The site plans submitted with the original EIA application of 25 November 2016 and the modified EIA application of 14 February 2019 have been further modified to reduce the Project's impacts on the watercourse, wetlands, and to minimize the volume requirement for floodplain compensation. The current proposal for *The Crossing*, which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched (Figure 7). Overall, the proposal anticipates a total development footprint of 114 500 m<sup>2</sup> (Table 5). The tenant mix is subject to change based on future market conditions. The total footprint is slightly smaller than the modified proposal.

*The Crossing* is an extension of Saint John's eastern commercial corridor and the eastern regional retail centres (*i.e.*, McAllister Place, Smart Centre / Walmart, Lancaster Mall, and East Point); however, it will be unique in terms of shape, size, design, tenant mix, and function as it is a hybrid commercial business, highway services, retail, and residential mix development. The Project will complement rather than compete with the current retail offering in Saint John (*i.e.*, refer to Market Report in Appendix VI).





Figure 7. Current conceptual build-out plan for *The Crossing* proposed for east Saint John, New Brunswick.

Table 5. Characteristics of the current conceptual build-out plan for *The Crossing* proposed for east Saint John, New Brunswick.

Component	Floor Area (m <sup>2</sup> )
Retail and food services	11 000
Entertainment and tourism	4 500
Hotel accommodation	11 000
Office and commercial	10 000
Highway service	4 000
Multi-family residential	74 000
<b>TOTAL</b>	<b>114 500</b>

## 2.7 PROJECT DETAILS

For Saint John, *The Crossing* is a unique mixed commercial and residential development. It will create new retail formats within the City, such as lifestyle centres, that are seen in other municipal centres. *The Crossing* will be a destination unrivaled in size, architectural quality, and visibility in Atlantic Canada.

### 2.7.1 Tenant Mix

While the specific tenants are not known, the Proponent is cognizant of the need to create complimentary tenancy. The tenant mix proposed for *The Crossing* includes:

- commercial office, business park;
- hotels;
- travel services, service stations, and washrooms;
- welcome and information centre;
- stores and tourist appeal merchandise;
- food services, fast casual dining, and fast food;
- entertainment venues; and
- residential.

*The Crossing's* tenant mix will help fill the gap in tourist / traveler / local convenience stores that are not a strong part of the existing commercial corridor.

#### 2.7.1.1 Build-Out

The overall build-out of the Project is anticipated to occur over a period of 10 to 20 years. The exact timeline, location of buildings, and tenants will be dictated by market conditions; however, it is expected that the Highway Services component will be the development's nucleus (*i.e.*, PID 00432203; Figure 1) and extend outward from there.

For planning purposes, the Proponent has divided the Project, based on floor space, into three general phases:

- Phase 1, ~ 35 000 m<sup>2</sup> with highway services being the proposed anchor;
- Phase 2, ~ 35 000 m<sup>2</sup> with a retail / entertainment focus; and
- Phase 3, ~ 44 500 m<sup>2</sup> including multi-family residential.

### 2.7.2 Economic Generation

*The Crossing* will have a very significant positive impact on the Greater Saint John region through project construction spending, the direct and indirect creation of employment, and the increase in tax revenues. Some additional points regarding economic generation are provided below.

- Development of the site and the construction of buildings will result in millions of dollars being spent on labour and materials in the local economy.
- Considerable local and regional employment opportunities will be generated during the construction phases and full-time retail service, management, and maintenance positions will be created over the long-term. The International Council of Shopping Centres estimates one permanent job is created for every 37.2 m<sup>2</sup> of retail development (*i.e.*, ~ 1 060 jobs for 44 000 m<sup>2</sup> of retail space).
- *The Crossing* will be a gateway to the City of Saint John, attracting both locals and visitors from the highway to increase local spending; thus benefiting both new and existing businesses in the City.
- The construction of new buildings will result in a very significant increase in the property tax base for the City of Saint John.
- The creation of new employment and local spending will increase income taxes, HST revenue, and increase the provincial GDP.
- The gateway nature of the Project will help to transform the City of Saint John from a “drive by” to a “drive in” destination.
- The highway services component of the development combined with the international architectural design of the site will make *The Crossing* a destination for the Greater Saint John region.
- The development of the Project site will provide a wider range of new and enhanced services to the Greater Saint John region.
- *The Crossing* will be a very visible and architecturally unique development that will help create a greater sense of pride for the City.

### 2.7.3 Site Servicing

The Project site is located in close proximity to many existing municipal services. The concentrated nature of this Project will result in low incremental capital expenses and low operational servicing costs.

#### 2.7.3.1 Power

Power for the development will be purchased through Saint John Energy. A 69 kV electrical transmission line currently traverses the Project site and a substation (*i.e.*, Saint John Energy’s Brookville Substation) is located nearby at 1050 Rothesay Road. It is likely that power can be obtained for the Project from one of those locations with the addition of

new infrastructure. Detailed requirements will be determined during the design of the various Project buildings.

### 2.7.3.2 Lighting

Lighting will be required for all parking areas, roadways, and for building exteriors. The design and selection of exterior lighting for this Project will balance public safety criteria with requirements to minimize the effect on the environment and neighbours. Awareness of light pollution (*i.e.*, sky glow), light trespass (*i.e.*, spill light), and veiling luminance (*i.e.*, glare) will be considered in future lighting designs. The lighting design will be such that light trespass will be minimized. As a result, occupants of neighbouring spaces will be minimally affected because of the lighting system's ability to contain light within its intended area. To minimize light trespass, luminaires will be tilted or aimed away from neighbouring spaces. Luminaires will also be selected to minimize glare and up-lighting, which can affect avians.

In the past, parking lot lighting was dominated by high-pressure sodium, metal halide, and fluorescent luminaires. Light-Emitting Diode (LED) technology is now a significant environmentally energy efficient option (*i.e.*, considerably reducing energy costs and greenhouse gas emissions) that provides targeted safe lighting levels (*i.e.*, the light is focused where needed, which reduces light trespass) and reduces the incidence of migratory bird attraction. Parking lot lighting and building exterior lighting will also be controlled in order to reduce after hours energy consumption, which should also help reduce overall greenhouse gas emissions.

The tallest Project structures, the multi-residential buildings and / or hotel(s), will only be five to six storeys. It is not believed that pilot warning and obstruction avoidance lighting will be required on those buildings considering they will be lower than the surrounding hills; however, this will be confirmed during detailed engineering design. If required, pilot warning and obstruction avoidance lighting will be kept to a minimum. The lights should flash and completely extinguish between flashes. Furthermore, lights used at night should be strobes that are the lowest intensity with the least number of flashes per minute allowable by Transport Canada.

### 2.7.3.3 Water

Saint John Water, a department of the City of Saint John, treats and delivers potable water and industrial water to areas of the City. Recently, Saint John Water opened the Loch Lomond Drinking Water Treatment Facility, which treats water from the Loch Lomond and Latimer Lake watersheds. Potable water for the Project will be obtained from Saint John Water via the Loch Lomond Drinking Water Treatment Facility. Based on Saint John Water's 2018 Annual Report [*Saint John Water*, 2018], there should be no issue with water supply capacity for this Project.

The Project is in close proximity to the under-utilized water main that was installed several years ago to service the Kennebecasis Park subdivision in Rothesay. That subdivision is now serviced directly from the Town of Rothesay's municipal drinking water system. A water main extends from Rothesay Road to 901 Ashburn Road.

#### 2.7.3.4 Wastewater

Saint John Water also collects and treats wastewater for the City of Saint John. Wastewater is collected and transported to treatment plants through an extensive network of pipes and pumping stations. Wastewater from the Project will be directed to the City of Saint John's collection system. Based on the Project's location, it is likely that the wastewater would be directed to the Eastern Wastewater Treatment Plant along Red Head Road.

The Water and Sanitary Servicing report prepared by *exp Services Inc.* [2017b] (*i.e.*, refer to Appendix XIII) identified opportunities to use excess capacity in the Drury Cove Wastewater Pumping Station and the existing sanitary force main to the municipal sewer system at Simpson Drive. During the detailed design phase of the Project, further discussions will be undertaken with representatives of Saint John Water to confirm system excess capacity that is available.

#### 2.7.3.5 Stormwater

Stormwater systems will be designed to compensate for any displaced floodwater storage. Water detention areas will be designed to be integrated into the overall landscape plan, creating inviting open spaces while dramatically reducing the Project's stormwater discharge. The Storm Water Management Strategy and Stream Hydraulics and Hydrology report prepared by *exp Services Inc.* [2017c] (*i.e.*, refer to Appendix XIV) identified parking lot ponding, landscaped dry detention ponds, and roof rainwater detention galleries as the most effective stormwater attenuation methods to ensure post-development stormwater discharge flows are less than predevelopment conditions. There may also be opportunities, during detailed design, to include subterranean stormwater retention basins. Those would be constructed beneath parking areas to control surface water runoff from the Project site. They would be designed to collect rainwater falling on the site and be equipped with flow controls to slowly release that collected rainwater to Little Marsh Creek.

Should hydraulic and hydrological modelling during detailed design show an impact to floodwater storage on the Project site, Horizon Management will compensate for that lost storage. Compensatory flood storage would be created in a variety of ways, including on-site constructed channel storage, rock fill voids, constructed ponds, and at the lands located along Rothesay Avenue located downstream from the Project site [*exp Services Inc.*, 2017c] (Figure 1).

All stormwater systems will be designed in compliance with the City of Saint John's Drainage By-law **[M-32]** and Flood Risk Area By-Law **[CP-11]**.

#### 2.7.3.6 Traffic

The Proponent recognizes that a considerable aspect of the overall Project is the coordination of traffic flow for residents, customers, employees, and service providers, such as deliveries and waste collection. In order to minimize the impact on surrounding roads and neighbourhoods, access to the site will generally be restricted to specific locations (Figure 7). Internally, vehicle circulation will maximize the separation between tenants, customers, and service users. It is tantamount that vehicle and pedestrian traffic are segregated within a mixed-use development. During detailed design, a plan will be

implemented that prioritizes accessible pedestrian walkways throughout the Project. Horizon Management will continue discussions with City Staff regarding pedestrian facilities (e.g., crosswalks, pedestrian signals, sidewalks, etc.) as the Section 59 re-zoning process advances.

*exp Services Inc.* [2017a] completed a Traffic Impact Study (i.e., refer to Appendix X), which includes recommendations to ensure that traffic impacts are addressed. Those recommendations are described in Sections 2.8.3.2.1 and 2.8.3.2.2 below.

#### 2.7.3.7 Fire Prevention

Fire prevention equipment for all Project buildings requiring such equipment will be constructed in accordance with the National Fire Code and the National Fire Protection Association requirements. Automatic sprinkler systems will be included where necessary to provide the necessary level of fire protection. Fire water for the Project will be obtained from Saint John Water through the potable water distribution system.

#### 2.7.4 Low-Carbon Development and Energy Efficient Design

Although Horizon Management will not be the sole developer of *The Crossing*, they are uniquely positioned to enable a low-carbon development. Project buildings will be designed to include taking into consideration environmentally-friendly features, such as highly-efficient low-emissivity glass, canopies over windows to reduce cooling requirements, the use of natural gas by all tenants, and computer controls on building heating, ventilation, and air-conditioning systems.

Aligning with New Brunswick's Climate Change Action Plan for transitioning to a low-carbon economy [PNB, 2016], Horizon Management will strive to implement into the overall design of *The Crossing*:

- energy conservation;
- energy efficiency;
- renewable energy sources; and
- alternative transportation.

The Proponent will also consider beneficial GreenHouse Gas (GHG) reduction measures and incorporate practical and feasible measures into the development. Those measures will include:

- reducing vehicle idling;
- striving for a no net loss of carbon sinks; and
- improving energy performance.

#### 2.7.5 Landscaping

Horizon Management understands that the environment is one of the most important assets that must be respected and protected within their developments. The Project will be designed and constructed with environmental issues at top of mind.

As shown in Figure 7, the overall concept for the Project envisions an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment, to capture surface water runoff, and to help offset the effects of GHG emissions.

Exposed areas adjacent to the development will be seeded to promote revegetation. The seed mix used will comprise a variety of native herbaceous species and be free of invasive species. Revegetation of areas adjacent to Little Marsh Creek and on-site wetlands will be guided by the following prescription:

- 60 % blue joint reed-grass (*Calamagrostis canadensis*);
- 15 % American mannagrass (*Glyceria grandis*);
- 10 % wool grass (*Scirpus cyperinus*);
- 10 % soft rush (*Juncus effuses*);
- 3 % boneset (*Eupatorium perfoliatum*); and
- 2 % blue vervain (*Verbena hastate*).

### 2.7.6 Design Standards

The Project will be designed, constructed, operated, maintained, and abandoned using accepted standards and methods that are in accordance to the applicable *Acts*, permits, authorizations, regulations, and guidelines. Those standards and methods will reflect current legislation (*i.e.*, abandonment will reflect those standards and methods at some future date).

All materials, equipment, and installation labour supplied for this Project will be in accordance with all of the requirements governing New Brunswick jurisdictional codes. In particular, all work performed will be guided by the most recent codes of the organizations listed in Table 6. All contractors working on the Project will possess the necessary permits, certifications, and / or licenses to undertake Project work. Although not an exhaustive list, the primary codes of reference that contractors will focus on are also listed in Table 6.

Table 6. Jurisdictional organizations and contractor's codes of reference for *The Crossing* in east Saint John, New Brunswick.

Acronym	Description	Project Applicable Component(s)
<b><u>PROJECT JURISDICTIONAL ORGANIZATIONS</u></b>		
ANSI	American National Standards Institute	
ASME	American Society of Mechanical Engineers	
ASTM	American Society for Testing and Materials	
CGSB	Canadian Government Standards Board	
CSA	Canadian Standards Association	
MSS	Manufacturers Standardization Society	
TEMA	Tubular Exchange Manufacturers' Association	
TIAC	Thermal Insulation Association of Canada	
ULC	Underwriter Laboratory of Canada	
<b><u>PROJECT CONTRACTOR'S CODES OF REFERENCE*</u></b>		
ANSI	American National Standards Institute	Piping and electrical equipment
API	American Petroleum Institute	Tanks
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers	Heating, ventilation, and air conditioning equipment
ASME	American Society of Mechanical Engineers	Boilers and pressure vessels

Acronym	Description	Project Applicable Component(s)
ASTM	American Society for Testing Materials	Materials specifications
AWWA	American Water Works Association	Underground piping and potable water
CEMA	Conveyor Equipment Manufacturers' Association	Conveyors
CSA	Canadian Standards Association	Electrical equipment, concrete, and steel structures
CWB	Canadian Welding Bureau	Welding
EEMAC	Electrical and Electronic Manufacturers' Association of Canada	Electrical equipment
ICEA	Insulated Cable Engineers Association	Electrical cables
IEC	International Electric Commission	Electric motors and electric equipment
IEEE	Institute of Electrical and Electronic Engineers	Electrical equipment
ISA	Instrument Society of America	Instrumentation
NBC	National Building Code of Canada (2015)	Buildings and structures
NEMA	National Electrical Manufacturers' Association	Electrical enclosures
NFPA	National Fire Protection Association	Fire protection
OSHA	Occupational Safety and Health Administration	Safety regulations for NB
SSPC	Structural Steel Painting Council	Painting
TEMA	Tubular Exchange Manufacturers' Association	Tubular exchangers
TIMA	Thermal Insulation Manufacturing Association	Insulation

## 2.8 PROJECT STAGES

The proposed Project will proceed in several Stages. Environmental permitting, monitoring, and compliance are a necessary component for all Stages of *The Crossing*. Each of the Stages is described below.

### 2.8.1 Stage I - Project Environmental Permitting, Monitoring, and Compliance

Environment and safety are important to Horizon Management. To ensure environmental protection and preservation, the Proponent will strive to have all Project personnel implement and follow a list of Best-Management Practices (BMPs) designed to minimize erosion and sedimentation, impacts to surface water and groundwater systems and their interaction, and habitat loss. Of particular environmental importance to this Undertaking are watercourses, such as Little Marsh Creek, and wetlands present on the Project site.

The Proponent understands that any impact to the on-site watercourses and / or wetlands and / or their associated 30 m regulated buffers will require permitting through the NBDELG, Department of Fisheries and Oceans (DFO), or both regulatory authorities. Section 6.0 of this EIA document outlines the various approvals that may be required for the Project. As noted in Section 4.5, a Project-specific Environmental Protection Plan was developed for this Project and that document dictates the best-management practices that shall be undertaken by all those associated with the Project to ensure environmental protection during phase Stages of the Project.

#### 2.8.1.1 Existing Approvals

On 15 March 2016, the City of Saint John's Planning Advisory Committee dealt with a Municipal Plan Amendment and Rezoning application for 459, 617 to 885, and 540 to 900 Ashburn Road and a parcel of land northeast of the One Mile Interchange. A copy of the Section 39 information is included in Appendix VII. Pursuant to Section 39 of the New Brunswick *Community Planning Act* [R.S.N.B. 1973, c. C-12], the proposed Project is



subject to the 10 conditions noted below, which were registered in the Saint John County Registry Office on 1 June 2016 (*n.b.*, the *Community Planning Act* was repealed and replaced with the *New Brunswick Community Planning Act [S.N.B. 2017, c.19]* where rezoning is covered under Section 59).

- a) **Traffic Impact Study** - *No portion of the site shall be developed prior to the completion of a Transportation Impact Study prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions. The scope of work for the transportation impact study will be established in cooperation with the City, NBDTI and the developer.*
- b) **Site Servicing Study** - *No portion of the site shall be developed prior to the preparation of a servicing study reviewing the impacts on the City's water supply and sanitary sewer collection systems prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.*
- c) **Stormwater Management Study** - *No portion of the site shall be developed prior to the preparation of a stormwater management study that details the approach for stormwater management on the development site and reviews the impacts of the development on upstream and downstream areas of the Marsh Creek watershed prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.*
- d) **Environmental Impact Assessment Approval** - *No portion of the site shall be developed prior to the proponent registering the project with the Provincial Environmental Impact Assessment Process and a Certificate of Determination being issued by the Province.*
- e) **Detailed Development Plans** - *No portion of the site shall be developed except in accordance with detailed plans including, but not limited to, a context plan, a site plan, typical building floor plans, building elevations, and a landscape plan all of which are to be prepared by the proponent and subject to the approval of Common Council, as a statutory amendment to these conditions.*
- f) **Market Study** – *Should a significant change be proposed in the project concept plan, an addendum is required to the market study that provides additional analysis of the impacts of the proposed development on the regional retail sector as a whole, and is subject to the approval of Common Council, as a statutory amendment to these conditions. This addendum to the market study will be prepared by the developer.*
- g) **Municipal Infrastructure Upgrades** - *Any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's responsibility and cost. However, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, that such cost-sharing agreement be subject to the approval of Common Council, as a statutory amendment to these conditions.*
- h) **Maximum Building Size** - *The maximum floor area of a building in the rezoned area is limited to 3000 square metres.*
- i) **Additional Studies** – *The required studies outlined in conditions a) through f) inclusive shall be completed within 5 years of the date of the Municipal Plan amendment and rezoning coming into effect. Should this not occur, Common Council reserves the right to take steps to immediately repeal the rezoning*

agreement and the rezoning pursuant to Sections 39(5) and 39(6) of the Community Planning Act and return the land shall return [sic] to its previous zone which existed prior to this agreement; and, No portion of the site shall be developed prior to the preparation of a detailed phasing plan that graphically outlines the timeline for completion of the site development, prepared by the developer and is subject to the approval of Common Council, as a statutory amendment to these conditions. Common Council reserves the right to impose additional conditions relating to the timeline for completion of the project phases and the repeal of the rezoning agreement and the rezoning pursuant to Section 39(5) and 39(6) of the Community Planning Act and the return of the land to its previous zone which existed prior to this agreement at the time the studies are reviewed as part of the required Section 39 Amendment.

- j) **Costs** – In accordance with Section 39(8) of the Community Planning Act, the applicant shall provide a certified cheque in the amount of one thousand dollars (\$1,000.00) to cover expenses related to the cancellation of the conditional rezoning agreement and/or repeal of the rezoning in the event that the conditions attached to the rezoning cannot be met, as per policy 1-5 in the Municipal Plan. The certified cheque shall be repayable on the substantial completion of the development for which the rezoning is granted. This shall be provided by the Developer to the City within 30 days of Third Reading of the 2016 Municipal Plan Amendment and Rezoning.

It is expected that the 10 conditions made by the City of Saint John's Common Council, as per the Proponent's Section 39 (59) application, will be conditions of the EIA Certificate of Determination.

## 2.8.2 Stage II - Project Construction

### 2.8.2.1 Site Preparation

Portions of the overall Project site will be prepared on an as needed basis. When a portion of the site is required, existing trees and shrubs will be removed. The remainder of the materials, including *in-situ* soils, will generally remain on-site. In some areas of the Project site (*i.e.*, PIDs 00052985, 00053017, and 00053025; Figure 1), bedrock may exist at shallow depths and / or be exposed at the surface. There may be a need to remove some of that bedrock in order to achieve elevations suitable for constructing buildings. It is anticipated that bedrock would be removed using pneumatic hammers, but there may be some instances (*n.b.*, this will only be determined during comprehensive site inspections and detailed engineering design) where it may be more practical and feasible to remove the rock via blasting; however, if that is the case, the Proponent and / or contractors will work with the various regulatory authorities (*i.e.*, City of Saint John, NBDELG, and DFO) to ensure the blasting is done in an appropriate manner.

### 2.8.2.2 Structural Foundations

Because of the on-site soil conditions, it is expected that the majority of Project buildings will be supported on Steel H piles driven to bedrock. The total number of piles required, lengths of piles, *etc.* will not be known until detailed design is undertaken for the various buildings. The H piles will be driven into the ground using a crane equipped with a fixed or hanging lead configuration pile driver. It is likely that a hydraulic hammer will be used;

however, a diesel hammer may also be used depending on hydraulic hammer availability. The steel piles will be connected at grade using cast in place concrete pile caps.

### 2.8.2.3 Temporary Infrastructure and Supporting Facilities

As is typical with commercial, retail, and multi-residential development, several contractor trailers will be brought on to the Project site as new buildings are built. Those trailers will serve as construction offices for Project development. Temporary services, such as power and internet, will be connected to those facilities.

Temporary washroom facilities will be brought on-site during construction of the various buildings. Those temporary washrooms will be maintained by licensed and approved third-party contractors who will be required to regularly service the facilities.

A specific entrance will be designated for materials being delivered to the Project site when a new building is being constructed. Pedestrian and customer traffic will be safely separated from laydown space and contractor parking required for any new buildings being constructed.

### 2.8.2.4 Services and Excavations

Some excavation work will be required to install underground services (*i.e.*, water, stormwater, and sanitary sewer) and building foundations (*n.b.*, it is expected that the majority of buildings will require structural foundations as noted in Section 2.8.2.2). It is anticipated that excavated materials will be used elsewhere on the Project site; however, if that is not the case, the materials will be temporarily piled on-site to allow water to drain from the soils before transporting off-site.

### 2.8.2.5 Work Hours

Project construction is anticipated to occur over 10 to 20 years. Construction will not be continuous, but instead occur intermittently as market conditions dictate.

Loud work that has the potential to disturb neighbours (*i.e.*, pile driving) will normally be done between regular work hours of 7 AM to 7 PM Monday through Friday. Crews working outside of those regular work hours will be sensitive to neighbours and will, whenever practical, confine loud work to regular work hours.

### 2.8.2.6 Labour

No detailed estimates are available regarding the potential work that will be generated through Project construction because at this time the exact tenant mix is not known; however, the Project does have the potential to substantially and positively affect the local labour market and economy. For construction, Horizon Management's focus will be to use local trades and contractors whenever possible and practical.

### 2.8.2.7 Site Access

It is anticipated that access to the site will be provided at several points along Ashburn Road and two locations along Rothesay Road as shown in Figure 7. The anchor

development will be the Highway Services located on PID 00432203 (Figure 1). Two access points will be required to service that area; one off of Ashburn Road between the intersections with Rothesay Road and Drury Cove Road and one off of Rothesay Road across from Fulton Lane. Site access points will be installed as required (e.g., the road into the residential development will not be built until the Proponent wants to break ground on a residential building, etc.).

#### 2.8.2.8 Watercourse Crossings

Two crossings of Little Marsh Creek will be required to access portions of the site (Figure 7). It is anticipated that those two crossings will be facilitated either using open-bottom arch culverts or free-span bridges with shoreline abutments. Two crossings of the unnamed tributary to Little Marsh Creek that is located closest to the Rothesay Road / Rothesay Avenue intersection will also be required to promote traffic flow within the development. It is expected that those crossings would be enabled by placing either concrete or corrugated steel culverts within the watercourse. It is likely that two or more crossings would be required on the unnamed tributary to Little Marsh Creek that is located near the Jones Drive / Ashburn Road intersection. As with the other unnamed tributary, it is expected that those crossings would be enabled via concrete or corrugated steel culverts.

The above noted watercourses are described within Section 3.1.5.1.

#### 2.8.2.9 Watercourse Realignment and Piping

As noted in Section 2.6.2.3, the flow path of Little Marsh Creek is expected to remain as it presently exists on the Project site (Figure 7). The northerly unnamed tributary to Little Marsh Creek that flows on to the Project site between Fulton Lane and Ashburn Road will be placed within a pipe to allow development of Phase 1. The size of pipe will be determined during detailed engineering design, but it will be approximately 178 m long.

The unnamed tributary to Little Marsh Creek that flows on to the Project site near the Rothesay Road / Rothesay Avenue intersection may require some realignment to suit the overall development (Figure 7). Based on the uncharacteristically straight channel of that tributary on the property, it is believed that it was channelized in the past. In 2018, Gateway Operations Inc. replaced the twin culverts within this culvert on Rothesay Road.

Although not shown on the conceptual design (Figure 7), it is believed that the unnamed tributary to Little Marsh Creek near the Jones Drive / Ashburn Road intersection will largely remain within its existing channel, but may require some realignment to facilitate placement of the multi-residential buildings. Also not shown on the conceptual design is the unnamed tributary to Little Marsh Creek near the Foster Thurston / Jones Drive intersection. It is expected that it would be piped in the area where it flows across the Project site.

The above noted watercourses are described within Section 3.1.5.1.

The 30 m regulated buffers of the above noted watercourses will be entirely impacted to facilitate the development. For example, the buffer will be lost where watercourses are piped and the buffer will be reduced where the watercourse is realigned. Little Marsh Creek's regulated buffer will be reduced through the development. There may also be

some development of the riparian buffer to increase channel capacity / constructed channel storage through the Project site as depicted in Figure 8.

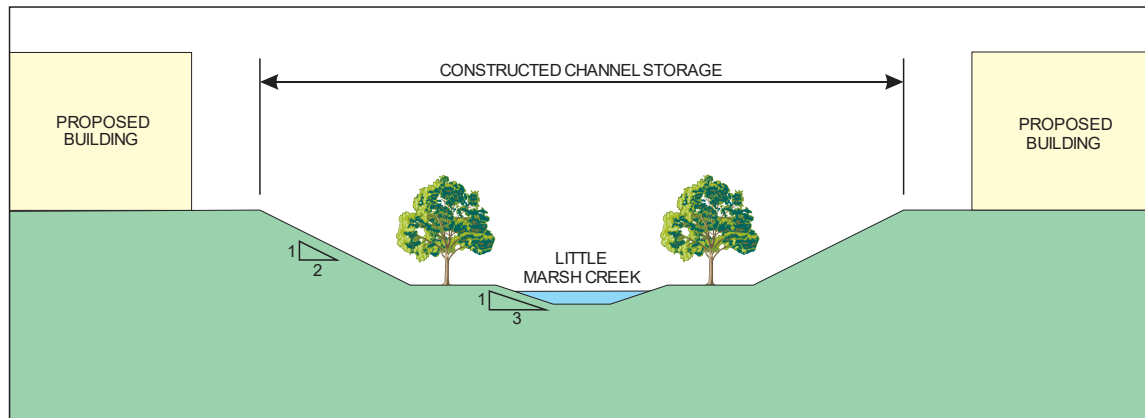


Figure 8. Conceptual drawing showing how the riparian buffer along Little Marsh Creek could be enhanced to provide constructed channel storage at *The Crossing* proposed for east Saint John, New Brunswick.

The existing compensatory storage provided by ponds contiguous with Little Marsh Creek on the Project lands across from Jones Road will remain. There are no plans, at this time to increase the size of those ponds.

#### 2.8.2.10 Storm Water Management

In 2008, Terrain Group Inc. issued a hydraulics and hydrology report for the Project site (*i.e.*, refer to Appendix V). Stormwater models indicated that development of *The Crossing* will not have a negative effect on flooding in the Marsh Creek watershed [Terrain Group Inc., 2008]. The Proponent recognized that Marsh Creek had been the subject to considerable attention and remediation efforts since 2008. Therefore, they chose to have more current modelling done.

In 2017, exp Services Inc. issued a storm water management strategy and stream hydraulics and hydrology concept design report (*i.e.*, refer to Appendix XIV). The study was commissioned by Horizon Management because the Project has the potential to displace significant flood water storage in the Marsh Creek drainage basin. To compensate for displaced flood water storage, compensatory flood storage is anticipated to be constructed on *The Crossing* site and on lands along Rothesay Avenue (*i.e.*, refer to Section 1.5).

A deterministic hydraulic and hydrologic model (*i.e.*, Autodesk SSA) was used to assess the impacts [exp Services Inc., 2017c]. The model was used to assess the impact of the modified proposal (*i.e.*, refer to Section 2.6.2.2) on the drainage system. Although the impacts will be different for the current proposal (*i.e.*, refer to Section 2.6.2.3), it is believed they will be reduced because Little Marsh Creek and its contiguous wetland will both remain largely untouched, which was not the case for the modified proposal.

exp Services Inc. [2017c] determined at full Project build-out, assuming compensatory storage is provided, that:

- water surface elevation within Little Marsh Creek will remain at or below existing levels for post-development conditions; and
- the development will not negatively affect upstream, downstream, or adjacent property or infrastructure for the modeled design storms.

Compensatory storage options considered in the assessment include:

- on-site constructed channel storage;
- on-site rock fill void storage (*i.e.*, under parking lot storage);
- on-site constructed ponds (*e.g.*, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, *etc.*); and
- off-site downstream constructed storage volume directly connected to Marsh Creek (*i.e.*, excavated areas on the Rothesay Avenue lands to provide compensatory storage capacity).

Surface water runoff attenuation options provided in the assessment to yield a net zero increase in post-development storm water discharge for the 100 year + 20 % return period for storms include [*exp Services Inc.*, 2017c]:

- parking lot ponding;
- landscaped dry detention ponds; and
- roof rainwater infiltration galleries.

To determine the maximum allowable off-site compensatory storage that could be provided without negative impacts on upstream, downstream or adjacent properties, a variety of scenarios with compensatory volumes on-site and at the off-site location along Rothesay Avenue were modeled until the maximum off-site volume was determined. The maximum allowable off-site volume was determined by comparing water surface elevations for pre- and post-development scenario conditions. Modeled post-development scenarios deemed acceptable were those that resulted in water surface elevations at all control points equal to or lower than existing (*i.e.*, undeveloped) condition scenarios. Water surface elevations at several control points were used as the basis for comparing existing conditions to proposed development compensatory flood volume storage location scenarios.

#### 2.8.2.10.1 Notes on Storm Water Management Study

- *exp Services Inc.* [2017c] completed the storm water management study for the modified proposal (*i.e.*, refer to Section 2.6.2.2) not the current proposal (*i.e.*, refer to Section 2.6.2.3).
- Modelling was done for existing conditions of Marsh Creek and its tributaries.
- Modelling will have to be redone prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.
- While the *Terrain Group Inc.* [2008] Hydraulics and Hydrology Report (*i.e.*, Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the *exp Services Inc.* [2017c] Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report (*i.e.*, Appendix XIV).

- Input to the deterministic hydraulic and hydrologic model included existing 100 year rainfall (*i.e.*, Environment Canada Meteorological Station Data with AR5 New Brunswick climate change predictions), predicted 100 year rainfall for 2050 (*i.e.*, University of Western Ontario climate change model, Scenario Regional Concentration Pathway (RCP) 2.6 for Saint John), existing 100 year tidal curves with storm surge, and predicted 100 year tidal curves with storm surge for 2050.
- *exp Services Inc.* [2017c] did not perform any flow measurements or measure any water levels for incorporation into the model. The initial existing conditions model was developed for Marsh Creek and its tributaries using a combination of LIDAR data, existing and new survey data, and historical information for hydraulic structures and aerial photography for catchment land-use and runoff characteristics.
- The deterministic hydraulic and hydrologic model was verified by comparing modelled results under existing conditions with the modelled results (*i.e.*, surface water elevations) from the *Terrain Group Inc.* [2008] Hydraulics and Hydrology Report (*i.e.*, Appendix V).
- *exp Services Inc.* were contacted regarding the modelling and indicated that winter runoff scenarios do not control storm water storage management for this site. Peak winter storm runoff scenarios were greatly reduced under post-development conditions with the proposed attenuation when compared to pre-development scenarios.
- The purpose of the storm water management study with respect to compensatory storage was to determine if required compensatory storage ponds could be physically accommodated on the Project lands to avoid any negative flooding impacts. Design of any compensatory storage ponds would be done during detailed engineering design and before applying for any required regulatory permits, such as a Watercourse and Wetland Alteration Permit or a Harmful Alteration, Disruption, and Destruction of fish and fish habitat Authorization.
- Horizon Management would be responsible for any infrastructure constructed on its property. The *exp Services Inc.* [2017c] storm water management strategy does not propose, nor require, the use of any City of Saint John property as compensatory storage to adequately manage storm water. Should the use of any available properties, including those owned by the City of Saint John, be identified as a viable and / or more practical alternative, then appropriate arrangements would need to be made with the owner.
- An upstream control point (*i.e.*, Ashburn Creek Road Culvert) was also included and showed that the Project will not negatively affect upstream properties or infrastructure for the modelled design storms.
- The 100 year + 20 % storm was used solely within the modelling to determine the required storm water attenuation requirements. This is the typical design criterion used in the region (*i.e.*, Moncton and Fredericton) and by regional regulators (*i.e.*, NBDTI) to account for climate change. The City of Saint John does not currently require the additional 20 % rainfall to account for climate change. For the Saint John meteorological station, the 24 hour 100 year + 20 % return period storm rainfall depth is 195.6 mm, which was the value used in the modelling.
- Storage was modelled and will be designed to meet storm water peak flow attenuation requirements of net zero increase in post-development storm water discharge for the 100 year + 20 % return period storms, which aligns with NBDTI's storm water management practices.

- The total pre-development flood storage volume of the Project lands along Ashburn Road is 155 000 m<sup>3</sup>.
- When calculating compensatory flood risk storage volume on-site between voids in the rock fill, a conservative void ratio of 0.2 (*i.e.*, 20 %) was used. This conservative void ratio accounts for consolidation and contamination of the void spaces by fines. Geotextile will be used to reduce the transmission of fines into and through the rock fill.
- Modelling suggests that all storm water storage zones should be above the modelled 100 year floodplain elevation of 4.1 m; however, that elevation is subject to change based on future modelling during detailed design.
- Parking lot ponding can provide an economic solution for the storage volume required to attenuate the design storms. In the lower lying areas of the site, where detention ponds are not feasible, the peak flows may be attenuated using this method. The proposed development concept has approximately 10 ha of parking areas. Preliminary design calculations indicate parking lot ponding will require approximately 8.0 ha of lot ponded area or approximately 80 % of paved areas would be utilized to provide storm water attenuation storage during the 100 year + 20 % return period design storms. Maximum parking lot ponded depth during the modelled design storm was 0.40 m. Ponded areas can typically be limited to low traffic zones away from building accesses as was the case in the concept model.
- Tidal curves for the Marsh Creek outlet / floodgates at Courtney Bay for the 100 year return periods were generated by the model and included surge residuals of 1.14 m. Tidal Higher High Water Large Tide (HHWLT) scenarios modelled included the 2010 HHWLT + storm surge (*i.e.*, 5.74 m) and the predicted year 2050 HHWLT + storm surge (*i.e.*, 6.19 m).
- In future modelling scenarios, the culverts located under the west bound on-ramp to NB Route 1 will be added as control points in order to determine surface water elevations for 2 hour and 24 hour duration storms with a 100 year + 20 % return period.
- For larger catchment areas like Marsh Creek, exp Services Inc. has observed that the Soil Conservation Service (SCS) Type III design storms are more conservative (*i.e.*, yield higher runoff values) when compared to the Chicago distribution design storm. That is why they used the SCS Type III design storm as opposed to the Chicago distribution design storm indicated in the City of Saint John's 2016 Storm Drainage Design Criteria Manual.
- The 24 hour duration, 100 year + 20 % return rainfall SCS Type III hyetograph is shown in Figure 9.
- The international climate modelling community has adopted four RCPs through the Intergovernmental Panel on Climate Change (IPCC). The scenarios range from RCP 8.5, which corresponds to a "non-climate policy" scenario translating into high severity climate change impacts, to RCP 2.6, which is a future scenario requiring stringent climate policy to limit GHG emissions, translating into low severity impacts. Two middle scenarios, RCP 4.5 and RCP 6.0, were selected by the IPCC to be evenly spaced between RCPs 2.6 and 8.5. The 100-year (*i.e.*, 2050, RCP 2.6) storm was used in the modelling to determine water surface elevations under existing and proposed conditions, with and without climate change effects, and compensatory flood volume requirements. The 24 hour 100 year 2050 RCP 2.6 return period storm rainfall depth is 177 mm.



- When comparing modeled water surface elevations for pre- and post-development conditions, the comparisons were made for the same climatic conditions:
  - Comparison 1: pre-development without climate change versus post-development without climate change; and
  - Comparison 2: pre-development with climate change versus post-development with climate change.

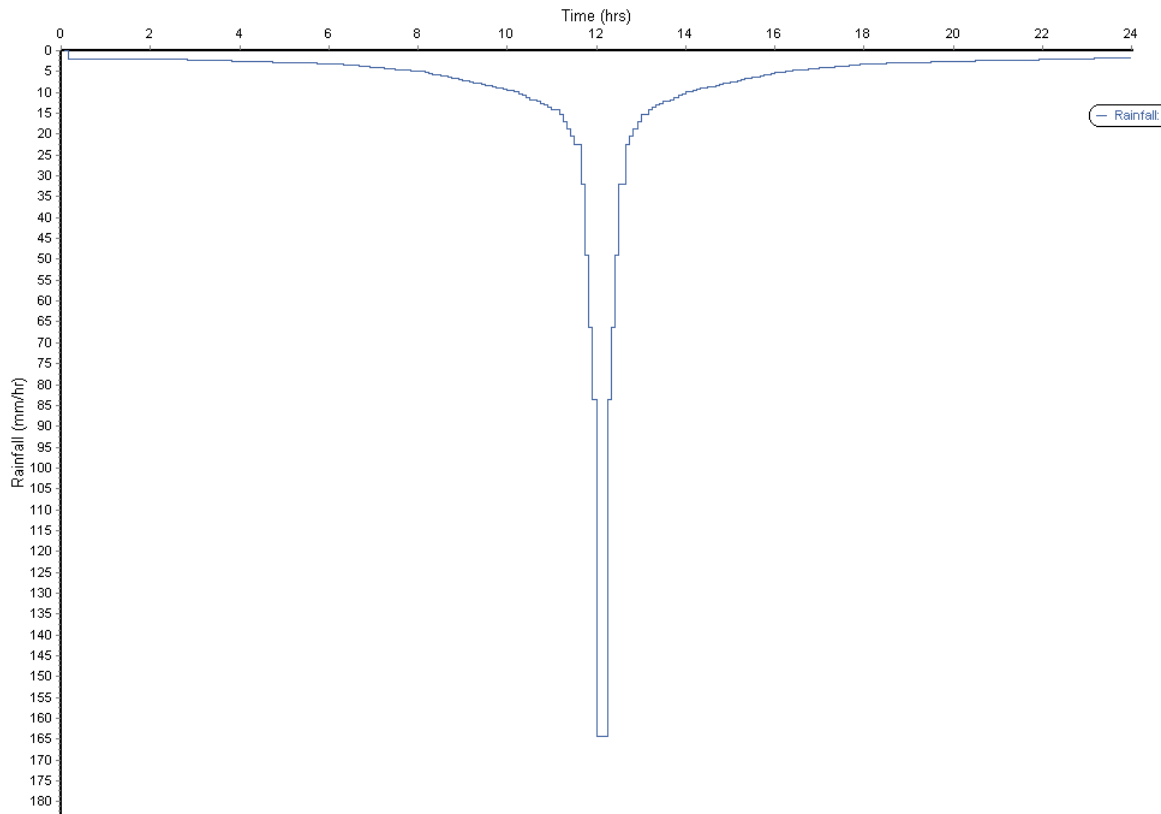


Figure 9. The 24 hour duration, 100 year + 20 % return rainfall Soil Conservation Service Type III hyetograph used in the storm water management study by *exp Services Inc.* [2017c] for *The Crossing* proposed for east Saint John, New Brunswick.

#### 2.8.2.11 Traffic

Trucks going to and from the site during construction will slightly increase traffic in the area; however, it is anticipated that it can be adequately accommodated by the existing road network and associated infrastructure. Because overall construction will be protracted over 10 to 20 years, construction traffic be intermittent and infrequent.

#### 2.8.2.12 Safety

Employee and contractor safety are of paramount importance to Horizon Management. Some of the various potential hazards that may exist during construction include:

- strikes by objects and equipment;
- slips, trips, and falls;

- falls from heights;
- scaffold collapse;
- electrocution and arc blast / flash;
- trench collapse; and
- failure to use the required personal protective equipment.

Contractors will be required to provide a safe and healthy work environment for all employees, subcontractors, and visitors.

Safety concerns identified by Project personnel will be resolved as they arise as per the New Brunswick *Occupational Health and Safety Act (OHSA)* [S.N.B. 1983, c. O-0.2]. Depending on the number of contractors on site and the duration of the Project construction stage, a contractor Joint Occupational Health and Safety Committee (JOHSC) may be formed to address safety concerns brought forward by contract employees. The JOHSC addresses safety concerns as necessary. In addition to the safety practices in place, all other safety standards and / or requirements under the *OHSA* will be followed and enforced.

### 2.8.3 Stage III - Project Operation and Maintenance

The Crossing site will operate and be maintained consistent with the normal operation of a mixed-use commercial / residential development.

#### 2.8.3.1 Work Hours

Hours of operation for the various components of the development will vary. Most retail establishments will operate on a schedule typical of other retailers in the area whereas facilities like the Highway Services will be 24 / 7 / 365 operations.

#### 2.8.3.2 Traffic

##### 2.8.3.2.1 Phase 1

Projected traffic associated with Phase 1 of the Project can adequately be accommodated with relatively minor improvements (*i.e.*, traffic control changes, additional turning lanes, and intersection realignment) to the existing road network [*exp Services Inc.*, 2017a] (*i.e.*, refer to Traffic Study in Appendix X). Those improvements are shown in Figure 10 include:

- installing actuated-coordinated traffic signals and additional turning lanes on the approaches to the Rothesay Road / Rothesay Avenue intersection;
- installing actuated-coordinated traffic signals and a separate left lane on the northbound approach (*i.e.*, on Rothesay Road) to the Rothesay Road / Ashburn Road intersection;
- installing actuated-coordinated signal and a separate through lane pocket on the eastbound approach (*i.e.*, on Rothesay Avenue) to the Rothesay Avenue / NB Route 1 off-ramp;
- installing separate left turning lanes on Ashburn Road at all accesses on all approaches to accommodate future traffic demand;

- installing traffic signals at the main Project entrance from Ashburn Road;
- adding a separate right turning lane on the southbound approach (*i.e.*, Ashburn Road) to accommodate the increase in right turning traffic exiting the development at the Foster Thurston Drive / Ashburn Road intersection; and
- aligning the truck stop access with Fulton Lane and making access right in / right out (*i.e.*, left turners use access on Ashburn Road) to prevent left turners from blocking through movement and causing queuing back-up at the Rothesay Road / Fulton Lane intersection.

In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NB DTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes (*n.b.*, these have yet to be installed as of December 2019, but the bases are in place).

NB DTI also did work in the vicinity of that intersection in 2018 to upgrade the culverts (*i.e.*, three 1.2 m diameter corrugated steel pipe) under the west bound on-ramp to NB Route 1. Part of that channel may be realigned within the boundaries of the Project site, but that would be > 30 m from the edge of the existing roadway. Therefore, because NB DTI has not installed guardrail in that area during their previous work, it is not believed that guiderail will be required.

#### 2.8.3.2.2 Phase 2 and 3

Projected traffic associated with Phases 2 and 3 of the Project will require additional modifications to the existing road network [*exp Services Inc.*, 2017a]. The major modification would involve the construction of a new interchange at the Ashburn Lake Road / Foster Thurston Drive intersection. This would significantly redistribute traffic from the existing interchange at Rothesay Road (*i.e.*, Exit 129). The Route 1 Corridor Study prepared by *exp Services Inc.* for NB DTI in 2016 (*i.e.*, refer to Appendix XXIV) also included as its first recommendation that completion of the Ashburn Interchange was required to reduce traffic volumes and improve safety at the existing Route 100 Interchange (*i.e.*, Exit 129) [*exp Services Inc.*, 2016].

In February 2018, the Province announced funding to begin planning for the new Route 1 interchange (*i.e.*, an overpass to connect Foster Thurston Drive / Ashburn Road area to Ashburn Lake Road. It is not known when the interchange will be built; however, its construction would also improve safety and traffic flow at the Ashburn Lake Road / Rothesay Avenue / Retail Drive intersections.

#### 2.8.3.2.3 Notes on Traffic Impact Study

- *exp Services Inc.* [2017a] completed the Traffic Impact Study for this Project and for the upgrades to the redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps.
- Final details of the road network upgrades recommended by *exp Services Inc.* (*i.e.*, refer to Sections 2.8.3.2.1 and 2.8.3.2.2 above) will need to be adjusted as detailed engineering design of the development is undertaken. This will also be required as changes were recently undertaken by NB DTI on the Rothesay Road, Rothesay Avenue, and NB Route 1 ramps. Additionally, it is anticipated that the Province

- will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those upgrades were both considered within the *exp Services Inc.* [2017a] Traffic Impact Study.
- NBDTI is using information contained in the *exp Services Inc.* [2016] report regarding the new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection (*i.e.*, refer to Appendix XXIV). That information includes the associated impacts to traffic and land acquisition.
  - In November 2017, Horizon Management arrived at an initial agreement with the City of Saint John regarding near-term infrastructure cost-sharing. Horizon Management intends to continue cost-sharing discussions with City staff as the Section 59 re-zoning process advances.
  - Studies of other retail shopping facilities indicate that a bypass component of up to 34 % can occur. *exp Services Inc.* [2017a] considered a 25 % bypass component, which also includes diverted traffic from other parts of the road network, including new roadways within the Project site.
  - Retail shopping facility studies suggest that the synergy rate (*i.e.*, internal capture rate) can vary from 24 % to 55 % for mixed use developments like *The Crossing*. In their study, *exp Services Inc.* [2017a] used a conservative synergy rate of 20 %.
  - Since the Traffic Impact Study was completed, traffic signal timing and phasing changes have been completed to improve the level of service to reflect the actual operating conditions at the Rothesay Avenue / Ashburn Lake Road / Retail Drive Intersection.
  - The traffic assignments included in the Traffic Impact Study were based on existing traffic conditions within the Study Area; however, assumptions were made regarding how traffic would access the proposed development during Phase 1 (*i.e.*, minor road network improvements) and Phase 2 and 3 (*i.e.*, major road network improvements) as detailed in the report.
  - The redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps by NBDTI in Summer / Fall 2019 will accommodate the Phase 1 traffic; however, it will not accommodate the traffic associated with Phase 2 and 3. The new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection being considered by the Province would be required to adequately accommodate the Phase 2 and 3 traffic. That overpass would also address existing deficiencies at that Ashburn Road / Foster Thurston Drive intersection.
  - The Traffic Impact Study identified nine access points from Ashburn Road to the development. Horizon Management accepts the conclusions and recommendations contained within the *exp Services Inc.* [2017a] study; however, they are open to revisiting the number of access points from Ashburn Road. They welcome discussing possible changes with staff of the City of Saint John Growth and Community Development Services and Transportation and Environment Services Departments.
  - Once Phase 1 is under development, it would be appropriate to re-evaluate the road network upgrades recommended by *exp Services Inc.* for Phase 2 and 3 to ensure they are still appropriate and necessary. This would include updating the traffic impact study from the residential component as the ultimate number of residential units proposed could exceed the number of units included in the traffic study.



Figure 10. Improvements and upgrades recommended by *exp Services Inc.* [2017a] to the existing road network to improve traffic flow in the vicinity of *The Crossing* in east Saint John, New Brunswick.

### 2.8.3.3 Utilities

In 2017, exp Services Inc. completed a conceptual design report regarding the water and sanitary servicing for the Project (*i.e.*, refer to Appendix XIII). Horizon Management understands that more detailed plans (*i.e.*, comprehensive technical design report with supporting documentation and calculations for each Phase of the Project) will need to be developed in cooperation with representatives of the City of Saint John as the Project design and municipal approval process proceeds. Information below is from the *exp Services Inc.* [2017b] report.

#### 2.8.3.3.1 Phase 1

In their Water and Sanitary Servicing report, *exp Services Inc.* [2017b] notes that the Project will require connection to the 300 mm Rothesay Road watermain in order to meet fire water demands (*i.e.*, refer to Appendix XIII). Further design, analysis, and field testing would be required to verify proposed pipe sizes, routing, interconnections, and demands as concept designs are advanced to detailed design.

With respect to the sanitary sewer system, *exp Services Inc.* [2017b] believes that the development flows can be accommodated using existing infrastructure. Therefore, no significant existing infrastructure upgrades are anticipated for Phase 1.

#### 2.8.3.3.2 Phase 2 and 3

The existing 200 mm watermain on Ashburn Road will require extension in order to service portions of Phase 2 and 3 of the development that front Ashburn Road [*exp Services Inc.*, 2017b]. The report provides recommendations on measures to conserve water, such as high efficiency plumbing and commercial kitchen equipment. Typically, those BMPs can yield a 10 % to 20 % reduction in water consumption.

Regarding the sanitary sewer system, Phase 3, and perhaps portions of Phase 2, will require servicing via a new pressure sewer system injected into the Drury Cove force main downstream of the existing wastewater pumping station. Other possible upgrades may include:

- adding additional wet well storage capacity to any new wastewater pumping stations within the development to allow them to pump into the Drury Cove force main at off-peak times;
- replacing existing wastewater pumps with variable frequency drive pumps;
- adding a sewage retention tank to effectively increase the wet well capacity of the wastewater pumping station; and
- replacing or duplicating the existing force main.

In reviewing the sanitary sewer system for Phases 2 and 3, it is understood that a downstream assessment, which includes the Walter Street Waste Water Pumping Station, will be required.

#### 2.8.3.4 Deliveries and Waste Collection

The Project will be designed such that major deliveries and large volume waste collection (*i.e.*, dumpsters) will be done from either behind or beside the buildings. Pedestrian and customer traffic will be safely separated from these operations.

Third-party contractors will be hired by the various tenants of the Project to collect and dispose of waste generated at the respective buildings. Based on the Project's location, the collected waste will be transported to the Crane Mountain Landfill in Grand Bay-Westfield for disposal. Because of the waste mix from the various tenants, it is expected that the waste will be classified as Institutional, Commercial, and Industrial. Tenants and contractors will be required to comply with the City of Saint John's Storage, Collection, and Disposal of Solid Waste By-Law [M-2].

Generally, there are no standard schedules for deliveries and waste collection and no restrictions are anticipated for these activities.

#### 2.8.3.5 Landscaping

As shown in Figure 7, the overall concept for the Project envisions an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment, to capture surface water runoff, and to help offset the effects of GHG emissions. Third-party contractors will be hired to maintain landscaped areas during Project operation and maintenance. Typically, that work will be done during daylight hours in the spring, summer, and fall.

#### 2.8.3.6 Snow Clearing

Third-party contractors will likely be hired for snow clearing and removal operations during the winter. Contractors will be required to comply with the City of Saint John's Snow and Ice Removal By-Law [M-26], where applicable. Cleared snow will either be piled and stored on-site or transported off-site to an appropriate snow dump. No snow will be pushed onto (*i.e.*, during ice cover conditions) or into Little Marsh Creek and its associated tributaries.

Ice control, via sanding and / or salting, may be required at times on sidewalks and in targeted areas of parking lots and to ensure public safety. Third-party contractors generally provide 24 hour monitoring and management of snow and ice depending on weather conditions. It is expected that those contractors will clear snow from the site and control ice as conditions require.

#### 2.8.3.7 Redevelopment

Throughout the Project's lifespan, there will be instances when tenants turnover and buildings need to be modified to suit the needs of new tenants. Redevelopment areas will be cordoned off to allow redevelopment work to be done safely and efficiently.

### 2.8.4 Stage IV - Project Decommissioning

The Project has a predicted lifespan of 50+ years. Environmental protection measures are continually evolving and improving. Therefore, specific protection measures regarding

the decommissioning / abandonment of the Project cannot adequately or appropriately be made at this time. The decommissioning / abandonment will be subject to future study for assessing the environmental impacts and how the activities can be done in an environmentally appropriate manner.

#### *2.8.5 Stage V - Mishaps, Errors, and / or Unforeseen Events*

With any Project, there is always the possibility of mishaps, errors, and / or unforeseen events. Those instances may happen during this Project and the Proponent will mitigate them by taking a systematic approach to safeguarding public and personnel health and safety by establishing a safe culture during Project implementation. A Project-specific Environmental Protection Plan will be used throughout the construction of the Project. Where required, Environmental Protection Plan procedures will be updated specifically for this Project as it evolves and may include contingency measures in the event that mishaps, errors, and / or unforeseen events occur.

## **2.9 PROJECT SCHEDULE**

As previously mentioned, development of the Project will be dictated by market conditions. Therefore, no overall development schedule has been prepared. It is projected that the overall Project will be built out over 10 to 20 years. The anchor development (*i.e.*, the Highway Services) is anticipated to take a year to build. Construction would occur following a successful EIA determination and signing of a tenant.



### 3.0 DESCRIPTION OF THE EXISTING / BASELINE ENVIRONMENT

This section describes the existing environment, pre-Project, at and in the vicinity of the proposed Project. The information contained in this section is considered to be baseline information for this Project and can be used for comparison to post-Project data to assess any potential impacts. Within this section, “subregional” refers to east Saint John, which includes the rural, suburban, and urban centres around the proposed Project. Those areas include, but are not limited to, Renforth, Torryburn, Brookville, Drury Cove, Glen Falls, Forest Hills, Coldbrook, Eastmount, Silver Falls, and Sandy Point Road. Where specifically defined, the term “local” refers to the Project site and the area immediately surrounding the site (*i.e.*, a 500 m buffer with a particular focus on Coldbrook / Drury Cove).

#### 3.1 PHYSIO-CHEMICAL ENVIRONMENT

##### 3.1.1 Climate

Saint John exists within the Fundy Coast ecoregion of New Brunswick [*Hinds*, 2000]. According to the Köppen-Geiger climate classification, the region is characterized by a humid continental climate [*Peel et al.*, 2007]. The Bay of Fundy, which is a large heat sink that never fully freezes or warms (*i.e.*, temperatures average between 8 °C and 12 °C), influences the climate by generally providing cool summers and mild winters compared to inland locations.

Monthly climate data between 1947 and 2008 available for the meteorological station at the Saint John Airport (YSJ) were used to characterize the baseline climate. That station is part of the World Meteorological Organization (WMO) climate monitoring system (WMO ID 71609; 45.32 °N 65.89 °W, elevation 108.8 m). During that period, the mean annual temperature was 5.0 °C ± 0.73 °C (Figure 11) with a monthly daily minimum of - 7.8 °C ± 2.38 °C in January to a monthly daily maximum of 17.0 °C ± 0.84 °C in August [*Environment Canada*, 2019]. The warmest and coolest years on record were 1953 and 1948, respectively, when the mean annual temperature was 6.9 °C and 3.8 °C. The extreme minimum mean daily temperature of - 36.7 °C was measured on 11 February 1948. In contrast, the extreme maximum mean daily temperature of 34.4 °C was measured on 22 August 1976.

Precipitation (*i.e.*, rain, drizzle, freezing drizzle, hail, snow, *etc.*) is generally well distributed throughout all months and the majority (> 80 %) falls in the form of rain. Mean annual precipitation between 1947 and 2008 (Figure 12) was 1 379 mm with a mean monthly low of 90 mm in August to a mean monthly high of 148 mm in December [*Environment Canada*, 2019]. The driest year on record was 2001 when there was only 799 mm of precipitation. Conversely, the wettest year was 1979 when 1 975 mm of precipitation fell. The most extreme daily rainfall of 154.4 mm was measured on 13 November 1975. The greatest snowfall of 58.2 cm was recorded on 12 December 1960. Snow depth, during the seven months with snowfall, averages 8.6 cm and almost 158 days each year experience some form of precipitation.

Marine fog, which varies seasonally and is more common during the summer, averages 590 hours · year<sup>-1</sup> in the region; however, visibility is normally good at > 9 km about 77 % of the time [*Environment Canada*, 2019]. Annual sunshine is approximately 1 947 hours

ranging from 97 hours in November to 226 hours in July. The extreme amount of daily sunshine (*i.e.*, 15.2 hours) occurred on 26 June 1978.

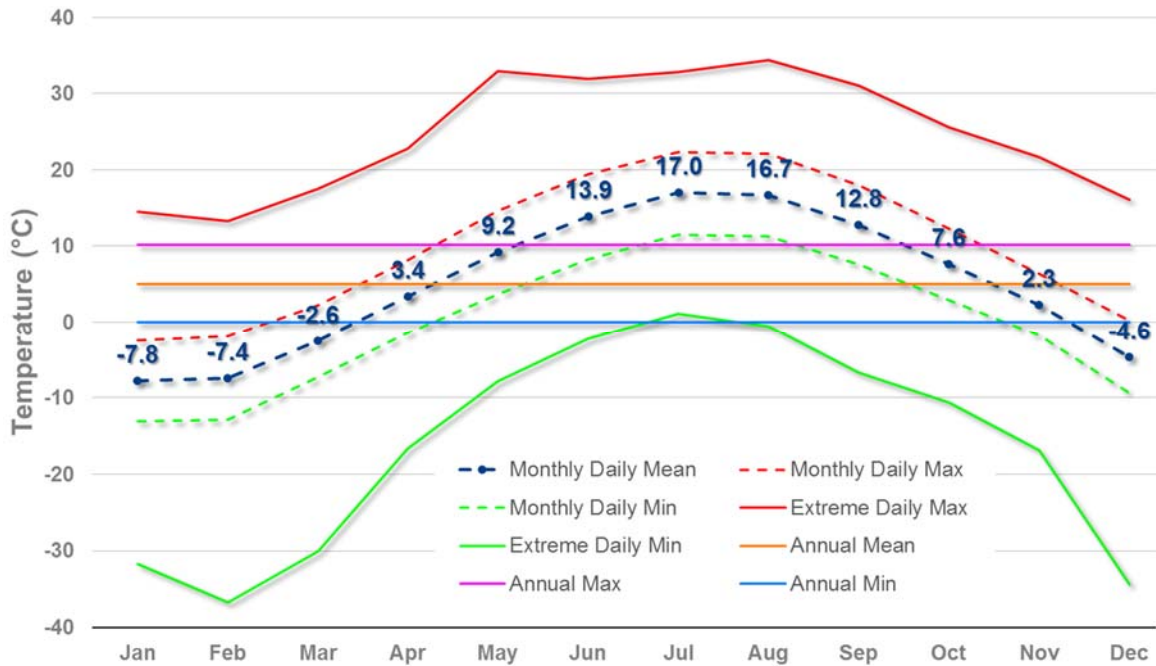


Figure 11. Compilation of mean daily temperatures measured at the YSJ meteorological station between 1947 and 2008.

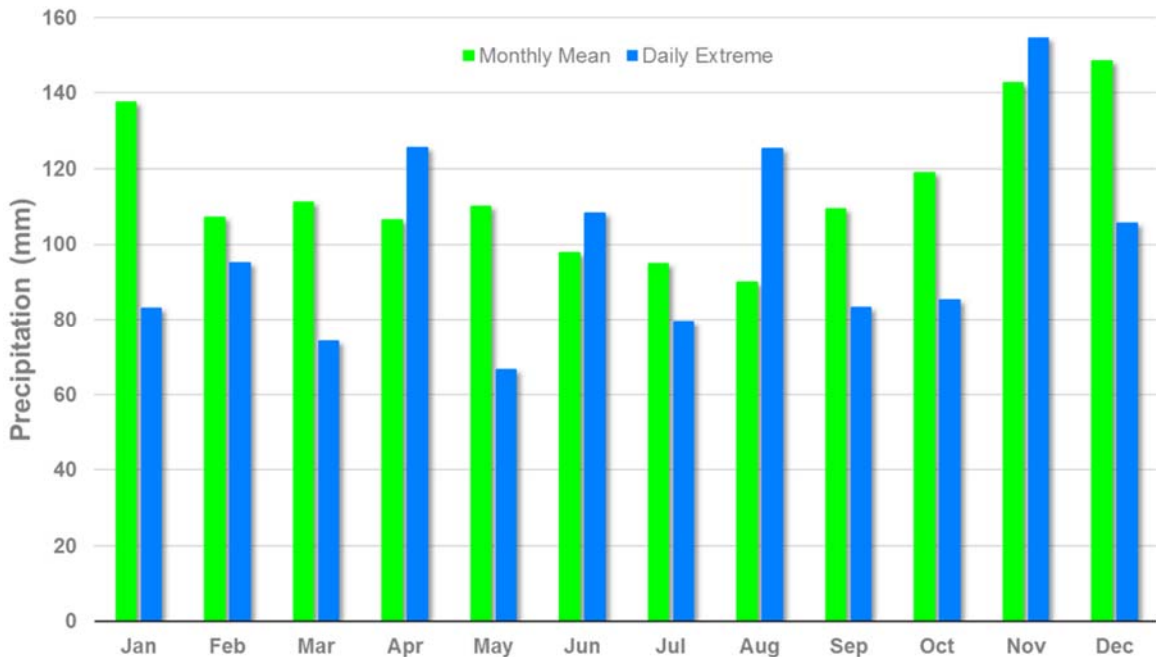


Figure 12. Compilation of mean daily precipitation measured at the YSJ meteorological station between 1947 and 2008.

Average wind speed measurements at YSJ are not available for the same period as the data previously discussed. Wind speed varies from  $12.1 \text{ km} \cdot \text{hour}^{-1}$  in August to  $18.6 \text{ km} \cdot \text{hour}^{-1}$  in March yielding an annual average of  $16.1 \text{ km} \cdot \text{hour}^{-1}$  [Environment Canada, 2019]. The winds predominantly blow from the south (*i.e.*, off the Bay of Fundy), but are also frequent from the northwest (*i.e.*, off the land towards the Bay of Fundy). Winds tend to be the strongest in the winter and weakest in the summer (Figure 13). The maximum hourly wind speed of  $111 \text{ km} \cdot \text{hour}^{-1}$  was measured on 9 January 1978. The most extreme wind gusts of  $146 \text{ km} \cdot \text{hour}^{-1}$  (south winds) were recorded on 2 February 1976 (*i.e.*, the *Groundhog Day Gale*).



Figure 13. Compilation of wind speeds measured for the 30 year period between 1981 and 2010 at the Saint John Station A (*i.e.*, Saint John airport).

### 3.1.2 Air Quality

#### 3.1.2.1 Objectives

The NBDELG recognizes several air quality objectives and standards; some are regulated while others are voluntary. Table 7 summarizes the air quality objectives as per the New Brunswick *Clean Air Act* [S.N.B. 1997, c. C-5.2]. The air quality objective provided for ground-level ozone is the national objective because there is not a legally-binding limit in New Brunswick.

Table 7. New Brunswick ambient air quality objectives as per the New Brunswick *Clean Air Act* [S.N.B. 1997, c. C-5.2].

Pollutant	Units	Averaging Period			
		1 hr	8 hr	24 hr	1 yr
Carbon Monoxide (CO)	ppm	30	13		
Hydrogen Sulphide (H <sub>2</sub> S)	ppb	11		3.5	
Nitrogen Dioxide (NO <sub>2</sub> )	ppb	210		105	52
Sulphur Dioxide (SO <sub>2</sub> )*	ppb	339 (169.5)		113 (56.5)	23 (11.5)
Total Suspended Particulates (TSS)	µg · m <sup>-3</sup>			120	70
Ozone (O <sub>3</sub> )†	ppb	82		25	15

NOTES:

\*Objectives are 50 % lower in Saint John, Charlotte, and Kings Counties (*i.e.*, shown in brackets)

†National ambient air quality objective (*i.e.*, acceptable level)

### 3.1.2.2 Monitoring

Air quality monitoring in Saint John began in the early 1970s. The air quality-monitoring program was established to assess the airshed with respect to various common industrial pollutants. In Saint John today, air quality is monitored at three NBDELG sites. The quality assured data from the NBDELG sites can be accessed from Environment Canada's National Air Pollution Surveillance (NAPS) Program website (*n.b.*, the most current data available are for 2016) [ECCC, 2019a]. Mean annual data, where available, for carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and particulate matter (PM<sub>2.5</sub>) are available from the NAPS. Those data are plotted in Figure 14. Generally, there has been a continual improvement in Saint John's air quality over time.

Carbon monoxide data have only been monitored in Uptown Saint John (Figure 14). Those data ( $n = 28$  years between 1980 and 2016) show that CO concentrations in the Saint John airshed have historically been 0.6 parts per million (ppm)  $\pm$  0.32 ppm. The mean annual CO concentrations have ranged from a maximum of 1.40 ppm (1983) to a minimum of 0.20 ppm (2007, 2013, 2014, and 2014). The overall trend for the 37 year period indicates that CO concentrations have been slowly declining. This is attributed to advances in air emissions technology and the subsequent decrease in CO emissions from industry and vehicles.

Similar to mean annual CO concentrations, mean annual concentrations of NO<sub>2</sub> have exhibited a downward trend in Saint John (Figure 14). The Uptown monitoring site has the largest number of datum points ( $n = 26$ ). The mean annual concentration for that site between 1981 and 2016 was 10.2 ppb  $\pm$  3.88 ppb and ranged from a low of 3.0 ppb in 2009 to a high of 19.0 ppb in 1987. All mean annual concentrations are well below the 52 ppb air quality objective limit set by the NBDELG.

Sulfur dioxide concentrations have also exhibited a downward trend in Saint John. Uptown Saint John, where data are the most complete, yielded a 33 year (*i.e.*, between 1974 and 2016) annual mean of 5.9 ppb  $\pm$  5.07 ppb (Figure 14). Mean annual concentrations in east Saint John were slightly higher at 7.0 ppb  $\pm$  4.85 ppb ( $n = 29$ ).

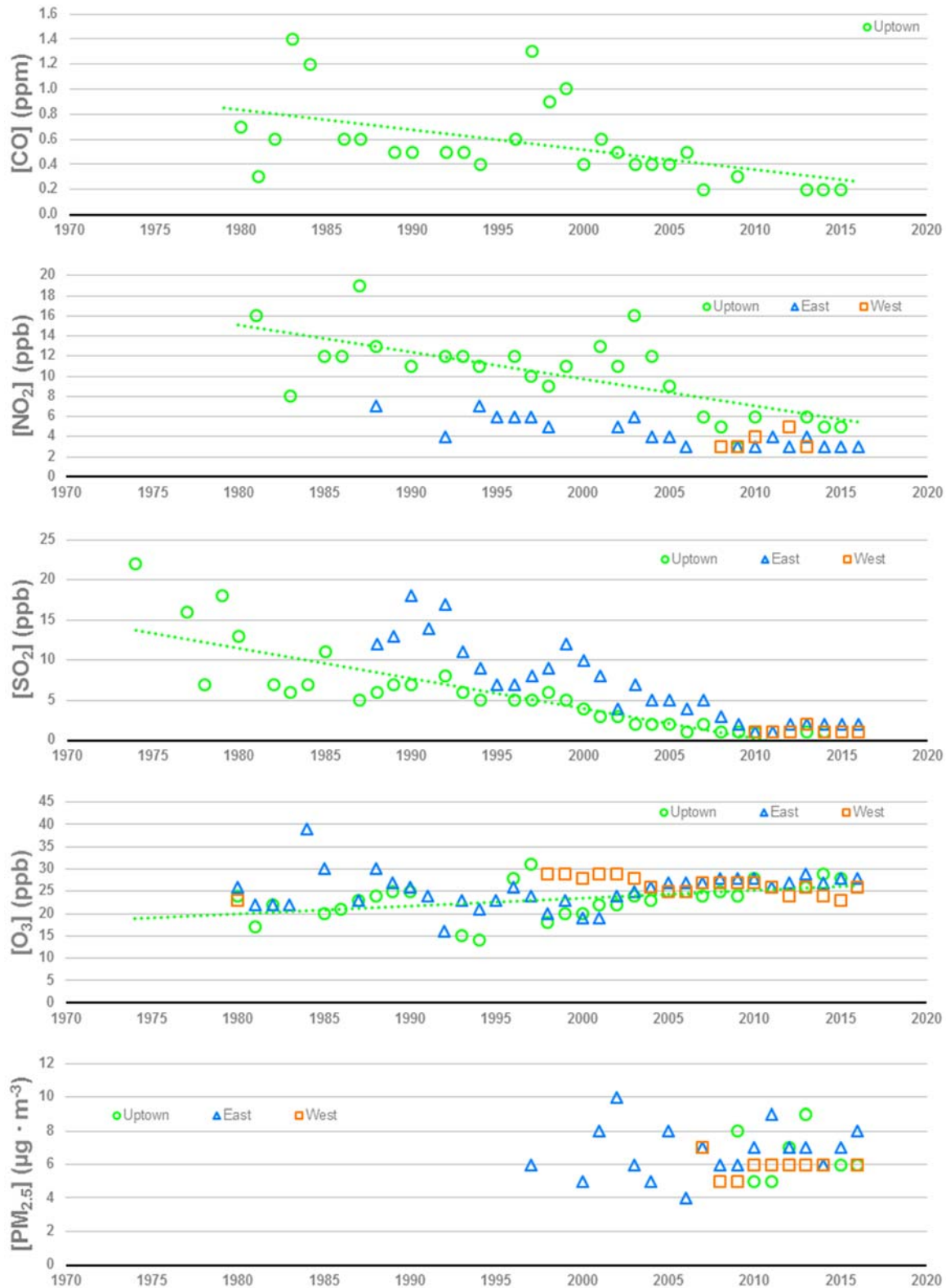


Figure 14. Mean annual air quality data as measured at NBDELG monitoring locations in Uptown, east, and west Saint John, New Brunswick between 1974 and 2016.

Ozone data are available at the sites starting in 1980 (Figure 14). There has been an overall upward trend in Uptown and east Saint John, but a slight downward trend in west Saint John; however, almost all annual values have been above the NB air quality objective of 15 ppb. The mean annual concentration in Uptown, east, and west Saint John was calculated to be 23.2 ppb  $\pm$  4.00 ppb ( $n = 29$ ), 25.3 ppb  $\pm$  4.05 ppb ( $n = 36$ ), and 26.4 ppb  $\pm$  1.96 ppb ( $n = 20$ ), respectively.

Particulate Matter in the 2.5 micron or less range (*i.e.*, PM<sub>2.5</sub>) started being measured at the NBDELG monitoring sites in 1997 (Figure 14). The highest annual concentrations were measured in east Saint John with a mean of 6.8  $\mu\text{g} \cdot \text{m}^{-3} \pm 1.48 \mu\text{g} \cdot \text{m}^{-3}$  ( $n = 18$ ). Mean annual concentrations in Uptown and west Saint John were, respectively, 6.6  $\mu\text{g} \cdot \text{m}^{-3} \pm 1.51 \mu\text{g} \cdot \text{m}^{-3}$  ( $n = 7$ ) and 5.9  $\mu\text{g} \cdot \text{m}^{-3} \pm 0.60 \mu\text{g} \cdot \text{m}^{-3}$  ( $n = 9$ ). Although the levels are fairly static, they are considerably below the annual air quality objective limit of 70  $\mu\text{g} \cdot \text{m}^{-3}$  set by the NBDELG.

### 3.1.2.3 National Pollutant Release Inventory Reporting

In addition to air quality monitoring sites, many industrial facilities are required, as per the *Canadian Environmental Protection Act, 1999* [S.C. 1999, c. 33], to annually report their emissions to the National Pollutant Release Inventory (NPRI) administered by Environment and Climate Change Canada (ECCC). The NPRI is Canada's legislated, publicly accessible inventory of pollutant releases (*i.e.*, to air, water, and land), disposals, and transfers for recycling. In the Greater Saint John region, there are at least nine facilities (Figure 15) that are required, based on meeting thresholds, to report their air emissions. Those numbers complement our understanding of the air quality for Greater Saint John. The most recent non-preliminary data available (*i.e.*, 2017 emissions data) for facilities in the Greater Saint John region are summarized in Table 8 [NPRI, 2019].

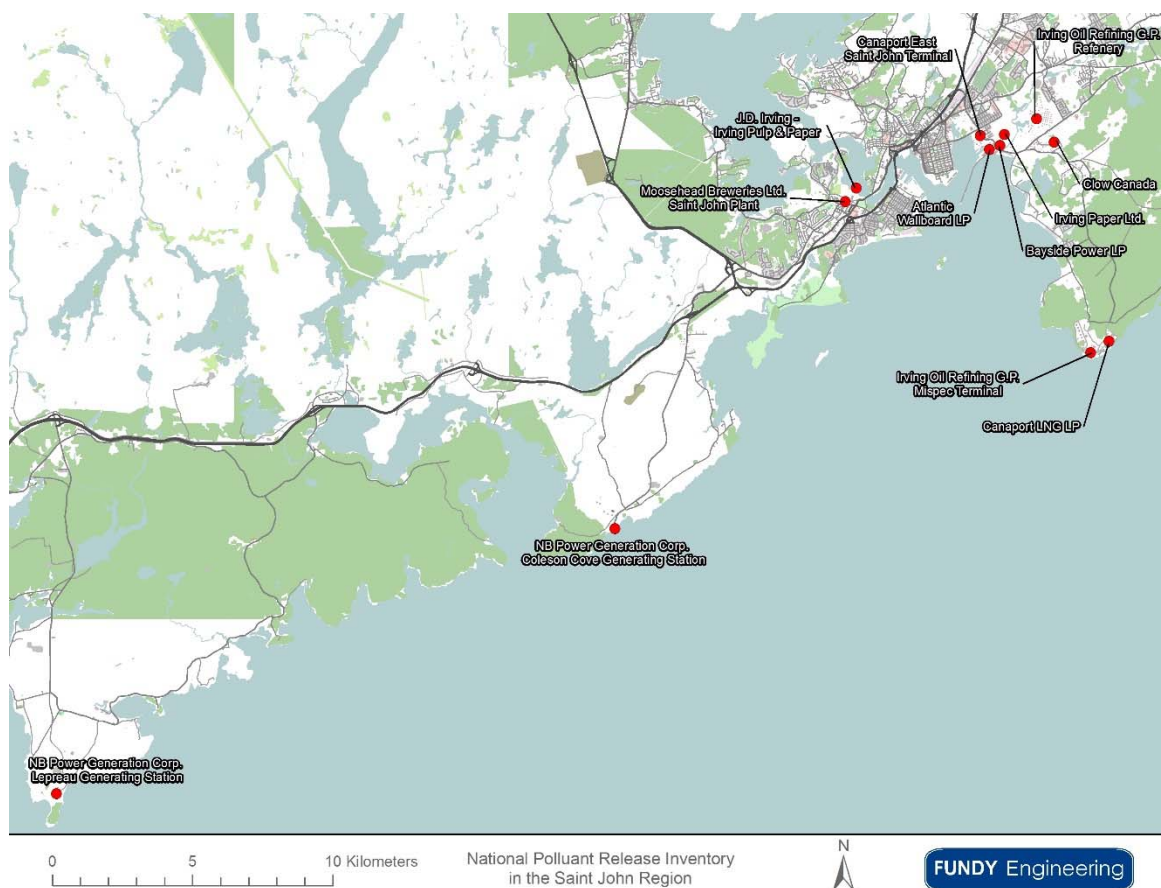


Figure 15. Facilities in the Greater Saint John region that are required to annually report emissions to Environment Canada's National Pollutant Release Inventory tracking database.

Table 8. Air emissions data, circa 2017, for facilities in Greater Saint John that reported to Environment and Climate Change Canada's National Pollutant Release Inventory tracking database.

Reporting Facility	Air Emissions (t · yr <sup>-1</sup> )						
	CO	NO <sub>2</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Atlantic Wallboard L.P.	7.9	30	36				
Bayside Power L.P.		75	13	13	13		
Canaport™ LNG <sub>LP</sub>				0.52	0.52		
Irving Oil Commercial G.P. - Canaport Mispéc Terminal							57
Irving Oil Commercial G.P. - Canaport East Saint John Terminal							38
Irving Oil Commercial G.P. – Refinery	1 311	2 923	438	336	224	1 632	493
Irving Paper Limited	59	170		7.1	6.6		46
JD Irving - Irving Pulp and Paper	2 208	948	161	119	79	1 059	205
NB Power Generation Corp. - Coleson Cove Generating Station	55	356	3.1	3.1	3.0	1 126	0.22

### 3.1.2.4 Greenhouse Gas Reporting

GreenHouse Gas emissions (*i.e.*, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and nitrogen trifluoride) are believed to be contributors to accelerated climate change. Greenhouse gas emissions summaries are available between 1990 and 2014 for all provinces and territories, Canada, and the World. In accordance with the United Nations Framework Convention on Climate Change, GHG emission inventories are from the following five sectors: energy activities (*i.e.*, stationary combustion sources, transportation, and fugitive sources); industrial processes (*e.g.*, mineral products, chemical industry, metal production, *etc.*), solvent, and other product use; agriculture (*i.e.*, fermentation, manure management, soils management, and field burning); waste activities (*i.e.*, wastewater handling, incineration, and landfills); and land-use, land-use change and forestry [ECCC, 2019b]. The data are summarized in Table 9.

Table 9. Provincial and territorial, national, and global greenhouse gas emissions data for five year intervals between 1990 and 2015 and the most current data, 2017. Data from ECCC [2019b] and *Climate Watch* [2019].

Region	Kilotonnes of Carbon Dioxide Equivalent Units (kt CO <sub>2eq</sub> )							Change*
	1990	1995	2000	2005	2010	2015	2017	
Alberta	172 614	201 600	229 287	231 110	239 429	274 777	272 768	158 %
British Columbia	51 580	59 002	63 617	63 051	58 902	59 455	62 077	120 %
Manitoba	18 296	19 447	20 688	20 122	19 098	20 620	21 668	118 %
<b>New Brunswick</b>	<b>16 142</b>	<b>17 420</b>	<b>20 798</b>	<b>20 003</b>	<b>18 240</b>	<b>14 162</b>	<b>14 336</b>	<b>89 %</b>
Newfoundland	9 437	8 257	8 871	9 861	9 739	10 669	10 538	112 %
Nova Scotia	19 566	18 878	22 002	23 173	20 138	16 555	15 601	80 %
Northwest Territories	1 632	1 954	1 484	1 564	1 362	1 687	1 261	77 %
Nunavut			371	441	481	604	588	158 %
Ontario	179 991	179 163	208 180	203 949	174 117	164 506	158 663	88 %
Prince Edward Island	1 926	1 852	2 108	2 028	1 954	1 731	1 823	95 %
Quebec	86 070	83 588	86 251	86 471	79 605	78 079	78 028	91 %
Saskatchewan	44 397	59 293	66 427	68 048	68 948	78 658	77 874	175 %
Yukon Territory	535	559	505	539	619	498	532	100 %
Canada	602 186	651 013	730 591	730 361	692 633	722 001	715 759	119 %
<b>NB†</b>	<b>2.68 %</b>	<b>2.68 %</b>	<b>2.85 %</b>	<b>2.74 %</b>	<b>2.63 %</b>	<b>1.96 %</b>	<b>2.00 %</b>	
World	33 823 470	34 922 080	36 855 490	42 504 580	45 760 960			135 %
Canada‡	1.78 %	1.86 %	1.98 %	1.72 %	1.51 %			

NOTES:

\*Percentage change between 1990 emissions and 2017 emissions except for Nunavut, which is between 2000 and 2017, and the World, which is between 1990 and 2010

†New Brunswick's emissions contribution to Canada's emissions

‡Canada's emissions contribution to the World's emissions

Although there have been efforts to curb and reduce GHG emissions, global GHG emissions continue to steadily increase (Table 9 and Figure 16). This is largely due to the increase in emissions from developing countries. Comparatively, Canadian emissions exhibited a sharp downward trend between 2007 and 2009, which was likely due to



increased awareness and the implementation of newer technologies to reduce GHG emissions; however, since 2009, emissions have generally been on the upswing. All provinces, with the exception of Alberta, British Columbia, Manitoba, Saskatchewan, and Newfoundland, all large fossil fuel extracting provinces, have shown a decrease in GHG emissions. Between 1990 and 2017, New Brunswick's GHG emissions decreased by about 11 % while Canada's overall emissions have increased.

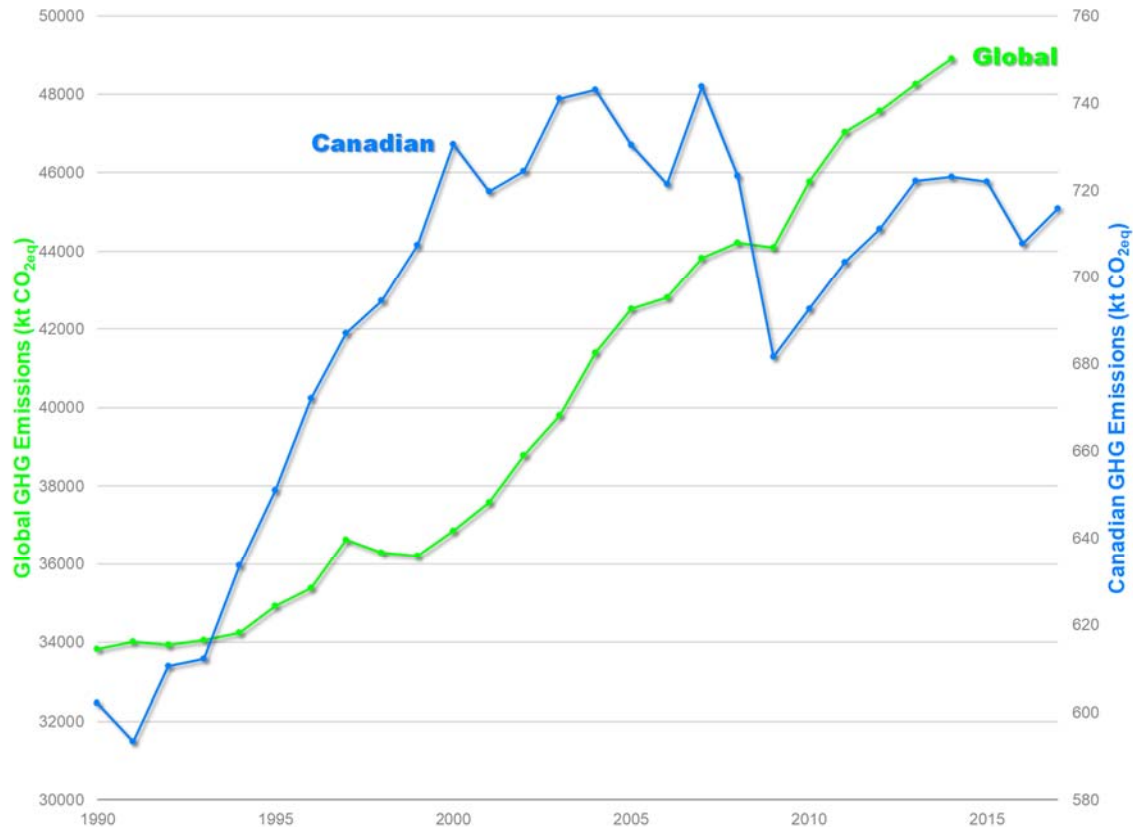


Figure 16. Global and Canadian annually reported greenhouse gas emissions, in kilotonnes (kt) of carbon dioxide equivalent units (CO<sub>2eq</sub>).

In order to assess Canada's overall environmental performance and contribution to GHG emissions, the Canadian Government announced the introduction of the Greenhouse Gas Emissions Reporting Program (GHGRP) in March 2004. Through the GHGRP, all facilities that emit the equivalent of 50 000 tonnes or more of GHGs in carbon dioxide equivalent units (CO<sub>2eq</sub>) per year from stationary combustion, industrial processes, venting, flaring, fugitives, and on-site transportation, waste, and wastewater sources are required to report. Facilities falling below the threshold are not obligated to report, but they may voluntarily do so.

Since 2004, several industrial facilities in New Brunswick have reported to the GHGRP. During that time, GHG emissions reporting in the Province have collectively decreased by 35 % from about 21 900 kt · yr<sup>-1</sup> CO<sub>2eq</sub> in 2004 to ~ 14 300 kt · yr<sup>-1</sup> CO<sub>2eq</sub> in 2017. Industrial emissions reductions, which are a significant amount of overall emissions, have resulted from the implementation of improved technology and the phasing out of coal-fired power generating stations (*i.e.*, Grand Lake Generating Station and Dalhousie Generating Station) [ECCC, 2016].

Figure 17 shows the total CO<sub>2eq</sub> emissions from 20 industrial facilities in New Brunswick reported to the GHGRP between 2011 and 2017 [ECCC, 2019c]. The four largest contributors to total carbon dioxide equivalent emissions, which represent > 80 % of the reported emissions, are the Belledune Generating Station, the Irving Oil Refinery, the Coleson Cove Generating Station, and Bayside Power. Belledune, which is the second largest industrial facility in the Province, is a coal-fired electricity generating station that will have to be shuttered by 2030 if a phase-out agreement to end-of-life is not approved by the Federal Government.

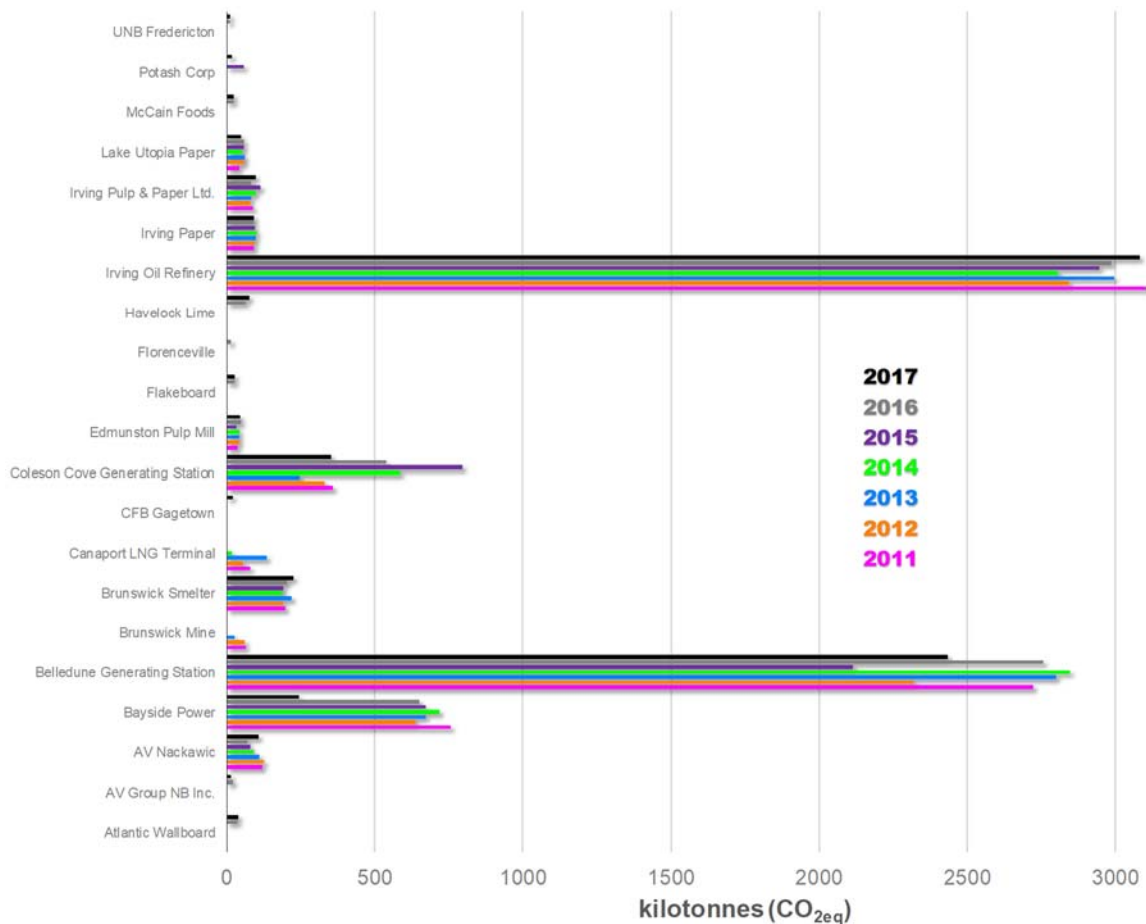


Figure 17. Reported total carbon dioxide equivalents (CO<sub>2eq</sub>), in kilotonnes, for New Brunswick facilities that reported to the Greenhouse Gas Emissions Reporting Program between 2011 and 2017.

### 3.1.3 Sound Levels

Saint John has pockets of heavy industrialized areas (e.g., the Irving Oil Refinery, the East Saint John Terminals, Saint John Harbour, the Reversing Falls Mill, etc.). Dense urban residential neighbourhoods are found within the older parts of the City that surround the industrialized areas (i.e., people wanted to be close to their place of work). The Project site is located in an area that is sparsely populated. No sound level studies have been conducted at the Project site; however, it is adjacent to NB Route 1 that has vehicles travelling on it continuously. Road noise, which typically averages 75 dB(A) 15 m from a highway [Corbisier, 2003], would be noticeable from the Project site.

Nearby residences ( $n \approx 46$ ) include:

- three on Foster Thurston Drive;
- seven on Jones Drive;
- five on Hunters Cove Road;
- three on Ashburn Road;
- four on Stagecoach Drive;
- one on Fulton Lane;
- three on Drury Cove Road; and
- about 20 on Rothesay Road.

There are also several businesses, commercial and industrial, located in the area. Some of those operations, such as the Brookville Manufacturing Co. Quarry (*i.e.*, Rothesay Road), Debly Resources Rock Quarry and Asphalt Plant (*i.e.*, Ashburn Lake Road); and the CN Rail line, regularly emit loud sounds.

### 3.1.4 Topography

Saint John is located in the south-central portion of New Brunswick along the north shore of the Bay of Fundy at the mouth of the Saint John River. The Project site is located within the Marsh Creek watershed in east Saint John in an area known as Ashburn Lake. Elevations in the lower part of the Marsh Creek watershed vary from 3 m Above Mean Sea Level (AMSL) to about 8 m while elevations in the upper part vary from 8 m to around 122 m AMSL.

Regional topography is hilly. Two coastal mountain ranges, the St. Croix Highlands from the west and the Caledonia Highlands to the east, converge as they run along the Bay of Fundy (*i.e.*, the two ranges are divided by the Saint John and Kennebecasis Rivers). The majority of the Project site is a topographically low area on the banks of Little Marsh Creek where elevations are about 4 m (Figure 18). The high ground of the Project site along Jones Drive and Hunters Cove Road has a maximum elevation of about 63 m. Slopes in the area range from about 0 % to 15 % and are considerably greater along the valley ridges. Bedrock outcroppings and bedrock bluffs are regionally prominent.

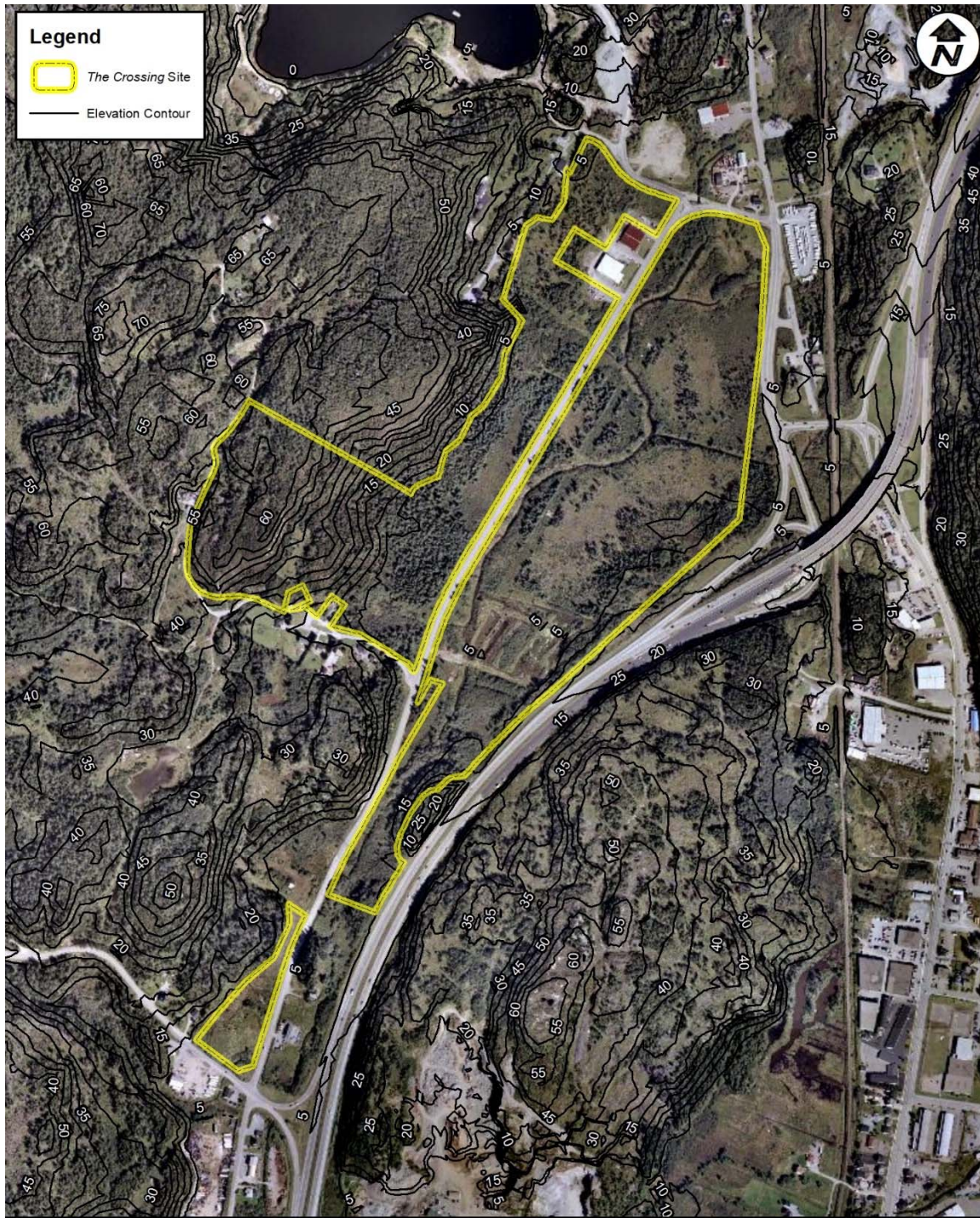


Figure 18. Aerial photograph, circa 2004, showing the general topography at *The Crossing* site proposed for east Saint John, New Brunswick.

### 3.1.5 Hydrology

The Project site is located within the 4 180 ha Marsh Creek watershed [McKenna et al., 2007]. The watershed, which comprises a mix of forested / undeveloped land and industrial, commercial, and residential development, is rectangular in shape, has a northeast to southwest aspect, and the average slope in the basin is 0.8 % [Proctor & Renfrew, 1974]. There are seven major sub-drainage basins within the watershed, including the Little Marsh Creek basin that the Project site falls within (*n.b.*, the Project lands along Rothesay Avenue are located within the Marsh Creek proper sub-basin). The upper reaches of the watershed are thinly covered with silty loam atop bedrock, the topography is hilly, rocky, and knobby, and there is very little development. The lower reaches are extremely flat, have deep alluvial soils, and support the majority of the watershed's development. Since Saint John was first settled by Europeans, Marsh Creek has experienced significant anthropogenic effects.

Dykes were built at the outflow of Marsh Creek in the late 1700s so that the "Great Marsh" portion of the watershed could be reclaimed as agricultural land (*i.e.*, the Great Marsh was once a large tidal marsh). Today, flap gates within five culverts of the Courtenay Bay causeway keep the tides from entering Marsh Creek. As development along the banks of Marsh Creek and within the Great Marsh progressed, storm water runoff increased and drainage within the basin slowed. Reports of flooding within the watershed were first reported in 1948, but perhaps occurred earlier. A study by Proctor & Renfrew [1974] noted that widespread flooding that occurs in the watershed is largely caused by restrictions in the main channel and the lack of adequate storage capacity. Based on their analysis, a majority of the Project site (*i.e.*, the low-lying areas between Ashburn Road and the McKay Highway) would flood during a 1:100 year storm event.

Results from the Proctor & Renfrew [1974, 1976] studies led to the implementation in 1977 of the Marsh Creek Flood Damage Reduction Agreement [Proctor & Renfrew, 1984]. A Flood Risk Area By-Law of the City of Saint John was subsequently adopted. The By-Law delineates adequate setbacks from watercourses, establishes minimum building elevations, and requires compensatory storage for fill placed within a flood zone. The major benefit of the Flood Risk Area By-Law [CP-11] is it provides an area to contain flood waters in undeveloped areas so that the impact on existing developed areas can be minimized.

Review of the watercourse and wetland mapping from the NBDELG's GeoNB online GIS tool shows that there are mapped watercourses and wetlands on the Project site (Figure 19). As noted previously, Little Marsh Creek and its contiguous wetland are key features of the site. As such, several assessments have been completed for the on-site watercourses and wetlands as described in the sections that follow. Copies of those previous assessments are included in Appendices IV, V, VII, XI, XIV, XVII, and XVIII.

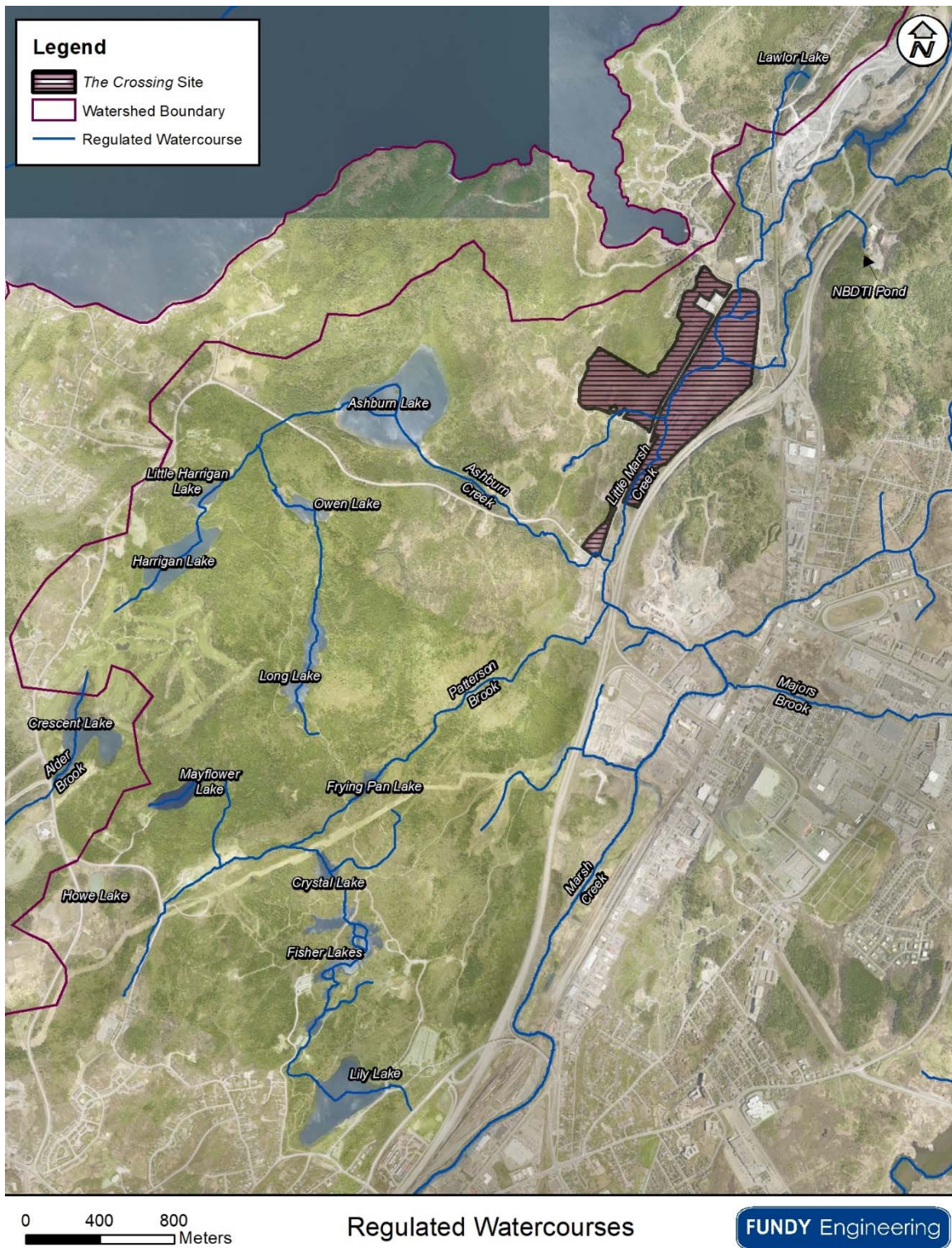


Figure 19. Aerial photograph, circa 2004, showing mapped watercourses in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

### 3.1.5.1 Watercourses

Little Marsh Creek, which is a key feature of the site, is a second order watercourse and a tributary to Marsh Creek that discharges to the Bay of Fundy via Courtenay Bay. An 8 ha open water wetland on the Brookville Manufacturing Co. Quarry site comprises the headwaters of the main Little Marsh Creek (Figure 19). The 2 ha Lawlor Lake, located along Rothesay Road near the entrance to the Brookville (*i.e.*, 1360 Rothesay Road) comprises the headwaters of the west branch of Little Marsh Creek. A 0.2 ha pond near the entrance of the NBDTI garage along the MacKay Highway comprises the headwaters of the east branch of Little Marsh Creek. Overall, not including the tributaries noted below, Little Marsh Creek has a flow length of about 10.2 km.

A 0.3 ha pond off of Jones Drive (*n.b.*, a discussed in Section 3.1.6.1, it is believed this pond was formerly a bedrock quarry) drains via an ~ 755 m long unnamed tributary to Little Marsh Creek on PID 01513080 of the Project site (Figure 19). Little Marsh Creek has two major tributaries, Ashburn Creek and Patterson Brook, and one unnamed tributary whose confluences are below *The Crossing* site. Lakes that drain to Little Marsh Creek via the 5.6 km long Ashburn Creek include: 7.8 ha Harrigan Lake; 1.4 ha Little Harrigan Lake; 5.4 ha Long Lake; 2.1 ha Owen Lake; and 20.7 ha Ashburn Lake. There is a small dam that exists at the outlet of Ashburn Lake. Patterson Brook, which is about 8 km long, drains the following lakes to Little Marsh Creek: 10.2 ha Lily Lake; 7.8 ha Fisher Lakes; 1.5 ha Crystal Lake; 2.8 ha Mayflower Lake; and 1.6 ha Frying Pan Lake. There are two dams located on Patterson Brook at the head of Fisher Lakes. There are no lakes associated with the small 220 m long unnamed tributary that flows into Little Marsh Creek.

On the Project site, there are five watercourses, with the following lengths and widths on the Proponent's properties:

- Little Marsh Creek, ~ 1 492 m long and 2 m to 9 m wide;
- an unnamed tributary between Fulton Lane and Ashburn Road, ~ 178 m long and 1 m to 2 m wide;
- an unnamed tributary near Rothesay Road / Rothesay Avenue intersection, ~ 165 m long and 2 m to 4 m wide;
- an unnamed tributary near Jones Drive / Ashburn Road intersection, ~ 220 m and 0.5 m to 1 m wide; and
- an unnamed tributary near Foster Thurston / Ashburn Road intersection, ~ 40 m long and 1 m to 1.5 m wide.

In June and July 2005, TAP Environmental Resources Inc. (TAP) conducted a preliminary watercourse and wetland assessment at the Project site (*i.e.*, refer to Appendix IV). During the assessment, Little Marsh Creek had a width ranging from 4.1 m to 5.2 m with a calculated bankfull width of 4.6 m [TAP, 2005]. The bankfull discharge was estimated to be  $1.06 \text{ m}^3 \cdot \text{s}^{-1}$ . In 2005, there was extensive beaver activity across the property and primarily in the area where compensatory flood storage had been previously constructed.

Terrain Group Inc. (Terrain) provided a stormwater master plan for Project site along Ashburn Road and compensatory storage estimates for the Project land along Rothesay Avenue site using a hydraulic and hydrologic model created for the City of Saint John as part of the Marsh Creek Watershed Analysis Project [Terrain, 2008] (*i.e.*, refer to Appendix V). Through their analysis, Terrain estimated that ~ 17 000 m<sup>3</sup> of water storage would be

eliminated within the Marsh Creek watershed if the Project site was filled to an elevation above the 1:100 year 24-hour flood elevation (*n.b.*, total depth of the selected storm event was 163 mm for 24 hours). They also estimated that up to 400 000 m<sup>3</sup> of compensatory storage could be created on the Rothesay Avenue lands.

Overall, hydraulic modelling results indicated that development of the Project will not have a negative effect on flooding in the Marsh Creek watershed regardless if compensatory storage is constructed or not [*Terrain*, 2008]. Although the Project will result in a greater peak discharge and an increased total volume of stormwater from the site compared to existing conditions (*i.e.*, due to the replacement of existing permeable surfaces with concrete, asphalt, and other impermeable surfaces), the peak water elevation within Marsh Creek would be unaffected. This is because the additional water runoff contributed from development of the site would be discharged before the bulk of water from Little Marsh Creek sub-watershed reaches Marsh Creek. Developing compensatory storage on the Project lands along Rothesay Avenue would reduce flooding throughout the Marsh Creek watershed.

An assessment conducted by ACAP Saint John [*Stewart-Robertson et al.*, 2018] of Little Marsh Creek and its tributaries in June and July 2018 showed a silty substrate throughout the Project site. Water depths of Little Marsh Creek at *The Crossing* site varied from 30 cm to 110 cm and stream width ranged from 4.5 m to 12 m. Water flows were observed to be slow within the Creek. During the assessment, remnants of three beaver dams were observed within the Creek on the Project site (*n.b.*, the dams had signs of human removal). No unmapped watercourses that meet the watercourse definition were identified on the Project site by ACAP Saint John during their 2018 assessment.

### 3.1.5.2 Wetlands

There are several regulated wetlands contiguous with the Little Marsh Creek and its tributaries (Figure 20). Wetlands are transitional areas between terrestrial and aquatic systems where the water table is at or near the surface and the land is covered by shallow water at some time during the growing season. Permits are required to impact regulated wetlands and / or their 30 m regulated buffer.

When *TAP* [2005] conducted their preliminary watercourse and wetland assessment they noted that wetlands on the Project site would need to be delineated in order to determine their extent (*i.e.*, refer to Appendix IV). Dillon Consulting (Dillon) completed a wetland delineation and functional assessment for the entire Project site and lands along Rothesay Avenue (*i.e.*, formerly referred to as the Eco-Park site) during May and June 2017 [*Dillon*, 2017] (*i.e.*, refer to Appendix XI). A total of 42.9 ha and 8.4 ha of wetland were delineated at the Project and Eco-Park sites, respectively. Regulated wetlands (*i.e.*, those that appear on the GeoNB Map Viewer) at the two sites are 10.5 ha and 0 ha, respectively, for the Project site and the lands along Rothesay Avenue.

*Dillon* [2017] used the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC), a standardized methodology for rapidly assessing some important natural functions of non-tidal wetlands in Atlantic Canada [*Adamus*, 2016]. A summary of the functional assessment results is provided in Table 10 and a copy of the *Dillon* [2017] assessment is included in Appendix IX. Results indicate that the Little Marsh Creek wetlands provide ecological value, specifically related to the maintenance of water quality and aquatic habitat for the Marsh Creek Watershed. Furthermore, the wetlands are at risk based on



ecological sensitivity and surrounding stressors (*i.e.*, denoted by the “Higher” benefit rating for wetland risk in Table 10).

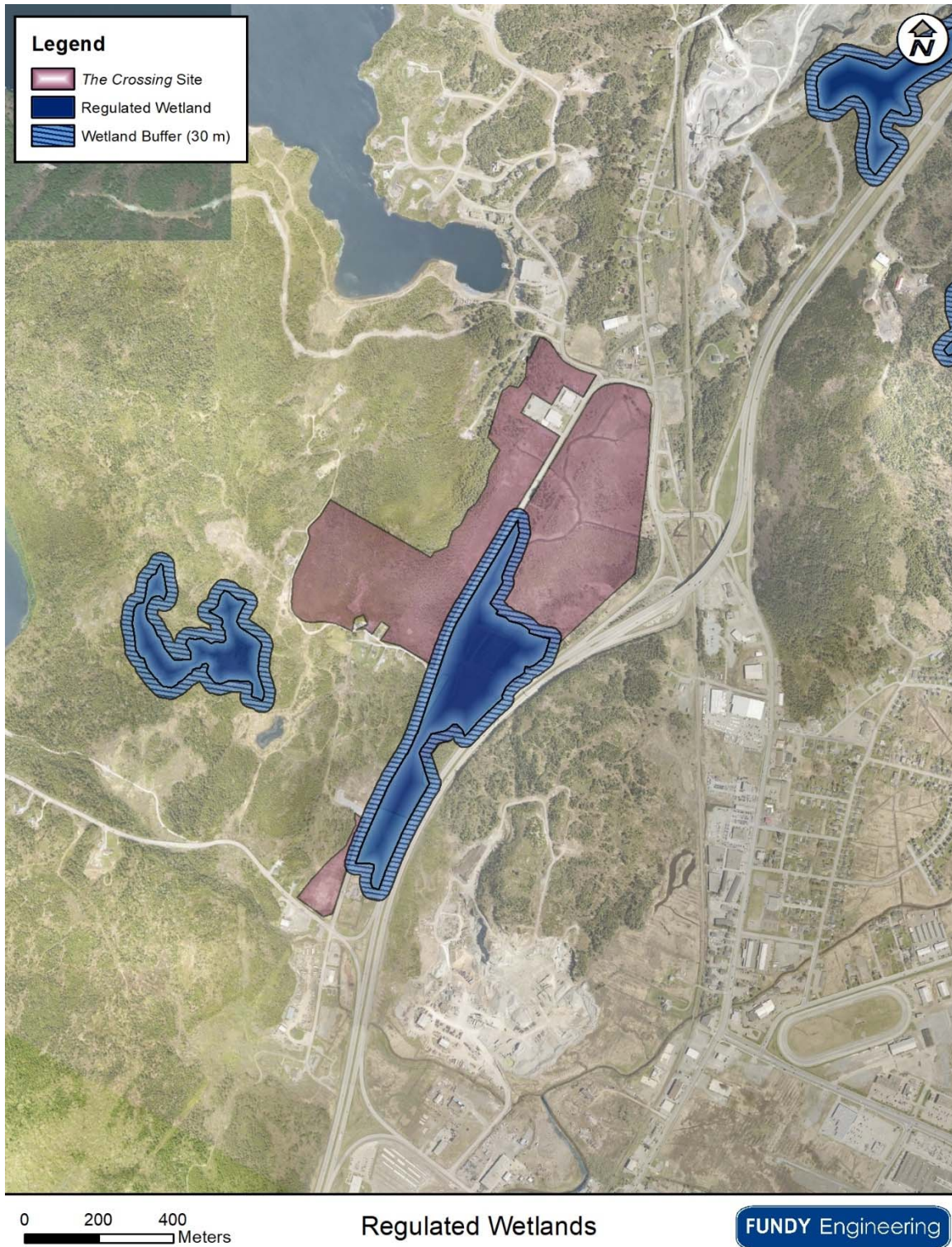


Figure 20. Aerial photograph, circa 2004, showing mapped wetlands in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

Table 10. Summary of Dillon's functional assessment results from May and June 2017 for the three wetland areas on the lands proposed for *The Crossing* in east Saint John, New Brunswick.

Wetland Function	Ratings (Normalized Score)					
	Project Site Wetland Area 1		Project Site Wetland Area 2		Rothesay Avenue Lands Wetland	
	Function	Benefit	Function	Benefit	Function	Benefit
<b>Hydrologic</b> Water storage and delay	Lower (1.65)	<b>Higher</b> (6.07)	Moderate (2.94)	Moderate (2.86)	Lower (1.93)	Moderate (2.86)
<b>Water Quality Support</b> Sediment retention & stabilization, phosphorous / nitrate retention, and carbon sequestration	NR (2.41)	<b>Higher</b> (10.00)	NR (2.46)	<b>Higher</b> (10.00)	NR (1.82)	<b>Higher</b> (10.00)
<b>Aquatic Support</b> Streamflow, aquatic invertebrate habitat, organic nutrient export, and water cooling	NR (7.23)	<b>Higher</b> (9.00)	NR (7.11)	<b>Higher</b> (7.96)	<b>Higher</b> (7.56)	<b>Higher</b> (10.00)
<b>Aquatic Habitat</b> Anadromous fish, resident fish, amphibian, turtle, and waterbird (breeding + feeding) habitat	NR (6.72)	<b>Higher</b> (6.50)	NR (6.41)	<b>Higher</b> (8.27)	NR (6.95)	<b>Higher</b> (10.00)
<b>Transition Habitat</b> Songbird, raptor, mammal, native plant, and pollinator habitat	NR (5.25)	<b>Higher</b> (8.25)	<b>Higher</b> (7.45)	<b>Higher</b> (10.00)	NR (5.10)	<b>Higher</b> (10.00)
<b>Wetland Condition</b> Wetland ecological condition		Lower (2.76)		Lower (2.76)		Moderate (5.52)
<b>Wetland Risk</b> Sensitivity and stressors		<b>Higher</b> (9.54)		<b>Higher</b> (9.82)		<b>Higher</b> (10.00)

Notes:

NR = No Rating and does not mean the function is absent, but implies that the assessed wetland has a capacity that is equal to or less than the lowest-scoring among the 98 NB calibration wetlands for that particular function

### 3.1.6 Geology

#### 3.1.6.1 Bedrock

The Project site lies within the Central Plateau of the Caledonia Highland physiographic region of New Brunswick [Rampton *et al.*, 1984]. The Caledonia Zone is underlain by a Middle Proterozoic quartzite-carbonate sequence and a succession of Late Proterozoic volcanic and associated intrusive rocks. A Cambrian to Early Ordovician platformal sequence containing a distinctive Acado-Baltic trilobite fauna unconformably overlies Precambrian rocks. The Caledonia Zone is generally considered to represent a crustal fragment rifted from the margin of Gondwana during opening of the Early Paleozoic Iapetus Ocean.

Bedrock geology of the local area is described in Table 11 and shown in Figure 21. Underlying the majority of the site are metamorphic and igneous rocks from the Ashburn Formation and the Brookville Gneiss Formation [Johnson *et al.*, 2005]. Rocks of those formations are Middle Neoproterozoic in age (*i.e.*, 545 mya to 1 000 mya). Bedrock exposure in the vicinity of the Project site occurs along the valley edges. Based on geotechnical investigations at the site in 2005, the depth to bedrock ranges from 3.3 m to 39.3 m (*i.e.*, refer to Appendix III for a geotechnical investigation report).

Table 11. Descriptions of the bedrock geology in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

Code	Age	Group	Formation	Description
ZAS <sub>mb</sub>	Middle Neoproterozoic	Green Head	Ashburn	White to grey and light green, generally banded and locally stromatolitic marble; black to brown pelite; massive spotted hornfels; white to grey fine-grained quartzite; minor marble-pebble conglomerate and mica schist
ZBK <sub>gn</sub>	Middle Neoproterozoic	New River Plutonic Suite	Brookville Gneiss	Dark grey to pinkish grey fine- to medium-grained, banded, and locally magmatitic paragneiss with minor calc-silicate, marble, or quartzite layers; grey medium-grained granodioritic to tonalitic orthogneiss with locally abundant biotite schlieren and amphibolite; the gneisses are locally intruded granodiorite, pegmatite, and diabase
ZMB <sub>iv</sub>	Late Neoproterozoic	Coldbrook	McBrien Lake	Grey to green, locally flow-banded dacite with minor tuff, tuffaceous sandstone, rhyolite, and basalt
Z€RE <sub>ii</sub>	Neoproterozoic / Cambrian	Golden Grove Plutonic Suite	Renforth Granodiorite	Dark grey to red, medium-grained, quartz diorite and tonalite with fine-grained dioritic xenoliths that is locally gradational to granodiorite
Z€ <sub>ii</sub>	Neoproterozoic / Cambrian	Golden Grove Plutonic Suite	Deformed Granitoid Rocks	Grey strongly deformed monzogranite to granodiorite with augen of feldspar and quartz
€OS <sub>Jc</sub>	Cambrian to early Ordovician	Saint John	Ratcliffe Brook, Glen Falls, Hanford Brook, Forest Hills, Kings Square, Silver Falls, Reversing Falls	Red beds; white quartzite and black sandstone; grey sandstone and shale; grey to black shale and impure limestone; grey fine-grained sandstone and micaceous shale and siltstone; black shale and fine-grained sandstone; black carbonaceous shale

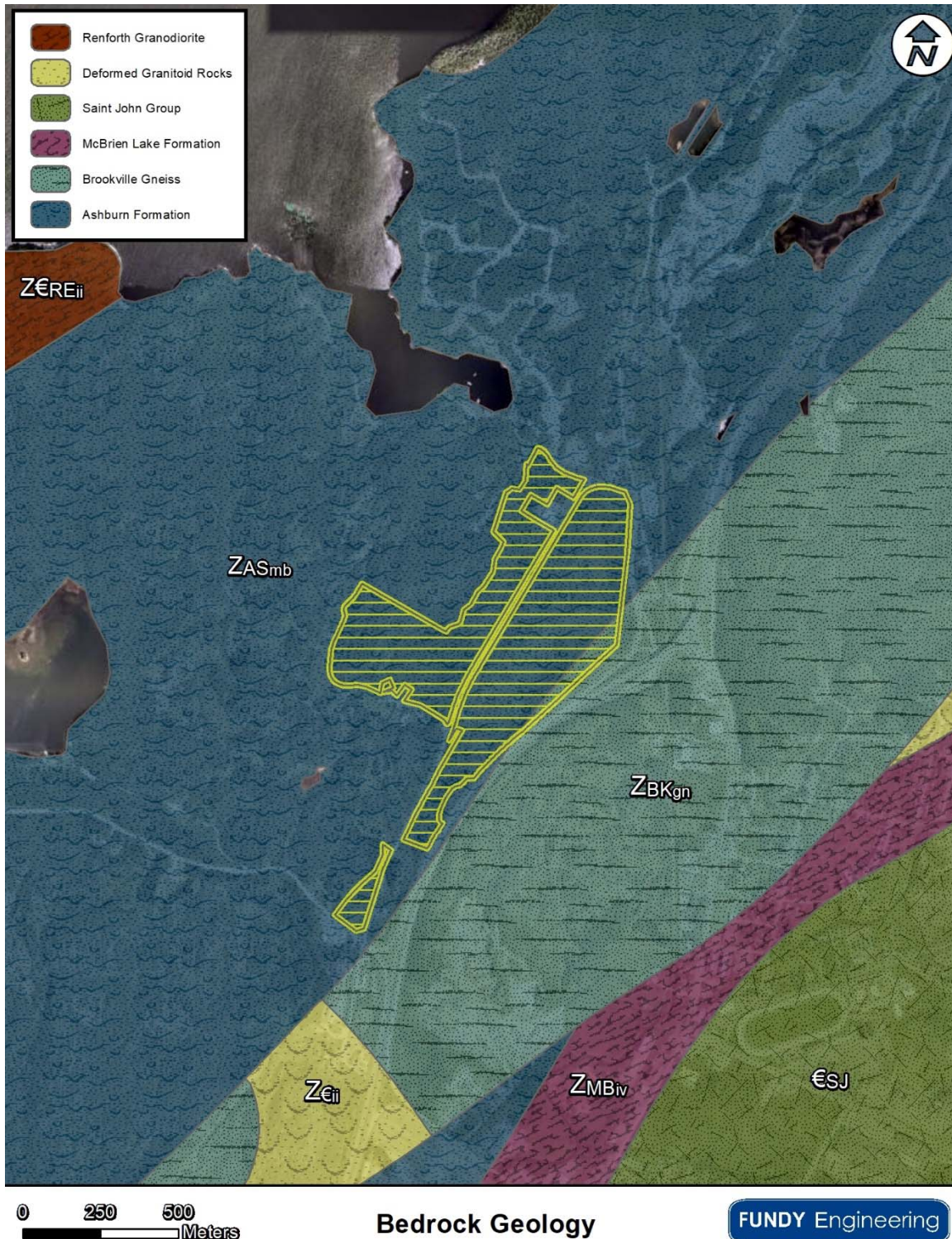


Figure 21. Bedrock geology map overlaying an aerial photograph, circa 2004, in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick. See text for bedrock geology descriptions.

### 3.1.6.2 Surficial

Surficial geology of the local area is described in Table 12 and shown in Figure 22. The Coldbrook / Drury Cove area is generally overlain by Late Wisconsinan sediments [Rampton, 1984]. Those blankets and veneers of ice-contact deposits are typically 0.5 m to 3 m thick and are generally comprised of sand, silt, and some gravel and clay. The materials were deposited in front of, at the margin of, within, or under retreating ice.

Much of the Little Marsh Creek valley is covered by a relatively deep overburden of marine and glaciofluvial sediments. Those marine sediments on the Project site are up to 40 m thick [Fundy Engineering, 2005]. The valley edges and surrounding hills are where the overburden tends to be shallow as described by Rampton [1984].

The Canada Land Inventory (CLI) database for land capability for agriculture indicates that lands within the Little Marsh Creek watershed are considered Class 7 soils, which suggests they are incapable of use for arable agriculture or permanent pasture [CLI, 1974]. The CLI database for land capability for forestry indicates that lands within the Little Marsh Creek watershed are considered Class 6 and Class 7 soils [CLI, 1975]. Class 6 soils are those that have severe limitations to the growth of commercial forests and Class 7 soils are those having severe limitations that preclude the growth of commercial forests. Agriculture Canada [1992] produced a water erosion risk map for the Maritimes. Review of that map suggests that there is a severe risk of erosion on bare soils in the study area.

Table 12. Descriptions of the surficial geology in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

Code	Age	Description
aMb3	Late Wisconsinan	Morainal blankets generally 0.5 m to 3 m thick that are comprised typically of loamy lodgement till, minor ablation till, silt, sand, gravel, and rubble; the till is mainly stony with more than 35 % of clasts pebble-sized and larger; the sediments were deposited directly by Late Wisconsinan ice or with minor reworking by water
aMv3	Late Wisconsinan	Morainal veneer is discontinuous over rock that is < 0.5 m thick and comprised typically of loamy lodgement till, minor ablation till, silt, sand, gravel, and rubble; the till is mainly stony with more than 35 % of clasts pebble-sized and larger; the sediments were deposited directly by Late Wisconsinan ice or with minor reworking by water
R	Pre-Quaternary	Rock of various lithologies and all ages; generally weathered and partially disintegrated, glacially moulded surfaces; few localities show glacially scoured and polished surfaces
WbGx3	Late Wisconsinan	Ice-contact deposits of sand, gravel, minor silt and till, generally more than 2m thick, in the form of eskers, kames, kame and kettle complexes

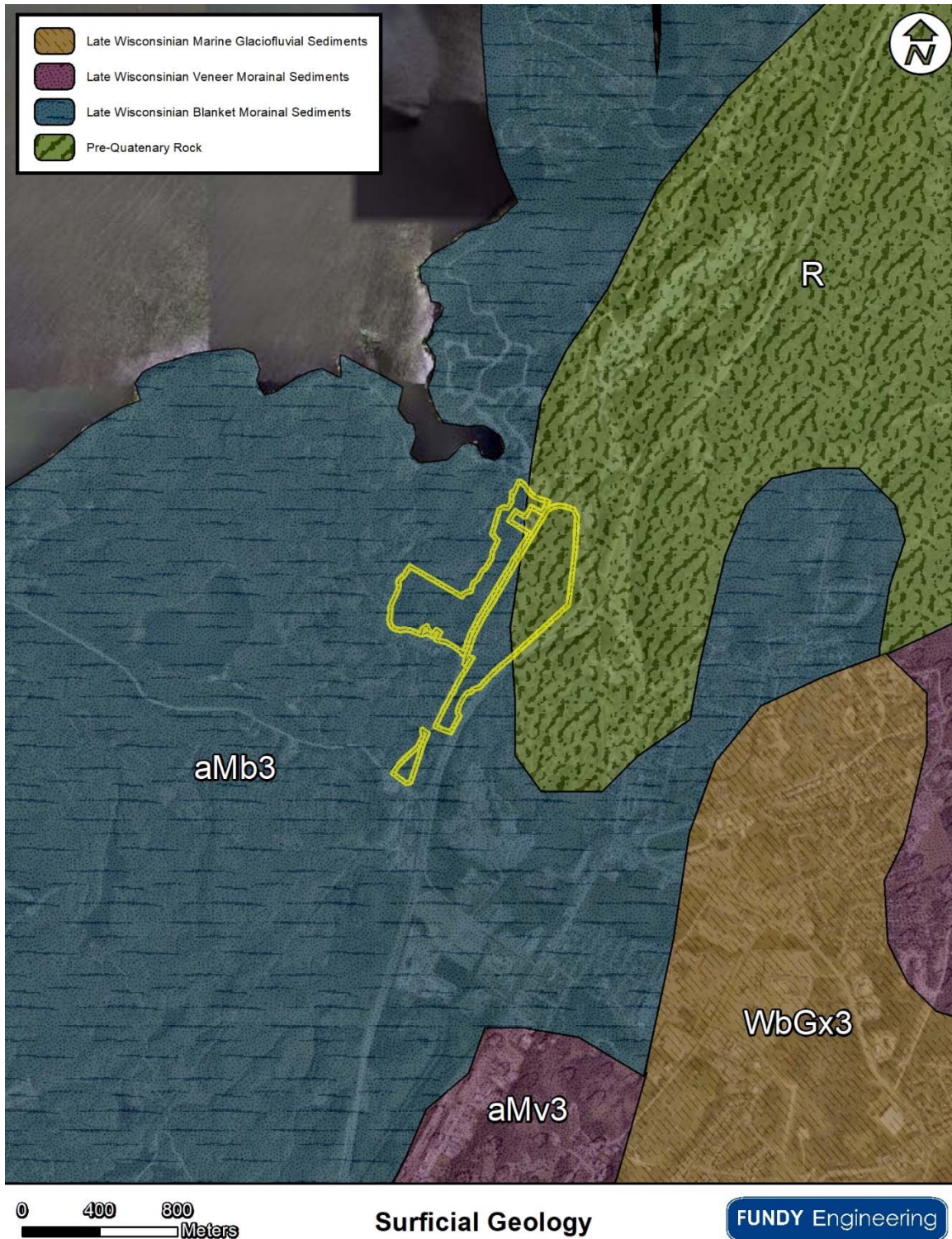


Figure 22. Surficial geology map overlaying an aerial photograph, circa 2004, in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick. See text for surficial geology descriptions.

### 3.1.7 Hydrogeology

Approximately 64 % of New Brunswick's population is reliant on groundwater for supplying domestic freshwater [Natural Resources Canada, 2005]. Individual water well owners in the province depend on small aquifers, typically composed of thin glacial sand and gravel deposits, to supply their potable water. Regional groundwater availability maps exist for most of Canada and are generalizations of large quantities of data collected for a region [Natural Resources Canada, 2005]. In Saint John, aquifers are typically able to supply a flow rate  $< 24 \text{ L} \cdot \text{min}^{-1}$  (Figure 23); however, localized groundwater availability can only be determined through on-site investigations.

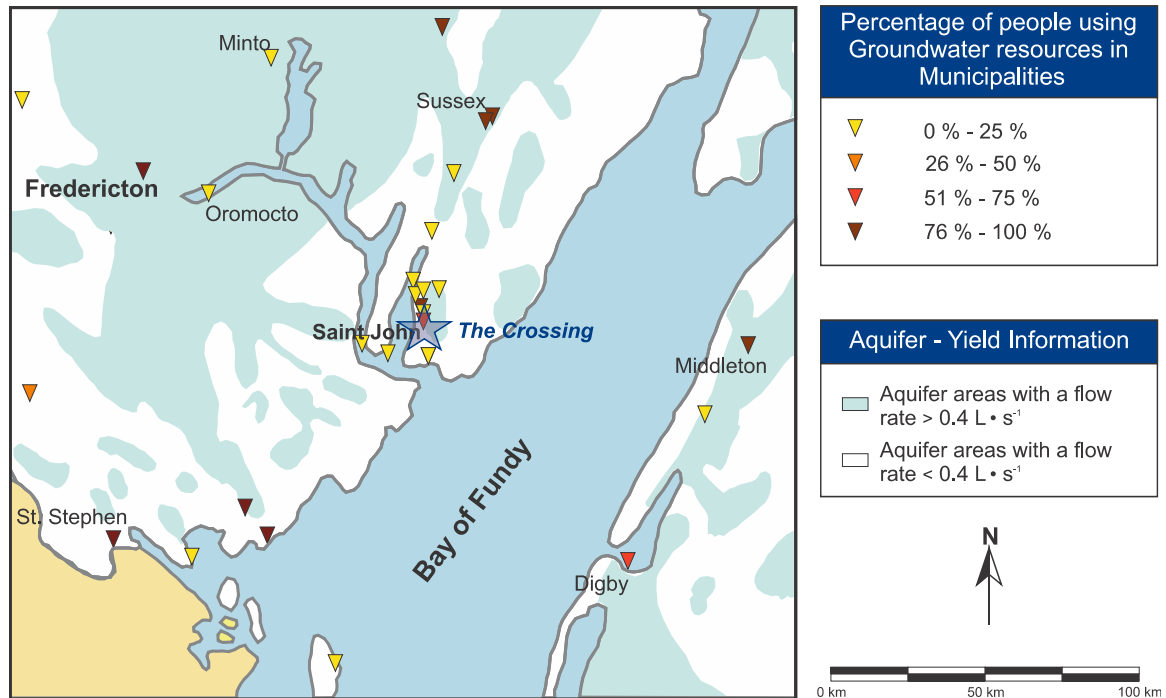


Figure 23. Groundwater availability map for Saint John, New Brunswick and the surrounding area.

Much of Saint John is serviced by a municipal potable water distribution system; however, there are pockets across the City where municipal infrastructure does not exist. In those areas, residential, commercial, and industrial properties rely on groundwater wells to supply potable water. Some lands surrounding the proposed Project are serviced by individual potable groundwater wells.

Residences along the following roads surrounding the Project site are served by individual groundwater wells (Figure 24):

- Stagecoach Drive;
- Jones Drive;
- Hunters Cove Road;
- Foster Thurston Drive; and
- Ashburn Road west of Foster Thurston Drive.

Most of those groundwater wells are located upgradient of the majority of the Project site.

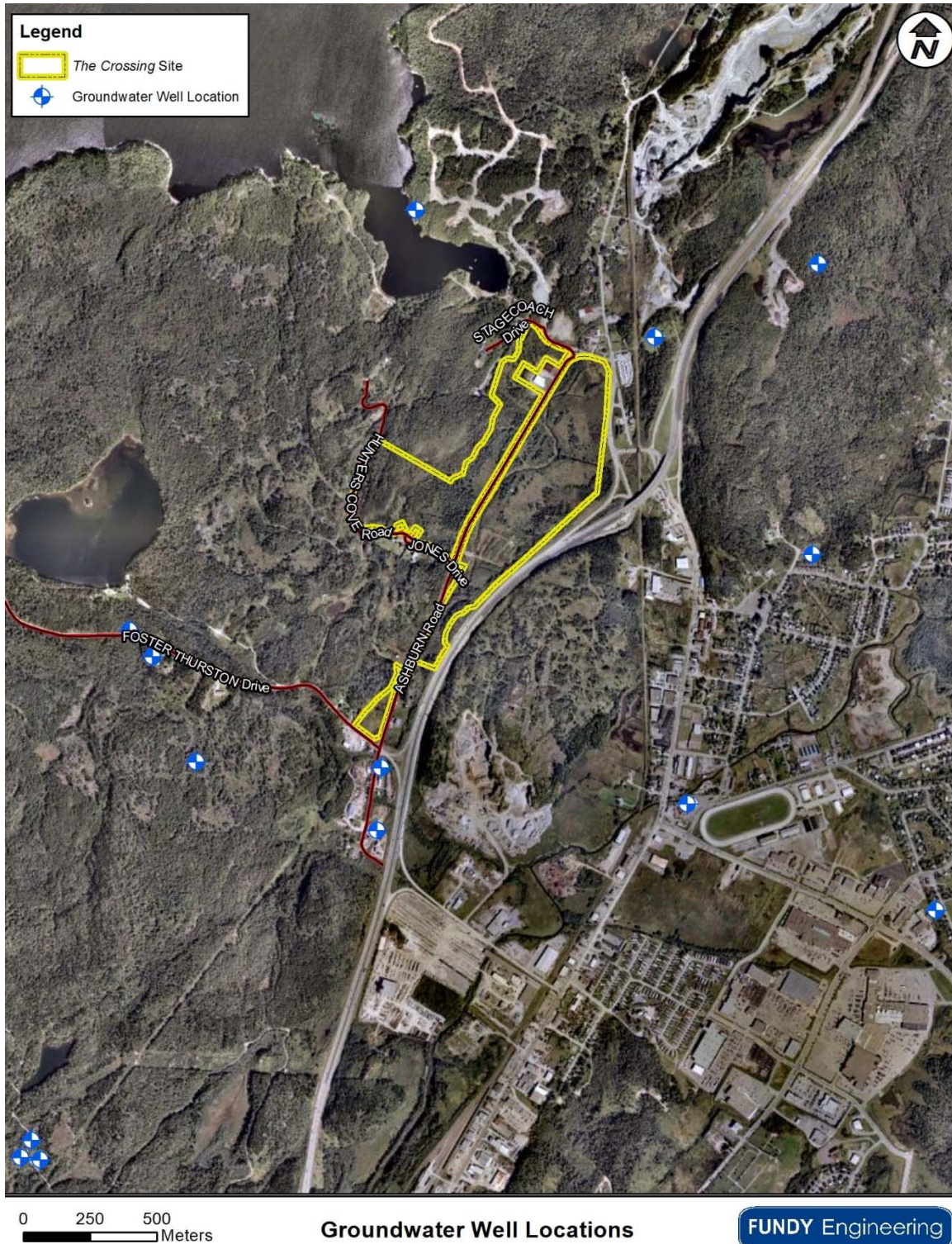


Figure 24. Aerial photograph, circa 2004, showing properties within 2 km of *The Crossing* proposed for east Saint John, New Brunswick where well logs were obtained and reviewed.



### 3.1.7.1 Local Groundwater Quantity

A potable groundwater well records search was performed within a 2 km radius of the proposed Project (*i.e.*, PID 55100325 was used for the search centre). The records search yielded 17 well logs (*n.b.*, not all well logs provide all data assessed below, which is the reason *n* varies). The area where the well records were drawn from and the location of the wells captured is shown in Figure 24. Table 13 provides a summary of the data obtained from the NBDELG's online well log system database. For the complete data set, please refer to Appendix XIX.

Based on the records, the mean well depth is 99.6 m  $\pm$  70.93 m (*n* = 15). Depths range from as shallow as 6.4 m to as deep as 243.8 m (Table 13 and Figure 25). Casing length for this group of wells averages 14.3 m  $\pm$  7.46 m (ranging from 6.1 m to 33.8 m; *n* = 15). Bedrock is typically found at a depth of 6.9 m  $\pm$  9.84 m (*n* = 12) below ground. The shallowest depth that bedrock was encountered is at the surface and the greatest depth is 33.8 m. Some of the wells are installed in unconsolidated materials while the majority of the wells are installed within fractured bedrock. The well drillers have identified the bedrock as being comprised of limestone, slate, granite, and conglomerate. Individual fracture yield (*n* = 26), as estimated by the well driller(s) during installation (*n.b.*, these data were not obtained from pump testing), varies from 1.1 L  $\cdot$  min<sup>-1</sup> to 228 L  $\cdot$  min<sup>-1</sup> with an average of 27.7 L  $\cdot$  min<sup>-1</sup>  $\pm$  49.7 L  $\cdot$  min<sup>-1</sup>. The average safe yield for the wells as estimated by the well driller(s) during installation, is 50.0 L  $\cdot$  min<sup>-1</sup>  $\pm$  84.78 L  $\cdot$  min<sup>-1</sup> (*n* = 15). The safe yield from the wells is estimated to be a low as 3.4 L  $\cdot$  min<sup>-1</sup> and as great as 341 L  $\cdot$  min<sup>-1</sup>. Static water levels, as measured by well drillers, are generally 79.4 m  $\pm$  80.02 m (*n* = 17) below the top of casing and typically range from the surface to 243.8 m.

Table 13. Summary of potable groundwater well records within a 2 km radius around *The Crossing* proposed for east Saint John, New Brunswick where well logs were obtained and reviewed.

Parameter*	<i>n</i>	Mean $\pm$ Std. Dev.	Min	Max
Well depth (m)	15	99.6 $\pm$ 70.93	6.4	243.8
Casing length (m)	15	14.3 $\pm$ 7.46	6.1	33.8
Bedrock depth (m)	12	6.9 $\pm$ 9.84	0	33.8
Safe yield (L $\cdot$ min <sup>-1</sup> )	15	50.0 $\pm$ 84.78	3.4	341.3
Static water level (m)	17	79.4 $\pm$ 80.02	0	243.8

Notes:

\*As determined by the Water Well Driller(s) during installation

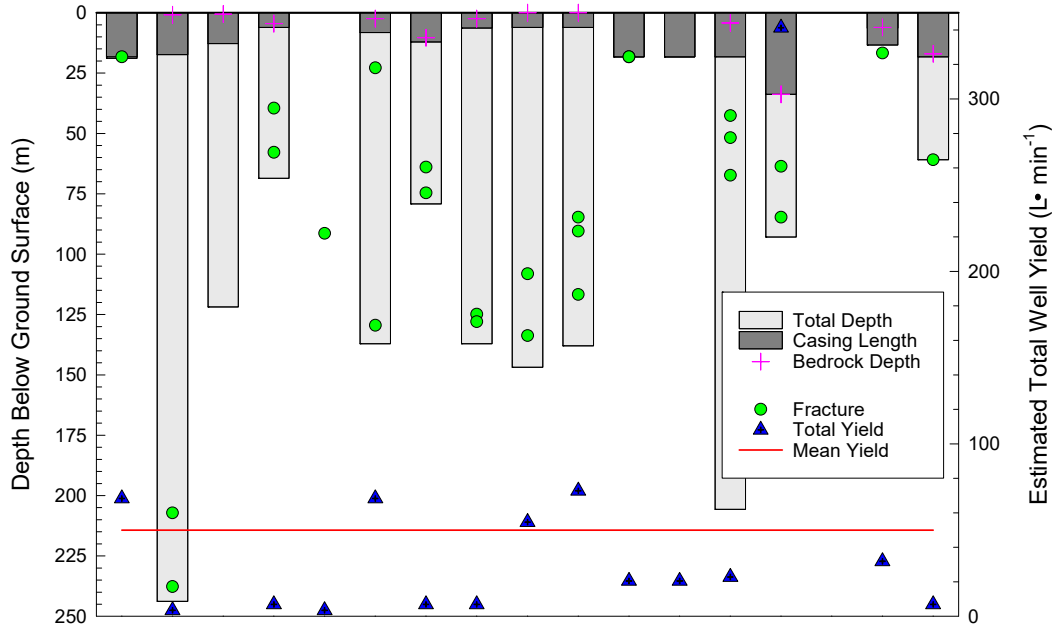


Figure 25. Compilation of the 17 potable groundwater well records within 2 km of the lands proposed for *The Crossing* in east Saint John, New Brunswick.

### 3.1.7.2 Local Groundwater Quality

Fundy Engineering reviewed water chemistry records (*i.e.*, microbiology, general chemistry, and trace metals) available for potable water wells within 2 km of the proposed Project (*i.e.*, PID 55100325 was used for the search centre). A total of six water quality records were obtained from the NBDELG groundwater well database for microbiology, general chemistry, and trace metals. Summaries of the water quality data obtained from the NBDELG for microbiology, general chemistry, and trace metals are provided in Table 14, Table 15, and Table 16, respectively.

Table 14. Microbiological analysis results obtained within 2 km of the lands proposed for *The Crossing* in east Saint John, New Brunswick. Highlighted cells with bold entries indicate values above the CDWQGs. Yellow shaded entries indicate that the values **do not** pose a health concern, while red shaded cells indicate that the values **may** pose a health concern.

Parameter	Units	CDWQG (Type)	1	2	3	4	5	6
Total Coliforms	units · 100 mL <sup>-1</sup>	0 (MAC)	Pr	Ab	Pr	Pr	Pr	
<i>Escherichia coli</i>	units · 100 mL <sup>-1</sup>	0 (MAC)	Ab	Ab	Ab	Ab	Pr	

Notes:  
 MAC = Maximum Acceptable Concentration, Pr = Presence, Ab = Absence

Total coliforms are a group of closely related, mostly harmless bacteria that live in soil and water and the intestinal tract of warm-blooded mammals, including humans [Henry and Heinke, 1996]. When present in a potable groundwater well, total coliforms suggest that there may be surface water containing these bacteria entering the groundwater aquifer. Their presence is common in potable groundwater throughout the Province [M. Alexander, personal observation], and they are more prominent in the spring and fall when infiltration

to aquifers is more pronounced. These bacteria may indicate the presence of other microorganisms that could lead to health effects including nausea, vomiting, and diarrhea. The effects may be more pronounced in susceptible individuals, such as infants, the elderly, and those with suppressed immune systems.

*E. coli* is a type of fecal coliform bacteria that is commonly found in the intestines of humans and warm-blooded animals. The presence of this bacteria within a potable groundwater well sample would indicate that there was sewage (e.g., discharge from a septic tank / or drainage field) or animal waste contamination recently to the aquifer. There are many strains of the bacterium *E. coli* and some are harmless while others can cause severe illness. Infection by *E. coli* can cause severe bloody diarrhea and abdominal cramps. Effects may be more pronounced in susceptible individuals, such as infants, the elderly, and those with suppressed immune systems. In the case of these individuals, complications, such as hemolytic uremic syndrome, which leads to kidney failure, can result.

Table 15. General chemistry analysis results obtained within 2 km of the lands proposed for *The Crossing* in east Saint John, New Brunswick. Highlighted cells with bold entries indicate values above the CDWQGs. Yellow shaded entries indicate that the values **do not** pose a health concern, while red shaded cells indicate that the values **may** pose a health concern.

Parameter	Units	CDWQG (Type)	1	2	3	4	5	6
Aluminum	mg · L <sup>-1</sup>	NG	0.054	0.037	< 0.025			< 0.025
Alkalinity (as CaCO <sub>3</sub> )	mg · L <sup>-1</sup>	NG	125	92.9	149			38.5
Boron	mg · L <sup>-1</sup>	5 (IMAC)	< 0.01	0.125	0.032			< 0.2
Barium	mg · L <sup>-1</sup>	1 (MAC)	< 0.01	0.084	0.062			0.029
Calcium	mg · L <sup>-1</sup>	NG	53.1	25.9	55.9			17.8
Chloride	mg · L <sup>-1</sup>	≤ 250 (AO)	7.02	10.7	142			7.07
Conductivity	µS · cm <sup>-1</sup>	NG	301.65	268.288	794.247			115.272
Iron	mg · L <sup>-1</sup>	≤ 0.3 (AO)	0.122	0.235	0.015			0.18
Hardness (as CaCO <sub>3</sub> )	mg · L <sup>-1</sup>	≤ 200 (AO)	155	81.5	<b>281</b>			130
Potassium	mg · L <sup>-1</sup>	NG	3	0.9	2.1			0.416
Magnesium	mg · L <sup>-1</sup>	NG	5.51	4.06	34.4			1.86
Manganese	mg · L <sup>-1</sup>	≤ 0.05 (AO)	0.011	0.039	< 0.005			<b>0.116</b>
Nitrate + Nitrite (as N)	mg · L <sup>-1</sup>	45 (MAC)	1	< 0.05	< 0.05			< 0.05
pH	pH units	6.5 - 8.5 (AO)	7.38	8.33	8.03			7.84
Sodium	mg · L <sup>-1</sup>	≤ 200 (AO)	7.88	30.4	62.2			2.89
Sulfate	mg · L <sup>-1</sup>	≤ 500 (AO)	22.3	29.2	67.2			5.73
Turbidity	NTU	≤ 1.0 (AO)	<b>1.9</b>	<b>2.2</b>	0.23			<b>1.3</b>
Total Dissolved Solids	mg · L <sup>-1</sup>	NG	0.054	0.037	< 0.025			< 0.025

Notes:

AO = Aesthetic Objective, IMAC = Interim Maximum Acceptable Concentration, NG = No Guideline

Of the four nearby well records, there was one CDWQG exceedance noted for manganese (Table 15). Iron and manganese, which are brought about due to biological reactions, both may become annoyances in groundwater supplies [Sawyer *et al.*, 1994]. The exceedances measured for iron and manganese in neighbouring wells **do not pose a health concern**. Under the CDWQGs, those species are assigned AOs. These chemical species ( $\text{Fe}^{2+}$  and  $\text{Mn}^{2+}$ ) are byproducts of bacterial oxidation of organic matter by microorganisms. There are no serious effects of these chemical species to humans [Sawyer *et al.*, 1994]; however, both chemical species can interfere with laundering, stain plumbing fixtures, and clog distribution pipes by supporting bacteria growth. Iron also imparts a taste to water that most people do not consider aesthetically pleasing. Datasheets in Appendix III provides more information on iron and manganese.

Three of the four water quality records reviewed exceeded the CDWQG for turbidity (Table 15). Turbidity is a measure of the suspended matter contained within water and is a result of varying sized materials within a sample. It is common for groundwater in the area to be above the CDWQG of 1 NTU [Health Canada, 2017]; however, turbidity only affects the look of water [Henry and Heinke, 1996]. Because of this, the CDWQG for turbidity is an AO; **exceedances do not pose a health concern**.

Table 16. Trace metal analysis results obtained within 2 km of the lands proposed for *The Crossing* in east Saint John, New Brunswick. Highlighted cells with bold entries indicate values above the CDWQGs. Yellow shaded entries indicate that the values **do not** pose a health concern, while red shaded cells indicate that the values **may** pose a health concern.

Parameter	Units	CDWQG (Type)	1	2	3	4	5	6
Antimony	$\mu\text{g} \cdot \text{L}^{-1}$	6 (IMAC)	< 1	< 1	< 1			< 1
Arsenic	$\mu\text{g} \cdot \text{L}^{-1}$	10 (MAC)	< 1.5	1.6	4.1			< 1.5
Cadmium	$\mu\text{g} \cdot \text{L}^{-1}$	5 (MAC)	< 0.5	< 0.5	< 0.5			< 0.5
Chromium	$\mu\text{g} \cdot \text{L}^{-1}$	50 (MAC)	20	< 10	< 10			< 10
Copper	$\mu\text{g} \cdot \text{L}^{-1}$	$\leq 1\ 000$ (AO)	68	< 10	< 10			< 10
Lead	$\mu\text{g} \cdot \text{L}^{-1}$	10 (MAC)	1.1	< 1	< 1			< 1
Selenium	$\mu\text{g} \cdot \text{L}^{-1}$	10 (MAC)	< 1.5	< 1.5	6			< 1.5
Thallium	$\mu\text{g} \cdot \text{L}^{-1}$	NG	< 1	< 1	< 1			< 1
Uranium	$\mu\text{g} \cdot \text{L}^{-1}$	20 (IMAC)	0.6	1	24			
Zinc	$\mu\text{g} \cdot \text{L}^{-1}$	$\leq 5\ 000$ (AO)	25	< 5	15			11

Notes:

AO = Aesthetic Objective, IMAC = Interim Maximum Acceptable Concentration, NG = No Guideline

High uranium levels are often the result of leaching from natural deposits and release from mine tailings [Henry and Heinke, 1996]. High concentrations of uranium ( $150\ \text{mg} \cdot \text{kg}^{-1}$ ) are found in phosphate fertilizers. Uranium is also released to the environment through the combustion of coal and other fuels [Health Canada, 2004]. High uranium levels in drinking water have been linked to increased risk of cancer and kidney failure. **Exceedances may pose a health concern**, which is why an MAC is applied to uranium. One of the nearby wells showed an exceedance for uranium (Table 16).

## 3.2 BIOLOGICAL ENVIRONMENT

The baseline biological environment was characterized using available desktop information and by completing several field assessments specific to the Project site. Desktop data included sources, such as:

- the federal species at risk registry;
- the Committee On Status of Endangered Wildlife In Canada (COSEWIC) database;
- the provincial species at risk registry;
- the Atlantic Canada Conservation Data Centre (ACCDC) databases; and
- eBird Canada and NatureCounts databases.

The sections below describe results of the desktop and field assessments related to the biological environment for the Project site.

### 3.2.1 Federal Species At Risk

Federally listed species at risk that exist in New Brunswick and could potentially be impacted by the Project are noted in Table 17. Those terrestrial and aquatic species identified under the federal *Species At Risk Act* (fSARA) [S.C. 2002, C.29] and by the COSEWIC as being at risk in New Brunswick are listed. Listing of a species in Table 17 does not indicate that it is either present or absent at the Project site. Presence and absence information is provided below. The order of risk level under the fSARA and by the COSEWIC is as follows: special concern; threatened; endangered; extirpated; and extinct.

Table 17. Terrestrial and aquatic flora and fauna listed as being species at risk under the fSARA and by the COSEWIC that could potentially be affected by *The Crossing* proposed for east Saint John, New Brunswick.

Common Name	Scientific Name	fSARA Status	COSEWIC Status
<b><u>Vascular Plants, Mosses, and Lichens</u></b>			
Black-foam lichen	<i>Anzia colpodes</i>	Threatened	Threatened
Blue felt lichen	<i>Degelia plumbea</i>	Special concern	Special concern
Boreal felt lichen	<i>Erioderma pedicellatum</i>	Endangered	Endangered
Vole ears lichen	<i>Erioderma mollissimum</i>	Endangered	Endangered
Prototype quillwort	<i>Isoetes prototypus</i>	Special concern	Special concern
Butternut	<i>Juglans cinerea</i>	Endangered	Endangered
Beach pinweed	<i>Lechea maritime</i>	Special concern	Special concern
Wrinkled shingle lichen	<i>Pannaria lurida</i>	Threatened	Threatened
Furbish's lousewort	<i>Pedicularis furishiae</i>	Endangered	Endangered
Eastern waterfan	<i>Petigera hydrothyria</i>	Threatened	Threatened
Anticosti aster	<i>Symphyotrichum anticostense</i>	Threatened	Special concern
Gulf of St. Lawrence aster	<i>Symphyotrichum laurentianum</i>	Threatened	Threatened
<b><u>Molluscs</u></b>			
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	Extirpated	Extirpated

Common Name	Scientific Name	fSARA Status	COSEWIC Status
Brook floater	<i>Alasmidonta varicosa</i>	Special concern	Special concern
Yellow lampmussel	<i>Lampsilis cariosa</i>	Special concern	Special concern
<b>Reptiles</b>			
Snapping turtle	<i>Chelydra serpentina</i>	Special concern	Special concern
Wood turtle	<i>Glyptemys insculpta</i>	Threatened	Threatened
<b>Birds</b>			
Short-eared owl	<i>Asio flammeus</i>	Special concern	Special concern
Barrow's goldeneye	<i>Bucephala islandica</i>	Special concern	Special concern
Red knot <i>rufa</i> subspecies	<i>Calidris canutus rufa</i>	Endangered	Endangered
Eastern whip-poor-will	<i>Caprimulgus vociferus</i>	Threatened	Threatened
Canada warbler	<i>Cardellina</i>	Threatened	Threatened
Bicknell's thrush	<i>Catharus bicknelli</i>	Threatened	Threatened
Chimney swift	<i>Chaetura pelagica</i>	Threatened	Threatened
Piping plover <i>melodus</i> subspecies	<i>Charadrius melodus melodus</i>	Endangered	Endangered
Common nighthawk	<i>Chordeiles minor</i>	Threatened	Special concern
Evening grosbeak	<i>Coccothraustes vespertinus</i>	Special concern	Special concern
Olive-sided flycatcher	<i>Contopus cooperi</i>	Threatened	Special concern
Eastern wood-pewee	<i>Contopus virens</i>	Special concern	Special concern
Yellow rail	<i>Coturnicops noveboracensis</i>	Special concern	Special concern
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened
Rusty blackbird	<i>Euphagus carolinus</i>	Special concern	Special concern
Barn swallow	<i>Hirundo rustica</i>	Threatened	Threatened
Harlequin duck	<i>Histrionicus histrionicus</i>	Special concern	Special concern
Wood thrush	<i>Hylocichla mustelina</i>	Threatened	Threatened
Least bittern	<i>Ixobrychus exilis</i>	Threatened	Threatened
Eskimo curlew	<i>Numenius borealis</i>	Endangered	Endangered
Red-necked phalarope	<i>Phalaropus lobatus</i>	Special concern	Special concern
Bank swallow	<i>Riparia riparia</i>	Threatened	Threatened
Roseate tern	<i>Sterna dougallii</i>	Endangered	Endangered
Eastern meadowlark	<i>Sturnella magna</i>	Threatened	Threatened
<b>Arthropods</b>			
Gypsy cuckoo bumble bee	<i>Bombus bohemicus</i>	Endangered	Endangered
Yellow-banded bumble bee	<i>Bombus terricola</i>	Special concern	Special concern
Cobblestone tiger beetle	<i>Cicindela marginipennis</i>	Endangered	Endangered
Maritime ringlet	<i>Coenonympha nipisiquit</i>	Endangered	Endangered
Monarch butterfly	<i>Danaus plexippus</i>	Special concern	Endangered
Skillet clubtail	<i>Gomphus ventricosus</i>	Endangered	Endangered
Pygmy snaketail	<i>Ophiogomphus howei</i>	Special concern	Special concern
<b>Fishes</b>			
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Special concern	Special concern
Rainbow smelt (Lake Utopia)	<i>Osmerus mordax</i>	Threatened	Threatened
Atlantic salmon (IBOF pop.)	<i>Salmo salar</i>	Endangered	Endangered

Common Name	Scientific Name	fSARA Status	COSEWIC Status
<b>Terrestrial Mammals</b>			
Little brown bat	<i>Myotis lucifugus</i>	Endangered	Endangered
Northern bat	<i>Myotis septentrionalis</i>	Endangered	Endangered
Tri-colored bat	<i>Perimyotis subflavus</i>	Endangered	Endangered

The ACCDC databases were queried for known observation data of federally protected species within a 5 km radius of the Project site (*i.e.*, refer to Appendix XX). According to the ACCDC data, 12 species listed under the fSARA and by the COSEWIC have been observed (Figure 26).

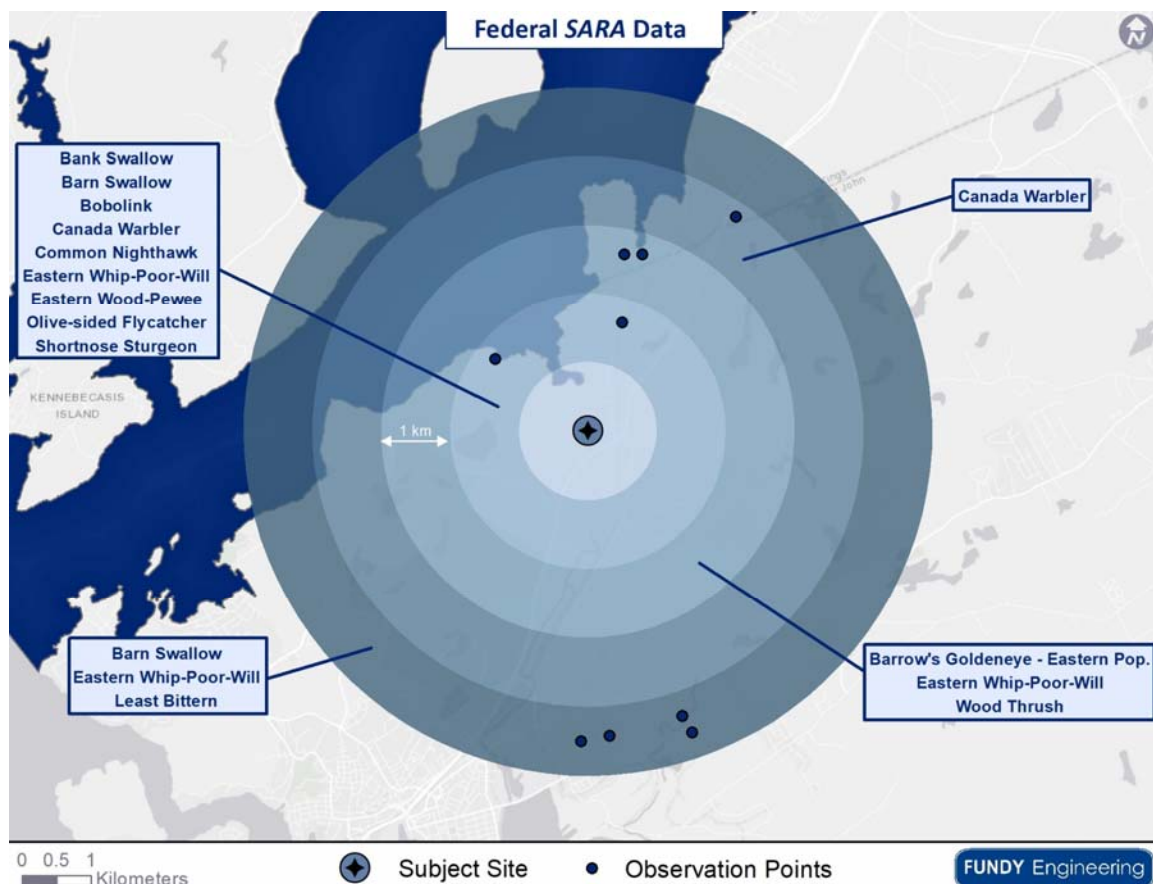


Figure 26. Map showing the recorded observations of species listed under the fSARA and by the COSWEIC within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

### 3.2.1.1 Snapshots of Federal Species At Risk Locally Present

Detailed information provided below on the protected species was obtained from the species profiles on the fSARA [SARA, 2019] and COSWEIC [COSEWIC, 2019] websites.

Barrow's Goldeneye (Figure 27) is ranked as a species of special concern under the fSARA and by the COSEWIC (Table 17). It is a medium-sized monogamous diving duck that breeds and winters primarily in Canada. About 400 of these birds over-winter in

Atlantic Canada. They breed in tree cavities and rock crevices and their nests are usually placed within 1 km to 2 km from water and between 2 m and 15 m above the ground. During the breeding season it feeds on aquatic insects and crustaceans of inland waters. During winter, they are partial to coastal waters where they feed on molluscs and crustaceans.



Figure 27. Photographs of species listed under the fSARA and by the COSEWIC that have been observed within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick.

The eastern whip-poor-will is a nocturnal, insect-eating bird, approximately 24 cm that has a long and large flattened head, large eyes, and a small bill (Table 17). The plumage of both males and females is grey and brown, which provides effective camouflage during the day. It is known by its persistent haunting song, which sounds like “whip-poor-will,”



hence its name. Breeding bird surveys have estimated populations in New Brunswick to be around 2 000 individuals, with an average annual decline of 3.5 %. The whip-poor-will is listed as a threatened species under the fSARA and by the COSEWIC (Figure 27).

The Canada warbler (Figure 27) is a small (12 cm to 15 cm), brightly coloured songbird. Their numbers have plummeted in the majority of their nesting areas. Although most abundant in wet, mixed deciduous-coniferous forest with a well-developed shrub layer, it is found in a variety of forest types. It also prefers riparian shrub forests on slopes and in ravines and in old-growth forests with canopy openings and a high density of shrubs, as well as in regenerating forest stands. Because their habitat is being lost and degraded, their numbers continue to be vulnerable to decline and hence the reasoning for their threatened ranking under the fSARA and by the COSEWIC (Table 17).

The common nighthawk (Figure 27), a medium-sized bird with long, narrow, pointed wings and a slightly notched long tail, is ranked as a threatened species under the fSARA and as a species of special concern by the COSEWIC (Table 17). While in flight, their distinguishing feature is a wide white stripe across the long feathers at the edge of their wings. They nest in a wide variety of open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. They are also known to inhabit mixed and coniferous forests. Causes of population decline are unknown, but it may be partly attributed to the decline of their main food source (*i.e.*, insects).

The olive-sided flycatcher (Figure 27) is a small (*i.e.*, 18 cm to 20 cm long), but stout songbird ranked as a threatened species under the fSARA and by the COSEWIC (Table 17). They breed in scattered locations throughout most coniferous and mixed forests of Canada. Considerable declines in population have occurred due to habitat loss and alteration. These birds are most often found in open areas containing tall live trees or snags for perching. Those vantage points are required to suit their foraging habits. Open areas used comprise forest clearings, forest edges located near natural openings, such as rivers and swamps, logged areas, burned forest, or open areas within old-growth forests.

The eastern wood-pewee is a small forest flycatcher that grows to about 15 cm long (Figure 27). It was once thought to be a single species of the olive-sided flycatcher, but was later identified as a separate species. Adults are generally greyish-olive on their upper parts and pale on the under parts with pale bars on their wings. Males and females are similar in appearance. They have a distinctive, clear, three-part song, usually heard as “pee-ah-wee”. It is generally found in the mid-canopy layer of forest clearings and at the edges of deciduous and mixed forests. Its habitat is threatened through various land-use activities, which is why it is listed as a threatened species under the fSARA and as a species of special concern by the COSEWIC (Table 17).

The bobolink (Figure 27) is a small bird that averages 18 cm long, has a wingspan of about 29 cm, and weighs approximately 40 g. Male bobolinks have a distinctive plumage during the breeding season, which includes a black and white rump and a black and yellow nape. Their winter plumage, yellow and brown, is similar to that of the female. Bobolinks feed mainly on insects during the summer and switch to grains during migration periods. They are ground nesters. Since the mid-1900s, bobolinks have experienced an average annual decline of 3.8 %. The loss of these birds is primarily caused by changes in land-use, but

it is suspected that some decline is attributed to winter kill. The bobolink is listed as being a threatened species under the fSARA and by the COSEWIC (Table 17).

The barn swallow (Figure 27) is the most widespread swallow species in the world. The population of over 190 million individuals globally is considered stable. Because there have been considerable declines in the presence for the past several decades, the barn swallow is species is listed as threatened under the fSARA and by the COSEWIC (Table 17). It is a distinctive passerine that has blue upperparts, a long, deeply forked tail that is curved, and pointed wings. This 17 cm to 19 cm long bird is commonly found in open areas with low vegetation, such as pasture, meadows, and farmland. They build a cup nest from mud pellets in barns or other similar structures and feeds on insects caught while in flight.

The wood thrush (Figure 27) is a medium-sized neotropical migrant that is slightly smaller than an American robin. Males and females are similar looking. Adults are generally rusty-brown on the upperparts with white underparts and large blackish spots on the breast and flanks. Juveniles also have tawny streaks and spots on the back, neck, and wing coverts. The wood thrush typically nests in sugar maple or American beech trees of second-growth and mature deciduous and mixed forests that have a well-developed understory. Habitat degradation and fragmentation due to development and over-browsing by white-tailed deer have caused significant population declines over much of its range since the late 1970s. Because of this, the wood thrush is listed as threatened under the fSARA and by the COSEWIC (Table 17).

The least bittern is a small member of the heron and bittern family (Figure 27). It is ranked as a threatened species under the fSARA and by the COSEWIC (Table 17). The Canadian population is estimated at 1 000 pair. This species nests in freshwater marshes where dense tall aquatic vegetation (*i.e.*, cattails) is interspersed with clumps of woody vegetation and open water. In New Brunswick, nesting occurs in the extreme south and they are more common in marshes that exceed 5 ha.

The bank swallow (Figure 27) is a small (*i.e.*, 12 cm to 14 cm long with a 25 cm to 29 cm wingspan) slender insectivorous songbird that is highly social at all times of the year and is conspicuous at colonial breeding sites. At those sites, it excavates nesting burrows about 75 cm long in eroding vertical banks, such as riverbanks, lake and ocean bluffs, aggregate pits, road cuts, and stockpiles of soil, using its conical bill, feet, and wings. It is ranked as threatened under the fSARA and by the COSEWIC (Table 17) because of the severe long-term population decline over the last 40 years resulting primarily from the loss of breeding and foraging habitat. The bank swallow has a white underbelly and is brown on top. It has a dark band across the chest that extends down the middle of the chest. It can be distinguished in flight from other swallows by its quick, erratic wing beats and its almost constant buzzy, chattering vocalizations.

Found in 19 large river and estuary systems along the Atlantic seaboard from New Brunswick to Florida, the shortnose sturgeon (Figure 27) is listed under the fSARA and the COSEWIC as a species of special concern (Table 17). Populations of this small anadromous species of sturgeon are disconnected because of their large geographical range but use of a small number of river systems; the only Canadian river system they are found within is the Saint John. These armoured fish are bottom feeders and primarily eat insects and small crustaceans. In cool rivers like the Saint John, these fish reach sexual maturity between about 10 years to 14 years for males and 13 years to 17 years for

females. They can be long-lived (*i.e.*, up to 30 years for males and in excess of 60 years for females) and can grow to lengths over 1 m. Their decline since the 1960s is attributed to the construction of hydroelectric facilities, by-catch in commercial fisheries, and poaching.

### 3.2.2 Provincial Species At Risk

Provincially listed species at risk that exist in New Brunswick and could potentially be impacted by the Project are noted in Table 18. Those terrestrial and aquatic species identified under the provincial *Species At Risk Act* (pSARA) [**S.N.B. 2012, c.6**] as being at risk in New Brunswick are listed. Listing of a species in Table 18 does not indicate that it is either present or absent at the Project site. Presence and absence information is provided below. The order of risk level under the pSARA is as follows: special concern; threatened; endangered; and extirpated.

Table 18. Terrestrial and aquatic flora and fauna listed as being at risk in New Brunswick under the pSARA.

Common Name	Scientific Name	pSARA Status
<b><u>Vascular Plants, Mosses, and Lichens</u></b>		
Blue felt lichen	<i>Degelia plumbea</i>	Special concern
Parker's pipewort	<i>Eriocaulon parkeri</i>	Endangered
Vole ears lichen	<i>Erioderma mollissimum</i>	Endangered
Boreal felt lichen Atlantic population	<i>Erioderma pedicellata</i>	Endangered
Prototype quillwort	<i>Isoetes prototypus</i>	Endangered
Butternut	<i>Juglans cinerea</i>	Endangered
Beach pinweed	<i>Lechea maritima</i>	Special concern
Southern twayblade	<i>Listera australis</i>	Endangered
Furbish's lousewort	<i>Pedicularis furbishiae</i>	Endangered
Van Brunt's Jacob's-ladder	<i>Polemonium vanbruntiae</i>	Threatened
Pinedrops	<i>Pterospora andromedea</i>	Endangered
Anticosti aster	<i>Symphyotrichum anticostense</i>	Endangered
Gulf of St. Lawrence aster	<i>Symphyotrichum laurentianum</i>	Endangered
Bathurst aster Bathurst population	<i>Symphyotrichum subulatum</i>	Endangered
<b><u>Molluscs</u></b>		
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	Extirpated
Brook floater	<i>Alasmidonta varicosa</i>	Special concern
Yellow lampmussel	<i>Lampsilis cariosa</i>	Special concern
<b><u>Reptiles</u></b>		
Loggerhead sea turtle	<i>Caretta caretta</i>	Endangered
Snapping turtle	<i>Chelydra serpentina</i>	Special concern
Leatherback sea turtle Atlantic population	<i>Dermochelys coriacea</i>	Endangered
Wood turtle	<i>Glyptemys insculpta</i>	Threatened
<b><u>Birds</u></b>		
Short-eared owl	<i>Asio flammeus</i>	Special concern
Barrow's goldeneye Eastern population	<i>Bucephala islandica</i>	Special concern

Common Name	Scientific Name	pSARA Status
Red knot <i>rufa</i> subspecies	<i>Calidris canutus rufa</i>	Endangered
Whip-poor-will	<i>Caprimulgus vociferus</i>	Threatened
Bicknell's thrush	<i>Catharus bicknelli</i>	Threatened
Chimney swift	<i>Chaetura pelagica</i>	Threatened
Piping Plover <i>melodus</i> subspecies	<i>Charadrius melodus melodus</i>	Endangered
Common nighthawk	<i>Chordeiles minor</i>	Threatened
Olive-sided flycatcher	<i>Contopus cooperi</i>	Threatened
Eastern wood-pewee	<i>Contopus virens</i>	Special concern
Yellow rail	<i>Coturnicops noveboracensis</i>	Special concern
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened
Rusty blackbird	<i>Euphagus carolinus</i>	Special concern
Peregrine falcon <i>anatum / tundrius</i>	<i>Falco peregrinus anatum/tundrius</i>	Endangered
Bald eagle	<i>Haliaeetus leucocephalus</i>	Endangered
Barn swallow	<i>Hirundo rustica</i>	Threatened
Harlequin duck Eastern population	<i>Histrionicus histrionicus</i>	Endangered
Wood thrush	<i>Hylocichla mustelina</i>	Threatened
Least bittern	<i>Ixobrychus exilis</i>	Threatened
Eskimo curlew	<i>Numenius borealis</i>	Endangered
Horned grebe Western population	<i>Podiceps auritus</i>	Special concern
Roseate tern	<i>Sterna dougallii</i>	Endangered
Eastern meadowlark	<i>Sturnella magna</i>	Threatened
Canada warbler	<i>Wilsonia canadensis</i>	Threatened
<b>Arthropods</b>		
Cobblestone tiger beetle	<i>Cicindela marginipennis</i>	Endangered
Maritime ringlet	<i>Coenonympha nipsisquit</i>	Endangered
Monarch	<i>Danaus plexippus</i>	Special concern
Skillet clubtail	<i>Gomphus ventricosus</i>	Endangered
Pygmy snaketail	<i>Omphigomphus howei</i>	Special concern
<b>Fishes</b>		
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Special concern
Atlantic sturgeon Maritimes populations	<i>Acipenser oxyrinchus</i>	Threatened
Thorny skate	<i>Amblyraja radiata</i>	Special concern
Atlantic wolffish	<i>Anarhichas lupus</i>	Special concern
American eel	<i>Anguilla rostrata</i>	Threatened
Cusk	<i>Brosme brosme</i>	Endangered
White shark Atlantic population	<i>Carcharodon carcharias</i>	Endangered
Atlantic cod Laurentian south population	<i>Gadus morhua</i>	Endangered
Atlantic cod southern population	<i>Gadus morhua</i>	Endangered
American plaice Maritime population	<i>Hippoglossoides platessoides</i>	Threatened
Mako shortfin Atlantic population	<i>Isurus oxyrinchus</i>	Threatened
Porbeagle	<i>Lamna nasus</i>	Endangered

Common Name	Scientific Name	pSARA Status
Winter skate southern Gulf of St. Lawrence population	<i>Leucoraja ocellata</i>	Endangered
Winter skate Georges Bank-Western Scotian Shelf-pop.	<i>Leucoraja ocellata</i>	Special concern
Smooth skate Laurentian-Scotian population	<i>Malacoraja senta</i>	Special concern
Striped bass Bay of Fundy population	<i>Morone saxatilis</i>	Endangered
Striped bass southern Gulf of St. Lawrence population	<i>Morone saxatilis</i>	Special concern
Rainbow smelt Lake Utopia large-bodied population	<i>Osmerus mordax</i>	Threatened
Rainbow smelt Lake Utopia small-bodied population	<i>Osmerus mordax</i>	Threatened
Blue shark Atlantic population	<i>Prionace glauca</i>	Special concern
Atlantic salmon Inner Bay of Fundy population	<i>Salmo salar</i>	Endangered
Atlantic salmon Outer Bay of Fundy population	<i>Salmo salar</i>	Endangered
Atlantic salmon Gaspé-S. Gulf of St. Lawrence pop.	<i>Salmo salar</i>	Special concern
Acadian redfish Atlantic population	<i>Sebastes fasciatus</i>	Threatened
Spiny dogfish Atlantic population	<i>Squalus acanthias</i>	Special concern
Atlantic bluefin tuna	<i>Thunnus thynnus</i>	Endangered
<b>Mammals</b>		
Blue whale - Atlantic population	<i>Balaenoptera musculus</i>	Endangered
Fin whale Atlantic population	<i>Balaenoptera physalus</i>	Special concern
Gray wolf	<i>Canis lupus</i>	Extirpated
North Atlantic right whale	<i>Eubalaena glacialis</i>	Endangered
Wolverine	<i>Gulo gulo</i>	Extirpated
Canada lynx	<i>Lynx canadensis</i>	Endangered
Little brown <i>Myotis</i>	<i>Myotis lucifugus</i>	Endangered
Northern <i>Myotis</i>	<i>Myotis septentrionalis</i>	Endangered
Atlantic walrus	<i>Odobenus rosmarus rosmarus</i>	Extirpated
Tri-colored bat	<i>Perimyotis subflavus</i>	Endangered
Harbour porpoise Northwest Atlantic population	<i>Phocoena phocoena</i>	Special concern
Woodland caribou	<i>Rangifer tarandus caribou</i>	Extirpated

The ACCDC databases were queried for known observation data of provincially protected species within a 5 km radius of the Project site (*i.e.*, refer to Appendix XX). According to the ACCDC data, 10 species listed under the pSARA have been observed (Figure 31).

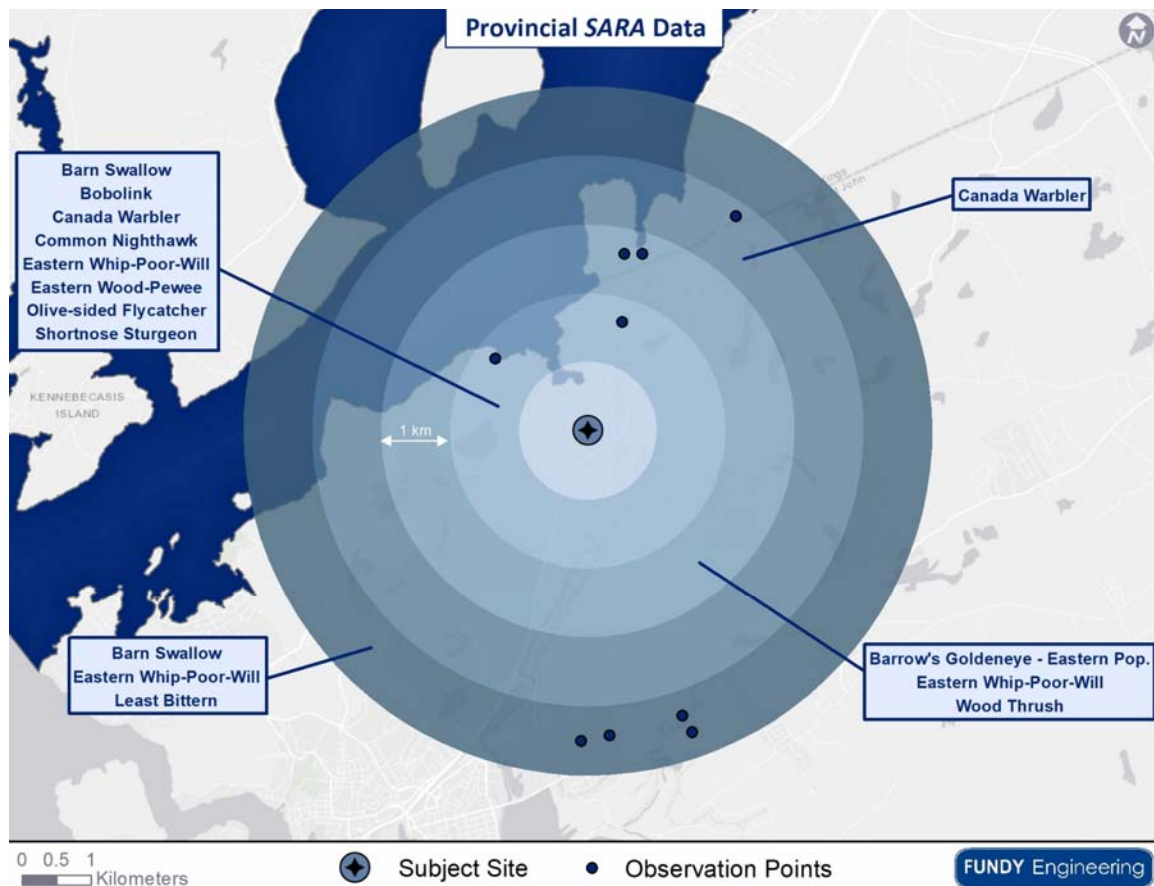


Figure 28. Map showing the recorded observations of species listed under the pSARA within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

### 3.2.2.1 Snapshots of Provincial Species at Risk Locally Present

Those 10 species listed under the pSARA that have been observed within 5 km of the Project site in east Saint John, New Brunswick are shown in Figure 29. All of those species were previously described in Section 3.2.1.1. All of the pSARA species have the same status under the fSARA (*c.f.*, Figure 27 and Figure 29).



Figure 29. Photographs of species listed under the pSARA that have been observed within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick.

### 3.2.3 Location-Sensitive Species

The New Brunswick Department of Natural Resources and Energy Development (NBDNRED) considers several species in the Province as “location-sensitive”. The ACCDC databases show three location-sensitive species for the area: wood turtle; bald eagle; and peregrine falcon (Figure 30). Bat hibernacula also appear on the location-sensitive query (*i.e.*, refer to Appendix XX). The three bat species that would use those hibernacula are also included as location-sensitive species (Figure 30).



Figure 30. Photographs of location-sensitive species included in the ACCDC data report within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick.

The wood turtle (Figure 30) inhabits a broad range of habitats. They prefer to be near areas of moderately flowing water (*e.g.*, streams, creeks, and rivers), and they favour

riparian areas with open canopy. During the summer, the wood turtle prefers to be on the ground in forested areas. In spring and fall they prefer to be near water and they overwinter in the water. Wood turtles appear to select habitats, rather than randomly using areas. The damming of watercourses, loss and degradation of riparian habitat, road mortality, and the pet trade all threaten the wood turtle population. They are considered sensitive to pollution as evidenced by their disappearance from low-quality watercourses. Pesticides and insecticides also threaten the population. No New Brunswick population is known to exceed 100 individuals. Although evidence suggests that populations are common and stable, the wood turtle is ranked as a threatened species under the pSARA, fSARA, and by the COSEWIC.

The bald eagle (Figure 30) is a large bird of prey with a distribution across North America and generally found near large bodies of open water that are near an abundant food supply and old-growth trees for nesting. Between the 1940s and 1970s, their numbers considerably declined due to intense hunting, unintentional poisonings (e.g., DDT and lead shot), and habitat destruction. Juveniles are dark brown with white streaking throughout, while adults support the white head and tail. At maturity, the bald eagle has a wingspan between 1.8 m and 2.3 m and can weigh up to 6 kg. Although the number of bald eagles has drastically increased over the past few decades to the point where they are no longer a species listed under the fSARA or by the COSEWIC, they are still listed as being endangered under the pSARA.

The *anatum* subspecies of the peregrine falcon (Figure 30) is a high-speed bird of prey slightly smaller and more streamlined than a hawk. Great declines in peregrine populations were observed following the introduction of the pesticide Dichloro-Diphenyl-Trichloroethane (DDT); however, their populations began to increase following DDT restrictions that were established in 1970. It is estimated that there are 500 pair in Canada. Because of this low number, they are listed as a threatened species under the pSARA, fSARA, and by the COSEWIC. Peregrine nests are usually scrapes made on cliff ledges near wetlands. Their nesting territory is about a 1 km radius around the nest and their home range extends to a radius of up to 27 km. They prefer open habitats such as wetlands, but they are known to hunt over open forest.

The little brown bat, northern bat, and tri-colored bat are small-bodied bats typical of the plain-nosed bats (Figure 30). These insectivores live in three different roosting sites: day roosts; night roosts; and hibernation roosts. Hibernation roosting populations have been decimated in recent years. It is estimated that about 6.5 million bats of several species, but primarily the little brown bat, have died in eastern Canada and the northeastern US as a result of white-nose syndrome. Populations in some hibernacula have fallen by more than 75 %. Species modelling has shown that this species could be extirpated by 2030 if declines continue. Their precipitous declines have resulted in their ranking under the under the pSARA, fSARA, and by the COSEWIC as endangered. Unaffected, these bats often live well beyond 10 years of age.

These bats generally range from 6 cm to 10 cm long, weigh less than 10 g, and have an average wingspan under 30 cm. The little brown bats distinguishing feature is a short and blunt tragus (*i.e.*, the inner side of the external ear). The northern bat has a long, slender, and pointed tragus and ears that extend beyond the nose when pressed forward. The tri-colored bat is distinguished by their distinctive tri-colored hairs.



### 3.2.4 Other Locally Observed Species

ACCDC databases were also queried for known observation data of provincially ranked flora and fauna within a 5 km radius of the Project site. Those species identified in the sections above are not included here. The full list of the flora and fauna within 5 km of the site is provided in Table 19 and the ACCDC report can be found in Appendix XX. Interpretation of the ACCDC S-rank system is provided in Table 20.

A visual representation of the 36 observed flora species is provided in Figure 31. Similarly, a visual representation of the 31 observed fauna species is provided in Figure 32 through Figure 34.

Table 19. List of provincially ranked flora and fauna identified by the ACCDC as being observed within 5 km of *The Crossing* proposed for east Saint John, New Brunswick.

Common Name	Scientific Name	S-rank	NB GS Rank
<b>Flora</b>			
Green spleenwort	<i>Asplenium viride</i>	S3	Secure
Common large Wetland Moss	<i>Calliergonella cuspidata</i>	S2S3	Sensitive
Calypso	<i>Calypso bulbosa var. americana</i>	S2	May be at risk
Large toothwort	<i>Cardamine maxima</i>	S3	Secure
Hairlike sedge	<i>Carex capillaris</i>	S3	Secure
Coastal sedge	<i>Carex exilis</i>	S3	Secure
Michaux's sedge	<i>Carex michauxiana</i>	S3	Secure
Russet sedge	<i>Carex saxatilis</i>	S1	May be at risk
Smooth twigrush	<i>Cladium mariscoides</i>	S3S4	Secure
Purple clematis	<i>Clematis occidentalis</i>	S3	Secure
Toothed flatsedge	<i>Cyperus dentatus</i>	S3	Secure
Showy lady's-slipper	<i>Cypripedium reginae</i>	S3	Sensitive
Few-flowered spikerush	<i>Eleocharis quinqueflora</i>	S3	Secure
Downy willowherb	<i>Epilobium strictum</i>	S3	Secure
Marsh horsetail	<i>Equisetum palustre</i>	S3	Secure
Hyssop-leaved fleabane	<i>Erigeron hyssopifolius</i>	S3	Secure
Herb Robert	<i>Geranium robertianum</i>	S2S3	Secure
Mountain firmoss	<i>Huperzia appressa</i>	S3	Sensitive
Loesel's twayblade	<i>Liparis loeselii</i>	S3	Secure
Brook lobelia	<i>Lobelia kalmii</i>	S3S4	Secure
Andean water milfoil	<i>Myriophyllum quitense</i>	S2S3	Secure
Siberian water milfoil	<i>Myriophyllum sibiricum</i>	S3S4	Secure
Glaucous rattlesnakeroot	<i>Nabalus racemosus</i>	S3	Secure
White-stemmed pondweed	<i>Potamogeton praelongus</i>	S2S3	Secure
Mistassini primrose	<i>Primula mistassinica</i>	S3	Secure
Roseroot	<i>Rhodiola rosea</i>	S3	Secure
Hooked scorpion moss	<i>Scorpidium scorpioides</i>	S2S3	Sensitive
Twisted peat moss	<i>Sphagnum contortum</i>	S3S4	Secure
Hairy hedge-nettle	<i>Stachys pilosa</i>	S3S4	Undetermined
Thread-leaved pondweed	<i>Stuckenia filiformis</i>	S2S3	Sensitive
Boreal aster	<i>Symphotrichum boreale</i>	S3	Sensitive
Lake Huron tansy	<i>Tanacetum bipinnatum ssp. huronense</i>	S3	Secure
Northern meadow-rue	<i>Thalictrum confine</i>	S3	Secure
Clinton's clubrush	<i>Trichophorum clintonii</i>	S3	Secure
Northern bog violet	<i>Viola nephrophylla</i>	S3	Secure

Common Name	Scientific Name	S-rank	NB GS Rank
Northern yellow-eyed-grass	<i>Xyris montana</i>	S3	Secure
<b>Fauna</b>			
Spotted sandpiper	<i>Actitis macularius</i>	S3S4B,S5M	Secure
Spike-lip crater	<i>Appalachina sayana</i>	S3?	
Ruddy turnstone	<i>Arenaria interpres</i>	S3M	Secure
Lesser scaup	<i>Aythya affinis</i>	S1B,S4M	Secure
Bufflehead	<i>Bucephala albeola</i>	S3M,S2N	Sensitive
Green heron	<i>Butorides virescens</i>	S1S2B,S1S2M	Sensitive
Pectoral sandpiper	<i>Calidris melanotos</i>	S3S4M	Secure
Semipalmated sandpiper	<i>Calidris pusilla</i>	S3S4M	Secure
Turkey vulture	<i>Cathartes aura</i>	S3B,S3M	Secure
Killdeer	<i>Charadrius vociferus</i>	S3B,S3M	Sensitive
Marsh wren	<i>Cistothorus palustris</i>	S2B,S2M	Sensitive
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	S3B,S3M	Secure
Petite emerald	<i>Dorocordulia lepida</i>	S3	Secure
Ring-billed gull	<i>Larus delawarensis</i>	S3S4B,S5M	Secure
Glaucous gull	<i>Larus hyperboreus</i>	S2N,S2M	Secure
Swamp spreadwing	<i>Lestes vigilax</i>	S3	Sensitive
Gadwall	<i>Mareca strepera</i>	S2B,S3M	Secure
Red-breasted merganser	<i>Mergus serrator</i>	S3B,S5M,S4S5N	Secure
Northern mockingbird	<i>Mimus polyglottos</i>	S2B,S2M	Sensitive
Brown-headed cowbird	<i>Molothrus ater</i>	S3B,S3M	May be at risk
Ruddy duck	<i>Oxyura jamaicensis</i>	S1B,S2S3M	Secure
Black-bellied plover	<i>Pluvialis squatarola</i>	S3S4M	Secure
Common eider	<i>Somateria mollissima</i>	S3B,S4M,S3N	Secure
Lake emerald	<i>Somatochlora cingulata</i>	S3	Secure
Pine siskin	<i>Spinus pinus</i>	S3	Secure
Saltmarsh hydrobe	<i>Spurwinkia salsa</i>	S3	
Common tern	<i>Sterna hirundo</i>	S3B,SUM	Sensitive
Greater yellowlegs	<i>Tringa melanoleuca</i>	S1?B,S5M	Secure
Solitary sandpiper	<i>Tringa solitaria</i>	S2B,S5M	Secure
Eastern kingbird	<i>Tyrannus tyrannus</i>	S3S4B,S3S4M	Sensitive
Warbling vireo	<i>Vireo gilvus</i>	S3B,S3M	Secure

Data from eBird Canada databases were obtained regarding the species that have been observed in the area. There are three birding hotspots within a 10 km radius of the Project site were reviewed: Marsh Creek; Rockwood Park; and Lily Lake. A total of 114, 66, and 76 species have been recorded at Marsh Creek, Rockwood Park, and Lily Lake, respectively (*i.e.*, refer to Appendix XXI). Based on observations by local birders, there are some sensitive, may be at risk, and at risk species that are sometimes seen in the area. The Marsh Creek birding hotspot, which is the furthest from the Project site, is where more sightings of sensitive, may be at risk, and at risk species are made and is likely due to its location along the coast of the Bay of Fundy.

Data from NatureCounts<sup>1</sup> were obtained for bird species that have been observed within the area encompassing the Little Marsh Creek watershed. The data showed 138 species have been observed and logged within the area. Some additional sightings of sensitive, may be at risk, and at risk species were captured in that query (*i.e.*, refer to Appendix XXI).

<sup>1</sup> Raw data are not provided within this document as the data are owned by NatureCounts and are not to be shared in raw form

Bird nest data were also obtained from NatureCounts for the area encompassing the Little Marsh Creek watershed. The query yielded eight nests, none of which were located on the Project site.

Table 20. The Atlantic Canada Conservation Data Centre's Sub-national (i.e., provincial) rarity rank (S-rank) of species and S-rank definitions.

ACCDC S-rank	Definition
S1	<b>Extremely rare:</b> may be especially vulnerable to extirpation; typically five or fewer occurrences or very few remaining individuals.
S2	<b>Rare:</b> may be vulnerable to extirpation due to rarity or other factors; six to 20 occurrences or few remaining individuals.
S3	<b>Uncommon:</b> found only in a restricted range, even if abundant at some locations; 21 to 100 occurrences.
S4	<b>Usually widespread, fairly common:</b> apparently secure with many occurrences, but of longer-term concern ( <i>e.g.</i> , watch list); 100 + occurrences).
S5	<b>Abundant:</b> widespread and secure under present conditions.
S#S#	<b>Numeric range rank:</b> a range between two consecutive ranks for a species / community; denotes uncertainty about the exact rarity ( <i>e.g.</i> , S1S2).
SH	<b>Historical:</b> previously occurred in the province but may have been overlooked during the past 20 years to 70 years; presence is suspected and will likely be rediscovered.
SU	<b>Unrankable:</b> possibly in peril, but status is uncertain; need more information.
SX	<b>Extinct / Extirpated:</b> believed to be extirpated from its former range.
S?	<b>Unranked:</b> not yet ranked.
SA	<b>Accidental:</b> accidental or casual, infrequent and far outside usual range; includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds, or even thousands of miles outside their usual range.
SE	<b>Exotic:</b> an exotic established in the province ( <i>e.g.</i> , Purple Loosestrife or Coltsfoot); may be native in nearby regions.
SE#	<b>Exotic numeric:</b> an established exotic that has been assigned a rank.
SP	<b>Potential:</b> potentially occurs, but no occurrences have been reported.
SR	<b>Reported:</b> no persuasive documentation ( <i>e.g.</i> , misidentified specimen).
SRF	<b>Reported falsely:</b> erroneously reported and the error has persisted in the literature.
SZ	<b>Zero:</b> not of practical conservation concern because there are no definable occurrences, although the species is native and appears regularly; an SZ rank is generally used for occasional long distance migrants.

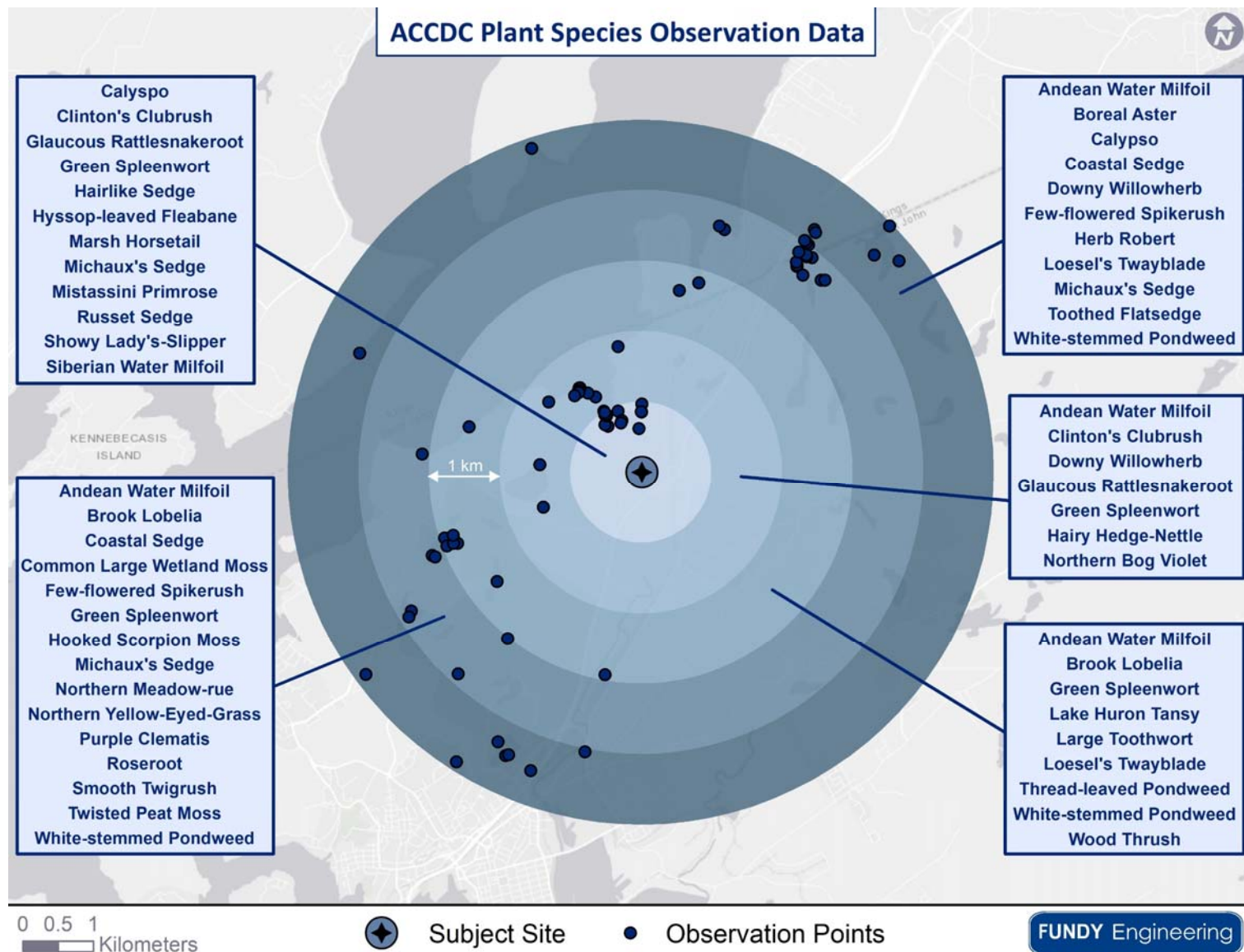


Figure 31. Map showing the observed flora species within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

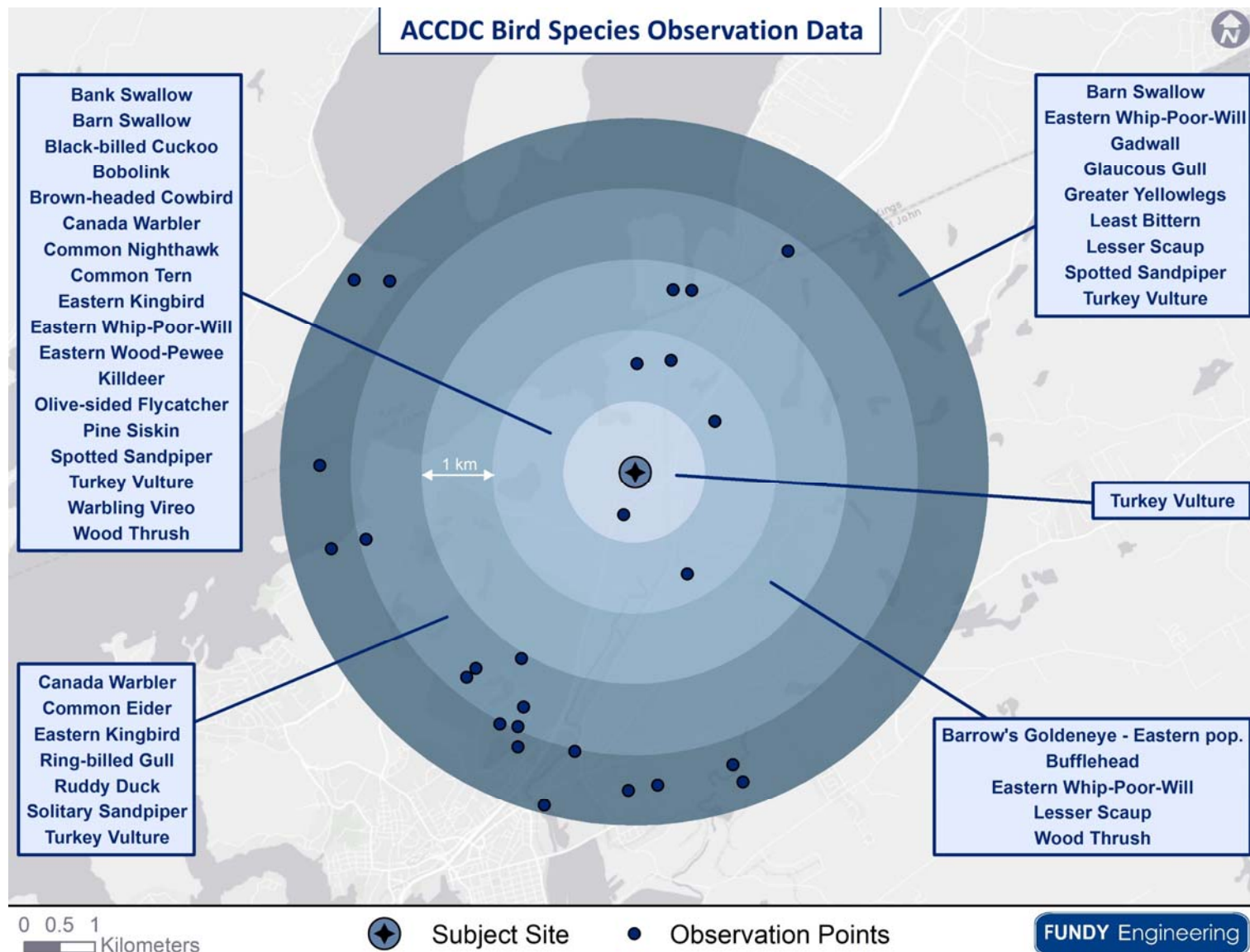


Figure 32. Map showing the observed birds within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

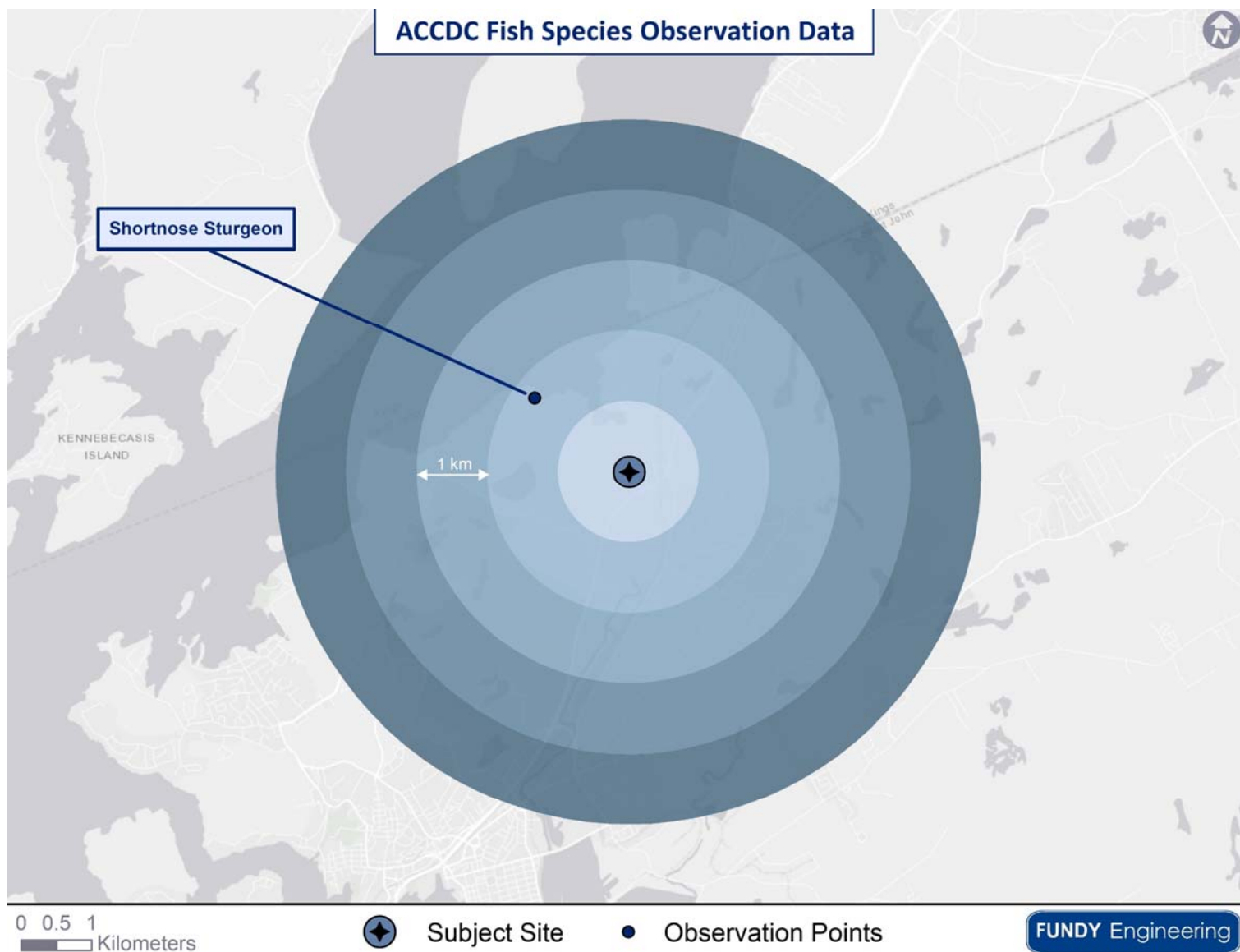


Figure 33. Map showing observed fishes within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

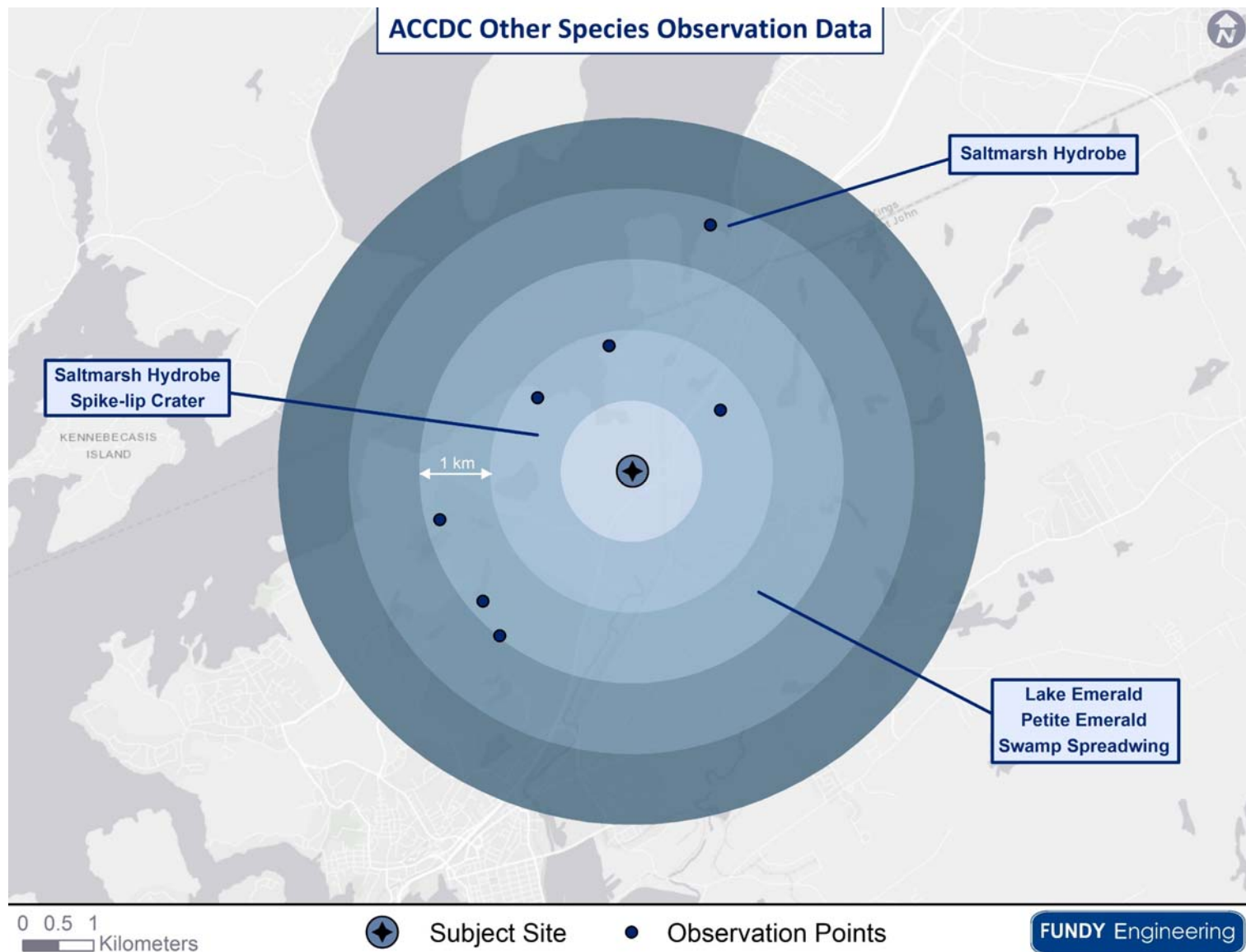


Figure 34. Map showing observed fauna other than birds within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

### 3.2.5 Project Site Observed Species

#### 3.2.5.1 Flora

Flora have been observed at the Project site during several studies, including wetland delineations, fish and fish habitat surveys, breeding bird surveys, and wildlife surveys. Table 21 collectively lists all of the species that have been observed through those studies. None of the flora species observed are listed under the pSARA, fSARA, or by the COSEWIC. Only one sensitive plant (*i.e.*, Boreal Aster) was observed at three locations at *The Crossing* site on 9 September 2016 (*i.e.*, 45.325869°, 66.034649°; 45.32553°, 66.034873°; 45.32.5435°, 66.035072°) by a rare plant botanical specialist with WSP (refer to Appendix VIII). The Boreal Aster grows 15 cm to 90 cm tall in boggy areas, has long and very leaves that are rolled inwards along the edges, and produces 20 to 30 white to pale rose or bluish ray flowers.

Table 21. List of provincially ranked flora that have been observed on the site proposed for *The Crossing* in east Saint John, New Brunswick. Red shaded entries indicate rare or sensitive species.

Common Name	Scientific Name	S-rank	NB GS Rank
Balsam fir	<i>Abies balsamea</i>	S5	Secure
Red maple	<i>Acer rubrum</i>	S5	Secure
Woodland agrimony	<i>Agrimonia striata</i>	S5	Secure
Speckled alder	<i>Alnus incana</i>	S5	Secure
Serviceberry <i>spp.</i>	<i>Amelanchier spp.</i>		
Wild sarsaparilla	<i>Aralia nudicaulis</i>	S5	Secure
Thyme-leaved sandwort	<i>Arenaria serpyllifolia</i>	SNA	Exotic
Common lady fern	<i>Athyrium filix-femina</i>	S5	Secure
Ribbed bog moss / glow moss	<i>Aulacomnium palustre</i>	S5	Secure
Three-lobed whipwort	<i>Bazzania trilobata</i>	SU	
Japanese barberry	<i>Berberis thunbergii</i>	SNA	Exotic
Paper birch	<i>Betula papyrifera</i>	S5	Secure
Bluejoint reedgrass	<i>Calamagrostis canadensis</i>	S5	Secure
Moss	<i>Campylium spp.</i>		
Sedge	<i>Carex spp.</i>		
Three-seeded sedge	<i>Carex trisperma</i>	S5	Secure
Tree climacium moss	<i>Climacium dendroides</i>	S5	Secure
Chinese hemlock-parsley	<i>Conioselinum chinense</i>	S4	Secure
Goldthread	<i>Coptis trifolia</i>	S5	Secure
Red osier dogwood	<i>Cornus sericea</i>	S5	Secure
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>	S4	Secure
Moss	<i>Drepanocladus</i>		
Crested wood fern	<i>Dryopteris cristata</i>	S5	Secure
Hairy willow-herb	<i>Epilobium ciliatum</i>	S5	Secure
Field horsetail	<i>Equisetum arvense</i>	S5	Secure
Marsh horsetail	<i>Equisetum palustre</i>	S3	Secure
Wild strawberry	<i>Fragaria virginiana</i>	S5	Secure
Creeping snowberry	<i>Gaultheria hispidula</i>	S5	Secure
Fowl manna grass	<i>Glyceria striata</i>	S5	Secure
Grass	<i>Gramineae</i>		
Spotted jewelweed	<i>Impatiens capensis</i>	S5	Secure
Harlequin blue flag	<i>Iris versicolor</i>	S5	Secure



Common Name	Scientific Name	S-rank	NB GS Rank
Sheep laurel	<i>Kalmia angustifolia</i>	S5	Secure
Tamarack	<i>Larix laricina</i>	S5	Secure
Marsh vetchling / pea	<i>Lathyrus palustris</i>	S5	Secure
Northern starflower	<i>Lysimachia borealis</i>	S5	Secure
Wild lily-of-the-valley	<i>Maianthemum canadense</i>	S5	Secure
Three-leaved false lily of the valley	<i>Maianthemum trifolium</i>	S5	Secure
Bog buckbean	<i>Menyanthes trifoliata</i>	S5	Secure
Small forget-me-not	<i>Myosotis laxa</i>	S5	Secure
Sweet gale	<i>Myrica gale</i>	S5	Secure
Sensitive fern	<i>Onoclea sensibilis</i>	S5	Secure
Interrupted fern	<i>Osmunda claytoniana</i>	S5	Secure
Royal fern	<i>Osmunda regalis</i>	S5	Secure
Cinnamon fern	<i>Osmundastrum cinnamomeum</i>	S5	Secure
Reed canary grass	<i>Phalaris arundinacea</i>	S5	Secure
Chokeberry	<i>Photina spp.</i>		
White spruce	<i>Picea glauca</i>	S5	Secure
Black spruce	<i>Picea mariana</i>	S5	Secure
Balsam poplar	<i>Populus balsamifera</i>	S5	Secure
Trembling aspen	<i>Populus tremuloides</i>	S5	Secure
Chokecherry	<i>Prunus virginiana</i>	S5	Secure
Common buttercup	<i>Ranunculus acris</i>	SNA	Exotic
Electrified cat's tail moss	<i>Rhytidiadelphus triquetrus</i>	S5	Secure
Rhodora	<i>Rhododendron canadense</i>	S5	Secure
Common Labrador tea	<i>Rhododendron groenlandicum</i>	S5	Secure
Skunk currant	<i>Ribes glandulosum</i>	S5	Secure
Rose spp.	<i>Rosa spp.</i>		
Red raspberry	<i>Rubus idaeus</i>	S5	Secure
Drawf red raspberry	<i>Rubus pubescens</i>	S5	Secure
Curled dock	<i>Rumex crispus</i>	SNA	Exotic
Pussy willow	<i>Salix discolor</i>	S5	Secure
Willow	<i>Salix spp.</i>		
Ragwort spp.	<i>Scencio spp.</i>		
Cottongrass bulrush	<i>Scirpus cyperinus</i>	S5	Secure
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	SNA	Exotic
Common water parsnip	<i>Sium suave</i>	S5	Secure
Canada goldenrod	<i>Solidago canadensis</i>	S5	Secure
American mountain ash	<i>Sorbus americana</i>	S5	Secure
Northern peatmoss	<i>Sphagnum capillifolium</i>	S5	Secure
Flat-top peatmoss	<i>Sphagnum fallax</i>	S5	Secure
Mangellan's peatmoss	<i>Sphagnum magellanicum</i>	S5	Secure
Russow's peatmoss	<i>Sphagnum russowii</i>	S5	Secure
Shaggy peatmoss	<i>Sphagnum squarrosum</i>	S5	Secure
White meadowsweet	<i>Spiraea alba</i>	S5	Secure
<b>Boreal aster</b>	<b><i>Symphyotrichum boreale</i></b>	<b>S3</b>	<b>Sensitive</b>
Purple-stemmed aster	<i>Symphyotrichum puniceum</i>	S5	Secure
Tall meadow-rue	<i>Thalictrum pubescens</i>	S5	Secure
Eastern white cedar	<i>Thuja occidentalis</i>	S5	Secure
Red clover	<i>Trifolium pratense</i>	SNA	Exotic
Broad-leaved cattail	<i>Typha latifolia</i>	S5	Secure
Common valerian	<i>Valeriana officinalis</i>	SNA	Exotic
Bird-eye speedwell	<i>Veronica persica</i>	SNA	Exotic

### 3.2.5.2 Fauna

#### 3.2.5.2.1 Fishes

During an electrofishing presence / absence survey in 2005, three fish species were observed within the Project site [TAP, 2005] and included white sucker, sea lamprey (*Petromyzon marinus*), and threespine stickleback. Provincially, sea lamprey is ranked abundant and secure.

In June 2013, electrofishing of Ashburn Creek was conducted by the Saint John Chapter of the Atlantic Coastal Action Program (ACAP) [Leblanc and Sears, 2013]. Brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), blacknose dace (*Rhinichthys atratulus*), American eel (*Anguilla rostrata*), and mummichog (*Fundulus heteroclitus*) were observed within the Creek at that time. Electrofishing in July 2014 of Ashburn Creek showed the presence of brook trout and American eel (refer to Appendix XXII). Table 22 is a compilation of fish species composition as a result of electrofishing in Ashburn Creek during 2009, 2013, and 2014 by ACAP Saint John [Stewart-Robertson et al., 2018].

From the mid-1800s to about 2014, sewage outfalls discharged untreated waste into Marsh Creek, which drains to Saint John Harbour. Discharge from those outfalls was halted when a new wastewater treatment plant in east Saint John, part of Saint John Harbour Cleanup, came online. Since then, Marsh Creek has seen a transformation from a polluted waterway to a more natural system.

Horizon Management recently contracted ACAP Saint John to undertake a more current fish and fish habitat assessment on the portion of Little Marsh Creek between Foster Thurston Drive and Rothesay Road. This was done in an effort to determine if additional fish species are inhabiting Little Marsh Creek following the stemming of sewage discharge and the removal of at least one barrier to upstream fish passage.

Between 19 June and 10 July 2018, ACAP Saint John conducted comprehensive fish population and habitat surveys within Little Marsh Creek and its tributaries upstream of the Project site in order to identify fish species present. A total of 19 species were found. Various stickleback species were the most abundant and several salmonid species were identified (Table 23). American eel, a species listed as threatened under the pSARA and by the COSEWIC, comprised 6.2 % of the total species caught.

The American eel has a slender, long body with scales, a single fin extends from its back around the tail to its belly, its mouth has thick lips and its lower jaw is slightly longer than the upper jaw, and it has several rows of small teeth on the jaws and the roof of the mouth. Adults range from 40 cm to 1 m long and their colour varies. Juveniles are yellow to green or olive brown on the belly and dark on the back and adults are grey with a white or cream-coloured belly. They spawn only in the Sargasso Sea and eggs hatch within about a week after laying. Their population declines, which is a result of habitat alteration, dams and turbines, fishery harvest, changes to ocean conditions resulting from climate change, contaminants, and parasites, affect Canada's aquatic biodiversity. That is because they are an important food source for a variety of birds, fish, and mammals, which is why they have been listed as threatened.

Four redbreast sunfish were caught during the electrofishing surveys in 2018 (Table 23). That species is listed as a species of special concern under the fSARA. These fish are

relatively small (*i.e.*, adults grow from 13 cm to 18 cm) and have a deep, laterally compressed body that is golden brown to olive in colour with the back being darker and the sides lighter. There are often inconspicuous reddish spots and bluish streaks along the sides, being most prominent on the head. The breast can vary from a yellowish hue to a bright orange-red. They are listed as a species of special concern because there is insufficient information to determine their actual distribution, number of locations present, and population sizes and trends.

The water quality of Little Marsh Creek is of good quality and was observed to support a wide diversity of aquatic life [*Stewart-Robertson et al.*, 2018]. Streamside vegetation comprised tall grasses, ferns, alders, conifers, and willows. Stream cover was sparse in most areas; however, large stands of willow are abundant in certain areas and where present provide excellent cover due to overhang. *Stewart-Robertson et al.* [2018] noted that the headwaters of Little Marsh Creek may serve as coldwater refuges for resident salmonids during high temperature events and / or seasons. Although siltation within the Creek is high, it appears to form a key corridor between its headwaters and Marsh Creek.

The increase in the number of species caught within Little Marsh Creek between the *TAP Resources Inc.* [2005] and *Stewart-Robertson et al.* [2018] studies may reflect the improvement in the health of the watershed since the stemming of raw sewage into the system.

Table 22. Fish species composition results from electrofishing surveys of Ashburn Creek in east Saint John, New Brunswick during 2009, 2013, and 2014 by ACAP Saint John.

Common Name	Scientific Name	Size Range (mm)	Total Caught	Percentage Caught (%)	S-rank	NB GS Rank
American eel*	<i>Anguilla rostrata</i>	120 to 300	12	13	S4	Secure
Mummichog	<i>Fundulus heteroclitus</i>	42	1	1.1	S5	Secure
Eastern blacknose dace	<i>Rhinichthys atratulus</i>	30 to 85	19	20.6	S5	Secure
Brown trout	<i>Salmo trutta</i>	35 to 188	19	20.6	SNA	Exotic
Brook trout	<i>Salvelinus fontinalis</i>	16 to 319	41	44.6	S4	Secure

NOTES:

\*listed as threatened under pSARA and by the COSEWIC

Table 23. Fish species composition results from electrofishing surveys conducted by ACAP Saint John within Little Marsh Creek in east Saint John, New Brunswick during July 2018.

Common Name	Scientific Name	Size Range (mm)	Total Caught	Percentage Caught (%)	S-rank	NB GS Rank
Brown bullhead	<i>Ameiurus nebulosus</i>	195	1	0.05	S5	Secure
American eel*	<i>Anguilla rostrata</i>	40 to 710	117	6.20	S4	Secure
Fourspine stickleback	<i>Apeltes quadracus</i>	16 to 50	603	31.96	S5	Secure
White sucker	<i>Catostomus commersonii</i>	102 to 173	7	0.37	S5	Secure
Northern redbelly dace	<i>Chrosomus eos</i>	55 to 79	4	0.21		
Chain pickerel	<i>Esox niger</i>	250 to 265	2	0.11	SNA	Exotic
Banded killifish	<i>Fundulus diaphanus</i>	36 to 80	42	2.23	S5	Secure
Mummichog	<i>Fundulus heteroclitus</i>	30 to 86	88	4.66	S5	Secure
Threespine stickleback	<i>Gasterosteus aculeatus</i>	12 to 72	124	6.57	S5	Secure
Redbreast sunfish**	<i>Lepomis auritus</i>	80 to 85	4	0.21	S4	Secure
Pumpkinseed	<i>Lepomis gibbosus</i>	73 to 100	10	0.53	S5	Secure
Common shiner	<i>Luxilus cornutus</i>	40 to 80	9	0.48	S5	Secure
Golden shiner	<i>Notemigonus crysoleucas</i>	48 to 96	14	0.74	S5	Secure
Ninespine stickleback	<i>Pungitius pungitius</i>	8 to 60	444	23.53	S5	Secure
Eastern blacknose dace	<i>Rhinichthys atratulus</i>	34 to 80	27	1.43	S5	Secure
Brown trout	<i>Salmo trutta</i>	42 to 138	14	0.74	SNA	Exotic
Brook trout	<i>Salvelinus fontinalis</i>	45 to 188	54	2.86	S4	Secure
Creek chub	<i>Semotilus atromaculatus</i>	122	1	0.05	S5	Secure
Pearl dace	<i>Semotilus margarita</i>	46 to 60	5	0.26		

NOTES:

\*listed as threatened under pSARA and by the COSEWIC; \*\*listed as special concern under fSARA

### 3.2.5.2.2 Herpetiles

During July 2019, no native aquatic turtles (*i.e.*, *Glyptemys insculpta*, *Chrysemys picta*, and *Chelydra serpentina*) were observed [Stantec, 2019] (*i.e.*, refer to Appendix XVIII). Although some areas of the Project site have the potential to provide some feeding and overwintering habitat for eastern painted turtles and common snapping turtles and possibly some habitat for wood turtles, the overall habitat for native aquatic turtle species was considered to be relatively low. Notably missing from the Project site was an abundance of prominent basking areas and extensive thick aquatic vegetation preferred by eastern painted turtles and common snapping turtles, and the lack of faster moving water and sandy / gravelly substrate preferred by wood turtles.

Green frogs (*Lithobates clamitans*), spring peepers (*Pseudacris crucifer*), and common gartersnakes (*Thamnophis sirtalis*) have all been observed at the Project site [Stantec, 2019]. All of those species are ranked as abundant and secure in New Brunswick.

### 3.2.5.2.3 Birds

During breeding bird surveys, 47 species of birds were observed at the Project site [Stantec, 2019] (*i.e.*, refer to Appendix XVIII). Those species are listed in Table 24. None of the birds observed are listed under the pSARA, fSARA, or by the COSWEIC and all are ranked provincially as being secure. The absence of species during the surveys does not mean that it is not possible for that species to occur there. In some instances, habitat appropriate for that bird may be available, but is not being utilized for some reason (*e.g.*, preference for another nearby area where similar habitat is available, *etc.*).

Table 24. List of provincially ranked birds that have been observed on the site proposed for *The Crossing* in east Saint John, New Brunswick.

Common Name	Scientific Name	S-rank	NB GS Rank
Mallard	<i>Anas platyrhynchos</i>	S5B,S4N,S5M	Secure
American black duck	<i>Anas rubripes</i>	S5B,S4N,S5M	Secure
Cedar waxwing	<i>Bombycilla cedrorum</i>	S5B,S5M	Secure
Northern cardinal	<i>Cardinalis cardinalis</i>	S4	Secure
Turkey vulture	<i>Cathartes aura</i>	S3B,S3M	Secure
Veery	<i>Catharus fuscescens</i>	S4B,S4M	Secure
Swainson's thrush	<i>Catharus ustulatus</i>	S5B,S5M	Secure
Northern flicker	<i>Colaptes auratus</i>	S5B,S5M	Secure
Rock pigeon	<i>Columba livia</i>	SNA	Exotic
American crow	<i>Corvus brachyrhynchos</i>	S5	Secure
Common raven	<i>Corvus corax</i>	S5	Secure
Blue jay	<i>Cyanocitta cristata</i>	S5	Secure
Downy woodpecker	<i>Dryobates pubescens</i>	S5	Secure
Pileated woodpecker	<i>Dryocopus pileatus</i>	S5	Secure
Hairy woodpecker	<i>Dryobates villosus</i>	S5	Secure
Gray catbird	<i>Dumetella carolinensis</i>	S4B,S4M	Secure
Alder flycatcher	<i>Empidonax alnorum</i>	S5B,S5M	Secure
Common loon	<i>Gavia immer</i>	S4B,S4M,S4N	Secure
Common yellowthroat	<i>Geothlypis trichas</i>	S5B,S5M	Secure
Purple finch	<i>Haemorhous purpureus</i>	S4S5B,SUN,S5M	Secure
Dark-eyed junco	<i>Junco hyemalis</i>	S5	Secure
Herring gull	<i>Larus argentatus</i>	S5	Secure

Common Name	Scientific Name	S-rank	NB GS Rank
Ring-billed gull	<i>Larus delawarensis</i>	S3S4B,S5M	Secure
White-winged crossbill	<i>Loxia leucoptera</i>	S5	Secure
Swamp sparrow	<i>Melospiza georgiana</i>	S5B,S5M	Secure
Song sparrow	<i>Melospiza melodia</i>	S5B,S5M	Secure
Black-and-white warbler	<i>Mniotilta varia</i>	S5B,S5M	Secure
Nashville warbler	<i>Oreothlypis ruficapilla</i>	S5B,S5M	Secure
Northern waterthrush	<i>Parkesia noveboracensis</i>	S4B,S5M	Secure
Double-crested cormorant	<i>Phalacrocorax auritus</i>	S5B,S5M	Secure
Black-capped chickadee	<i>Poecile atricapillus</i>	S5	Secure
Common grackle	<i>Quiscalus quiscula</i>	S5B,S5M	Secure
Golden-crowned kinglet	<i>Regulus satrapa</i>	S5	Secure
Eastern phoebe	<i>Sayornis phoebe</i>	S5B,S5M	Secure
Northern parula	<i>Setophaga americana</i>	S5B,S5M	Secure
Magnolia warbler	<i>Setophaga magnolia</i>	S5B,S5M	Secure
Palm warbler	<i>Setophaga palmarum</i>	S5B,S5M	Secure
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>	S5B,S5M	Secure
American yellow warbler	<i>Setophaga petechia</i>	S5B,S5M	Secure
American redstart	<i>Setophaga ruticilla</i>	S5B,S5M	Secure
Black-throated green warbler	<i>Setophaga virens</i>	S5B,S5M	Secure
American goldfinch	<i>Spinus tristis</i>	S5	Secure
Winter wren	<i>Troglodytes hiemalis</i>	S5B,S5M	Secure
American robin	<i>Turdus migratorius</i>	S5B,S5M	Secure
Blue-headed vireo	<i>Vireo solitarius</i>	S5B,S5M	Secure
Mourning dove	<i>Zenaida macroura</i>	S5B,S5M,S4N	Secure
White-throated sparrow	<i>Zonotrichia albicollis</i>	S5B,S5M	Secure

The annual bird breeding season in the Project area (*i.e.*, Zone C3) is as follows:

- forested areas - 8 April to 28 August;
- open areas - 21 April to 28 August; and
- wetland areas - 8 April to 16 August.

With respect to Zone C3, the information provided below was taken directly from ECCC's website regarding the general nesting periods of migratory birds.

For nesting Zone C3, within the species used, there are 84 species known to nest in forest habitats. The percentages of species actively nesting are:

- 0 % from August 29 to April 7;
- < 5 % from April 12 to 16 and from August 17 to 27;
- 6 % to 10 % percent from April 17 to 21 and from August 12 to 16;
- 11 % to 20 % from April 22 to May 4 and from August 4 to 11;
- 21 % to 40 % from May 5 to 15 and from July 29 to August 3;
- 41 % to 60 % from May 16 to 23 and from July 23 to 28; and
- 61 % to 100 % from May 24 to July 22.

For nesting Zone C3, within the species used, there are 88 species known to nest in open habitats. The percentages of species actively nesting are:

- 0 % from August 29 to April 11;
- < 5 % from April 17 to 21 and from August 18 to 27;
- 6 % to 10 % from April 22 to 25 and from August 14 to 17;
- 11 % to 20 % from April 26 to May 4 and from August 4 to 13;
- 21 % to 40 % from May 5 to 15 and from July 28 to August 3;
- 41 % to 60 % from May 16 to 21 and from July 23 to 27; and
- 61 % to 100 % from May 22 to July 22.

For nesting Zone C3, within the species used, there are 60 species known to nest in wetland habitats. The percentages of species actively nesting are:

- 0 % from August 17 to April 7;
- < 5 % from April 12 to 14 and from August 9 to 15;
- 6 % to 10 % from April 15 to 16 and from August 3 to 8;
- 11 % to 20 % from April 17 to 21 and from July 30 to August 2;
- 21 % to 40 % from April 22 to May 9 and from July 25 to 29;
- 41 % to 60 % from May 10 to 13 and from July 20 to 24; and
- 61 % to 100 % from May 14 to July 19.

#### 3.2.5.2.4 Mammals

Table 25 provides a list of mammals observed at the Project site. None of the species observed are considered rare and all are ranked provincially as abundant and secure.

Table 25. List of provincially ranked mammals that have been observed on the site proposed for *The Crossing* in east Saint John, New Brunswick.

Common Name	Scientific Name	S-rank	NB GS Rank
Eastern coyote	<i>Canis latrans</i>	S5	Secure
North American beaver	<i>Castor canadensis</i>	S5	Secure
North American porcupine	<i>Erethizon dorsatum</i>	S5	Secure
Snowshoe hare	<i>Lepus americanus</i>	S5	Secure
North American river otters	<i>Lontra canadensis</i>	S5	Secure
White tailed deer	<i>Odocoileus virginianus</i>	S5	Secure
Common muskrat	<i>Ondatra zibethicus</i>	S5	Secure
Northern raccoon	<i>Procyon lotor</i>	S5	Secure
Red squirrel	<i>Tamiasciurus hudsonicus</i>	S5	Secure
Red fox	<i>Vulpes vulpes</i>	S5	Secure

#### 3.2.6 Environmentally Significant and Managed Areas

The ACCDC query yielded three Environmentally Significant Areas (ESAs) within 5 km of the Project site (Figure 35), including:

- Coldbrook Roadcut ESA;
- Harrigan Lake ESA; and
- Renforth Bog ESA.

The Coldbrook Roadcut ESA is located along the MacKay Highway (*i.e.*, NB Route 1) in east Saint John between the Ashburn Lake Road interchange (*i.e.*, exit 128) and the Fox Farm Road interchange (*i.e.*, exit 133). The lithology of the area was exposed during road building efforts. Contacts between the Late Neoproterozoic aged Coldbrook Group can be seen with the Middle Neoproterozoic aged Green Head Group and the Cambrian aged Saint John Group. The Cold Brook Group in the area comprises the McBrien Lake Formation, which is grey to green locally of flow-banded dacite, minor tuff, tuffaceous sandstone, rhyolite, and basalt. The grey and pale green, felsic volcanic rocks are intruded by a few dark green diabase dykes.

Harrigan Lake is located within the boundaries of Saint John's Rockwood Park. The 7.8 ha lake and is one of the headwaters for Ashburn Creek. The Lake is considered an ESA because of the presence of green spleenwort (*Asplenium viride*). This small rock fern grows on calcareous rocks. It is found on rock bluffs at the southwest end of Harrigan Lake.

Renforth Bog, which is a classic example of a calcareous fen, is located adjacent to the Fox Farm Road interchange (*i.e.*, exit 133) of the McKay Highway (*i.e.*, NB Route 1). It is a mainly wet sedge bog with tamarack at its edges and a cedar-spruce island at its centre. Water channels are apparent to the south end, but water movement is not certain. Steep hills of mixed forest surround the majority of the clearly defined 27.2 ha open-water vegetated wetland. A number of uncommon calciphilous mosses can be found within the Renforth Bog ESA.

Two other ESAs, which are > 5 km from the Project site, but are connected to the Marsh Creek watershed are the Courtney Forebay ESA and the Courtney Bay ESA. The Courtenay Forebay ESA is a significant area for waterfowl in Saint John. Bald eagles have also been observed preying on waterfowl within the Forebay. It is a unique 43 ha urban wetland that is frequented by birders. ACAP Saint John has been a strong advocate for cleanup efforts related to the Forebay and Marsh Creek, which flows into the wetland. Courtenay Bay is the tidal marsh and estuary of the Marsh Creek watershed. The Bay has a diversity and abundance of aquatic and brackish habitats. Because the area is also an important urban-centric breeding area for ducks and geese, it is designated as an ESA. Marsh Creek and Courtenay Bay, which Marsh Creek discharges to, has also been the focus of ACAP Saint John. The group has become known for partnering and working with the community, including industry, to help improve the environmental health of these two diverse ecosystems.

Rockwood Park is the only managed area within 5 km of the Project site. Rockwood Park (Figure 35) is located entirely within Saint John and at 890 ha is one of Canada's largest urban parks. The Park has an extensive network of trails that wind their way through the upland Acadian forest, over many hills, and around several freshwater lakes. Rockwood Park Golf Course, the Cherry Brook Zoo, and an arboretum are also located within the Park.



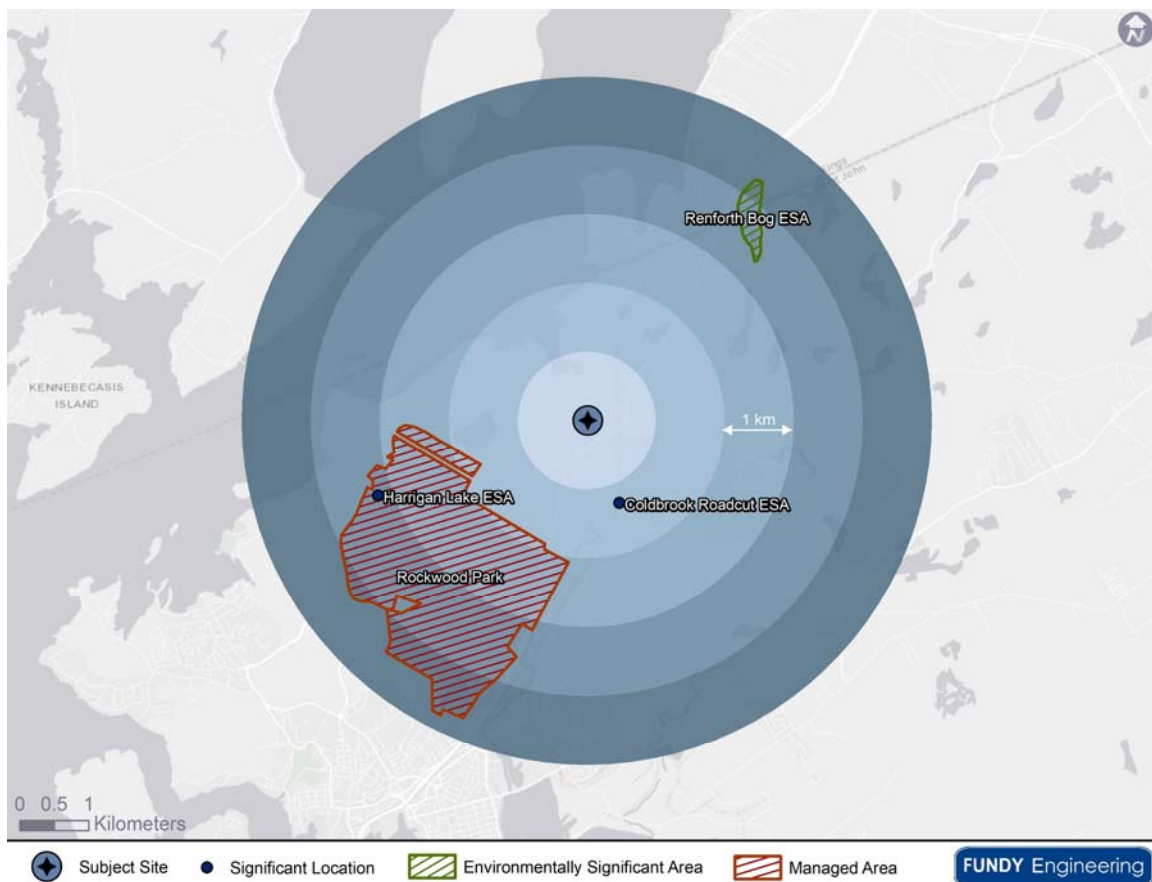


Figure 35. Map showing the environmentally significant and managed areas within a 5 km radius of *The Crossing* proposed for east Saint John, New Brunswick. Data obtained from the ACCDC.

### 3.3 SOCIO-ECONOMIC ENVIRONMENT

#### 3.3.1 Demographics and Labour

In 2016, the population of the Saint John Census Metropolitan Area (CMA) was 126 202 [Statistics Canada, 2019a]. Between 2011 and 2016, the population within the CMA decreased by 2.2 % from 129 057, a result of outmigration that was commonly felt throughout the Province in response to an economic downturn. As is common in most Canadian jurisdictions, the baby boomer generation (*i.e.*, 45 to 65 years old) is the dominant demographic (*i.e.*,  $n = 38\ 155$ ; Figure 36). Women represent a greater proportion of the population 25 years+ while men are the dominant group for those < 25 years old. More than 95 % of the population identifies English as their mother tongue.

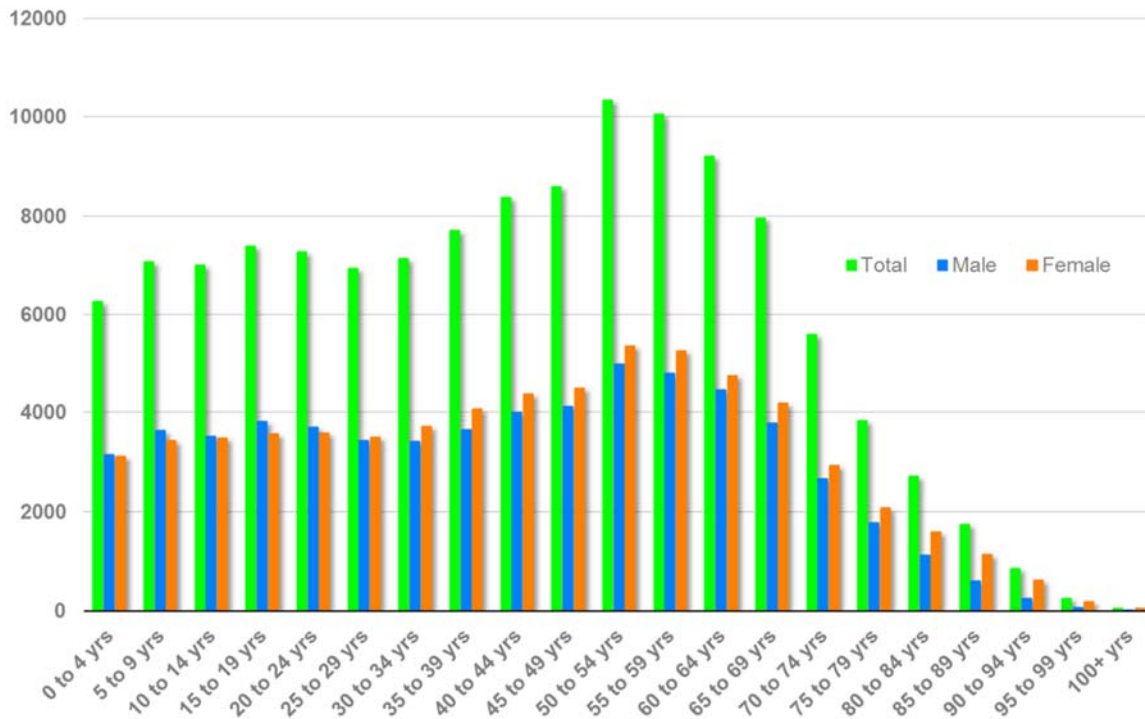


Figure 36. 2016 Statistics Canada demographics of the Saint John census metropolitan area.

At 3 510 km<sup>2</sup>, the Saint John CMA represents about 4.9 % of New Brunswick's landmass. In 2016, the total number of private dwellings within the CMA was 58 398 and the average number of persons occupying each household was 2.3. Although there are urban, suburban, and rural areas of the CMA, residential development is considered scattered [*Urban Strategies*, 2011]. The population density was 36 persons · km<sup>-2</sup> in 2016.

New Brunswick's monthly unemployment rate is shown in Figure 37 for January 2015 through to July 2019. Unemployment was its greatest during July 2015 when it hit 11 %. At that time, approximately 38 269 people were unemployed. During the 4.5 year period shown, unemployment was at its lowest in July 2017 when it was 6.5 %. At that time, 352 400 people were employed throughout the Province. The largest economic region for employment in New Brunswick is typically the southeast (*i.e.*, Albert, Westmorland, and Kent Counties).

The most recent labour force survey data available for Saint John are from 2016 [*Statistics Canada*, 2017]. A summary of the labour force by employment sectors is provided in Table 26. In 2016, the top five industries that employed people were: health care and social assistance; retail trade; construction; accommodation and food services; and administrative support, waste management, and remediation services.

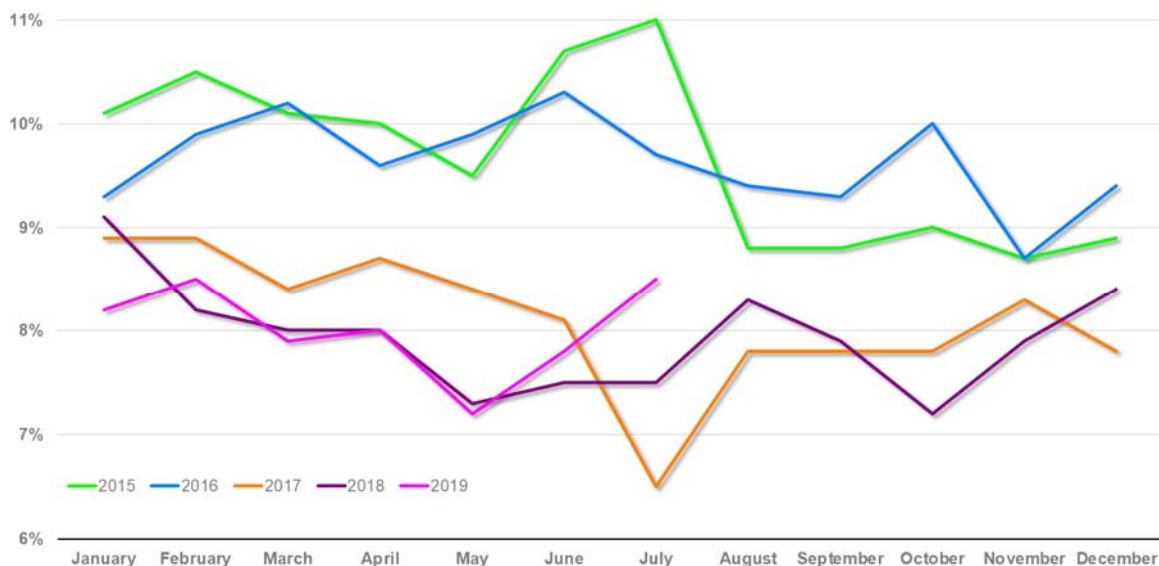


Figure 37. New Brunswick monthly unemployment rate between January 2015 and July 2019 based on data from New Brunswick Department of Labour and Statistics Canada.

Table 26. Saint John 2016 Statistics Canada labour force employment by sector.

Industry Sector*	Number of Employees	Percentage of Total Employees
Health care and social assistance	9 480	14.9
Retail trade	7 865	12.4
Construction	5 025	7.9
Accommodation and food services	4 360	6.9
Administrative and support, waste management, and remediation services	4 340	6.8
Professional, scientific, and technical services	4 195	6.6
Educational services	4 010	6.3
Manufacturing	3 990	6.3
Public administration	3 800	6.0
Other services, except public administration	2 985	4.7
Wholesale trade	2 625	4.1
Transportation and warehousing	2 625	4.1
Finance and insurance	2 430	3.8
Information and cultural services	1 390	2.2
Utilities	1 160	1.8
Arts, entertainment, and recreation	980	1.5
Real estate and rental and leasing	830	1.3
Mining, quarrying, and oil and gas extraction	765	1.2
Agriculture, forestry, fishing, and hunting	625	1.0
Management of companies and enterprises	85	0.1
<b>TOTAL</b>	<b>63 565</b>	<b>100</b>

NOTES:

\*North American Industry Classification System

The median total income for Saint John families (*i.e.*, two or more person households) in 2015 was \$81 243, which jumped 13 % from the \$70 610 median total income in 2011; however, > 17 % of the population are still considered low-income earners.

Saint John is located within the southwest economic region of New Brunswick, which encompasses Charlotte, Kings, and St. John Counties (*i.e.*, 12 % of New Brunswick's land area). According to census data, the region was home to about 168 389 people (2016 Census). Saint John County where the Project is located comprises Saint John, Simonds, Musquash, and Saint Martins, which represents about 44 % of the region's population (Table 27).

Table 27. Southwest New Brunswick Statistics Canada population data by County and Census Year.

County / Region	Area (km <sup>2</sup> )	1991	1996	2001	2006	2011	2016	1991 to 2016 % Change
Saint John County	1 462	81 460	79 305	76 407	74 621	76 550	74 020	- 9.1
Charlotte County	3 424	26 610	27 335	27 366	26 898	26 549	25 428	- 4.4
Kings County	3 482	62 120	64 720	64 208	65 824	69 665	68 941	9.9
Southwest economic	8 368	170 190	171 360	167 981	167 343	172 764	168 389	1.1
New Brunswick	72 908	723 900	738 135	729 498	729 997	751 171	747 101	3.1

The southwest economic region has a relatively balanced economy [NBDPSETL, 2018]. Over one quarter of employment in the region is within the sales and service occupations (Table 28). Employment by industry sector is presented in Table 29 and shows that after the public sector is accounted for, the majority of individuals are employed in the sales and services sector. Some of the most significant private sector industries in the southwest economic region are trade, manufacturing, and construction.

Table 28. Employment by occupational category for the southwest economic region of New Brunswick in 2017.

Occupational Classification	Number of Employees	Percentage of Total Employees
Sales and service	23 600	28.0
Business, finance, and administration	14 800	17.6
Trades, transport, and equipment operators	11 100	13.2
Education, law and social, community and government	9 800	11.6
Management	6 500	7.7
Health	6 100	7.2
Natural and applied sciences and related	4 900	5.8
Manufacturing and utilities	4 000	4.7
Natural resources, agriculture, and related	2 600	3.1
Art, culture, recreation, and sport	900	1.1
<b>TOTAL</b>	<b>84 300</b>	<b>100</b>

Some of the largest employers in the southwest economic region are [NBDPSETL, 2013]:

- Horizon Health Network;
- Anglophone South School District;
- Bell Aliant;
- Irving Oil;
- J.D. Irving, Limited;
- Wyndham Worldwide Canada; and
- City of Saint John.

Table 29. Employment by sector for the southwest economic region of New Brunswick in 2017.

Industry Sector	Number of Employees	Percentage of Total Employees
Retail and wholesale trade	13 900	16.5
Healthcare and social assistance	12 700	15.1
Manufacturing	8 700	10.3
Business, building, and other support services	6 300	7.5
Educational services	5 400	6.4
Accommodation and food services	5 300	6.3
Construction	5 200	6.2
Professional, scientific, and technical services	4 500	5.4
Finance, insurance, real estate, rental, and leasing	4 200	5.0
Other services	3 800	4.5
Public administration	3 600	4.3
Natural resources	3 400	4.0
Transportation and warehousing	3 100	3.7
Information, culture, and recreation	2 500	3.0
Utilities	1 500	1.8
<b>TOTAL</b>	<b>84 100</b>	<b>100</b>

### 3.3.2 Archaeological and Cultural Features

Archaeological predictive modelling obtained from the the New Brunswick Department of Tourism, Heritage, and Culture (NBDTHC) for the Project lands along Ashburn Road is presented in Figure 38 and for the Project lands along Rothesay Avenue is presented in Figure 39. The information does not show the presence of any historic and / or pre-contact sites on the lands proposed for Ashburn Road lands or the Rothesay Avenue lands, but there are several nearby (Table 30). The nearest documented site is located along the shoreline of Drury Cove. BhDm-24 is an historic (circa 1870) surficial artifact scatter site [AFW, 2018]. Up until 1970-80, an historic structure still stood at that site. Even with a 100 m buffer zone around this known archaeological site, it does not impact use of the Project site (*i.e.*, the 100 m buffer does not quite extend to the intersection of Old Drury Cove Road and Stagecoach Drive). The closest pre-contact sites (*i.e.*, pre-1604) are located near the mouth of the Saint John River (*i.e.*, BhDm-1 to BhDm-7, BhDm-9, and BhDm-41).

Table 30. Registered historic sites near the site proposed for *The Crossing* in east Saint John, New Brunswick. Descriptions from AFW [2018].

Registered Historic Site	Description
BhDm-21	Collection of several 19 <sup>th</sup> and 20 <sup>th</sup> century artifacts
BhDm-23	19 <sup>th</sup> century foundation and well
BhDm-24	Late 18 <sup>th</sup> to early 19 <sup>th</sup> century surficial historic artifact scatter
BhDm-25	Late 18 <sup>th</sup> to early 19 <sup>th</sup> century surficial historic artifact scatter
BhDm-26	Late 18 <sup>th</sup> to early 19 <sup>th</sup> century surficial historic artifact scatter

A preliminary archaeological impact assessment of the Project site was completed by Amec Foster Wheeler (AFW) in June 2017 under Archaeological Field Research Permit 2017NB53. AFW submitted a final archaeological impact assessment report in April 2018. Copies of both reports are included in Appendix XVI. No significant archaeological finds were made during AFW's reviews of the site.

First Nations and European settlers (*i.e.*, Acadians, New England Planters, and United Empire Loyalists) used New Brunswick's river systems as transportation routes and their shorelines for settlement. As a result, shorelines of the Province's primary river systems have high potential for archaeological and heritage resources. Desktop investigations determined that there were no documented archaeological or heritage sites within the boundaries of either *The Crossing* site or the lands along Rothesay Avenue (*i.e.*, the site formerly referred to as the Eco-Park) [AFW, 2018].

During a visit to *The Crossing* site, 20<sup>th</sup> to 21<sup>st</sup> century cultural features, such as hunting blinds, animal bones, and garbage piles, were identified within the high-ground area encompassed by Jones Drive, Hunters Cove Road, and Ashburn Road (*n.b.*, these are not considered to be heritage resources, but simply indicators of recent land-use). No archaeological features or artifacts were identified during the June 2017 survey and it was determined that the lands have low potential for both historic and pre-contact archaeological resources.

Several 20<sup>th</sup> to 21<sup>st</sup> century cultural features, such as railway line remnants, were identified during the June 2017 visit to the lands along Rothesay Avenue. The AFW [2018] report notes that with the exception of the shoreline of Marsh Creek, the area has low potential for archaeological resources. If ground disturbance activities were to occur along the shoreline of Marsh Creek at the lands along Rothesay Avenue (*i.e.*, a buffer extending 80 m from either shoreline), further archaeological impact assessment work, such as field testing and / or construction monitoring, would likely be required.

The potential for significant archaeological and / or cultural resources to be present at the Project site and lands along Rothesay Avenue is considered to be low; however, because there is a remote possibility that a find could be made, the Project-specific EPP should explicitly identify the processes that must be followed by Project personnel in the event of a find.

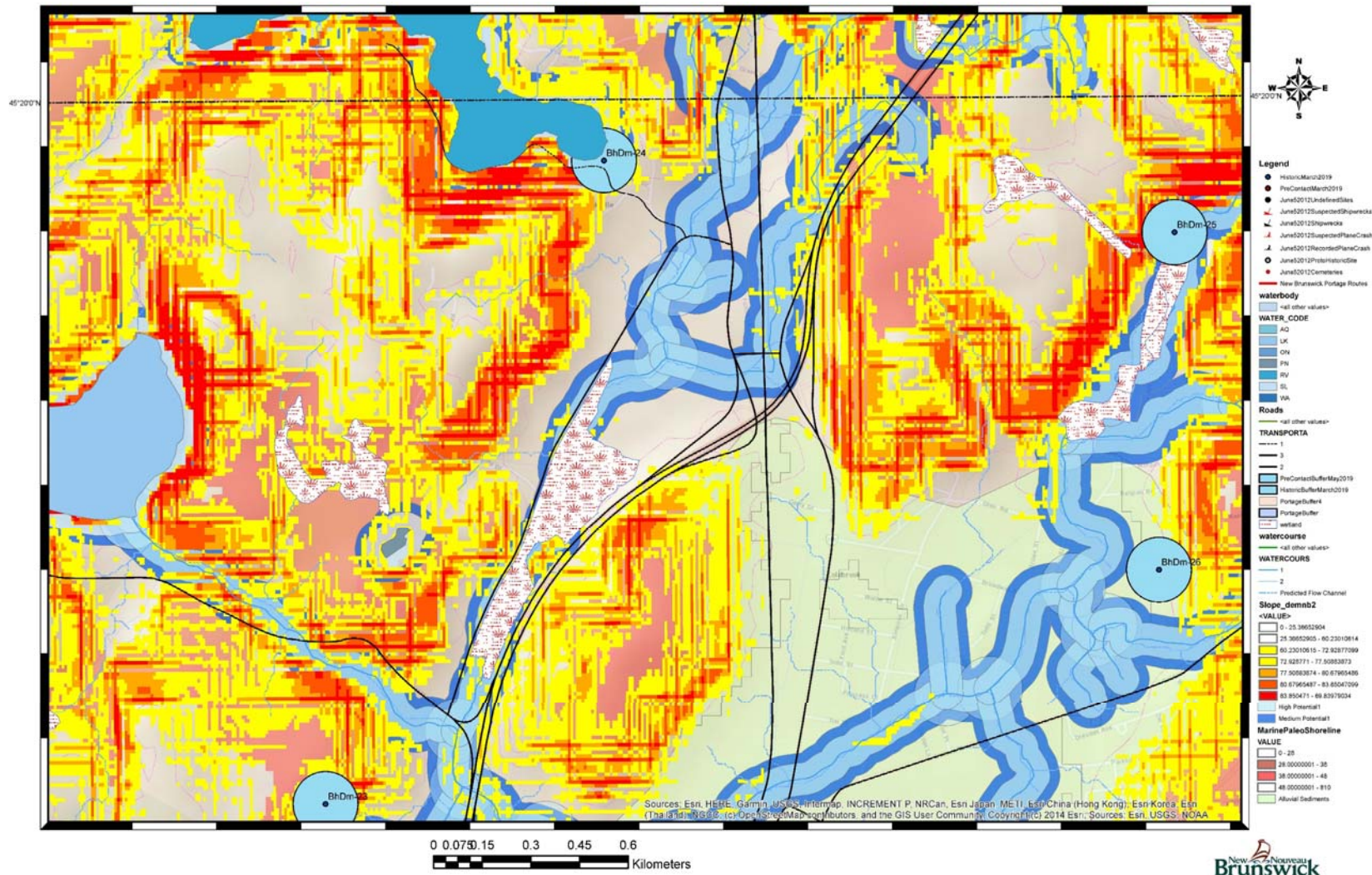


Figure 38. Archaeological predictive modelling in the vicinity of *The Crossing* site proposed for east Saint John, New Brunswick. Source: New Brunswick Department of Tourism, Heritage, and Culture.

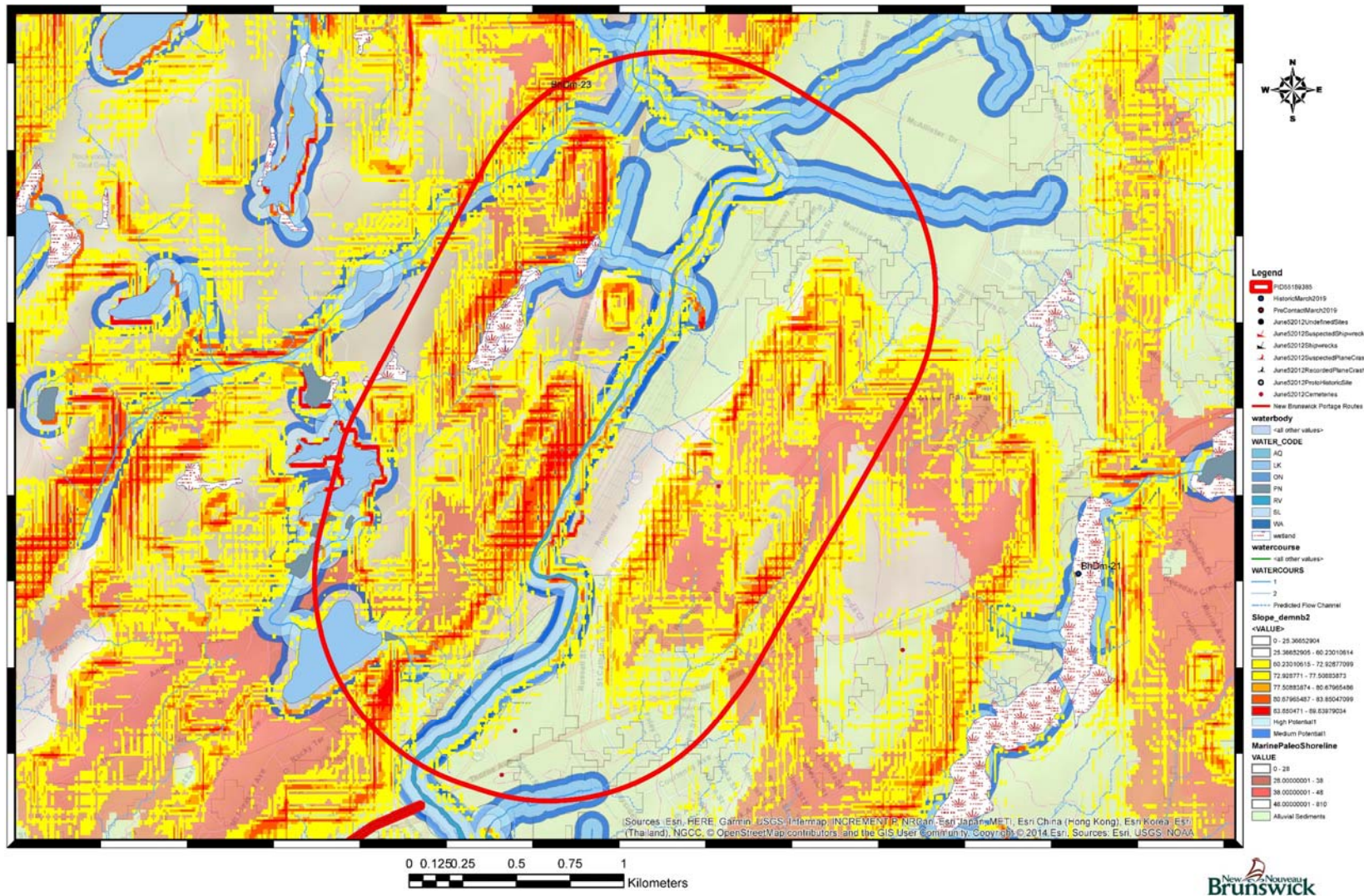


Figure 39. Archaeological predictive modelling in the vicinity of the Rothesay Avenue lands in east Saint John, New Brunswick. Source: New Brunswick Department of Tourism, Heritage, and Culture.



### 3.3.3 Traditional Uses by First Nations

The Project site is located within the traditional Maliseet territory of Wolastoqiyik [*Hinds, 2000*] (Figure 40). Since First Nations lacked a written history, not much is known prior to the arrival of Europeans. The Passamaquoddy people occupied the coastal regions along the Bay of Fundy and the Gulf of Maine and the shores of the St. Croix River and its tributaries while the Wolastoqiyik occupied more northern and inland areas (Figure 40).

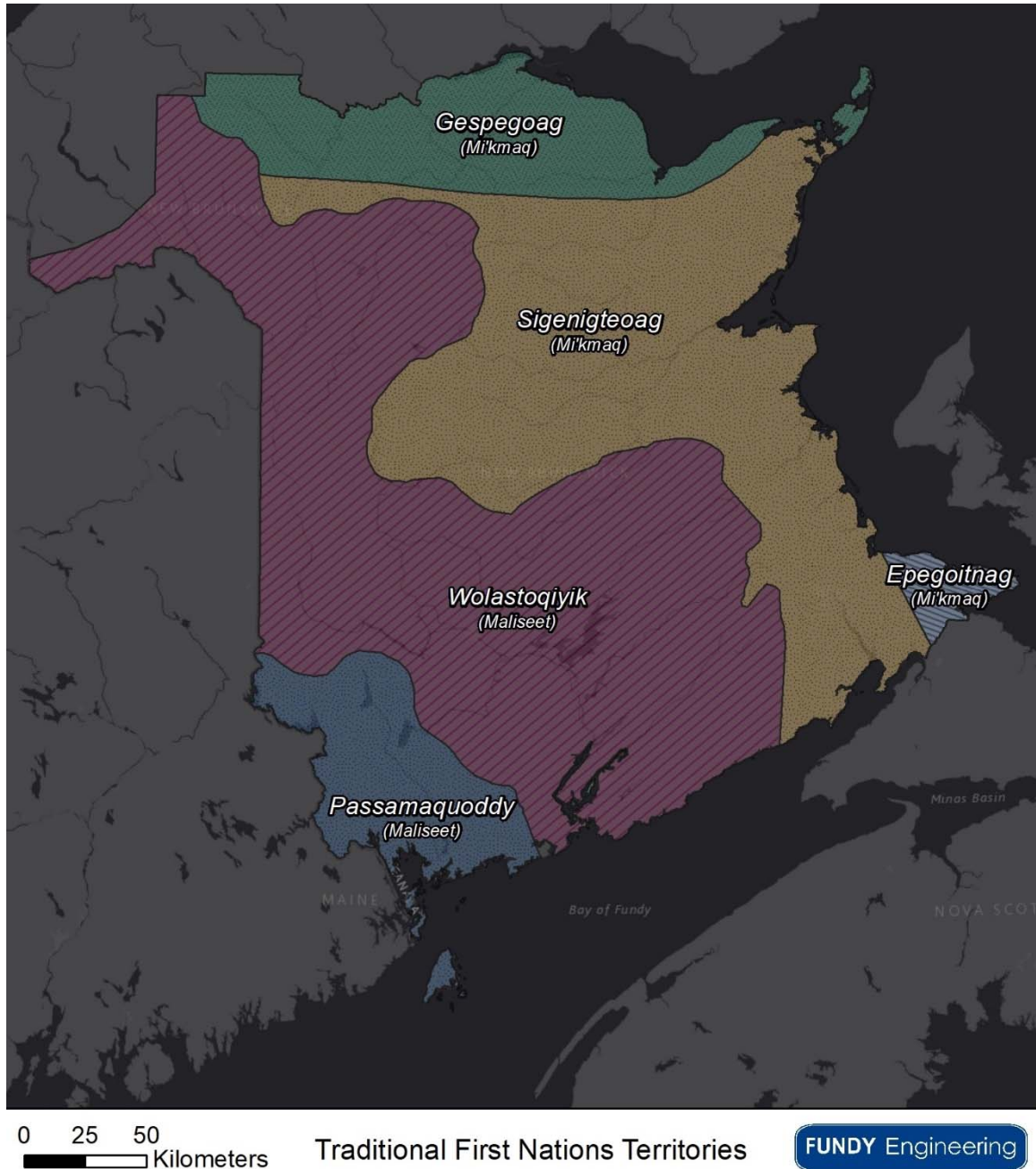


Figure 40. Traditional Maliseet and Mi'kmaq territory in New Brunswick.

Since both cultures lacked a written history, not much is known prior to the arrival of Europeans however, it is known that the Saint John River valley was inhabited by the Maliseet several thousand years prior to colonization by the French in the early 1600s [Webster, 1930]. Upon arrival of Europeans, it is believed the Maliseet were pushed north towards Fredericton. The Passamaquoddy people were forced off their lands repeatedly by the Europeans during the sixteenth century and were eventually confined to the Indian Township Reservation in Maine. It is believed the Maliseet were pushed north towards Fredericton. According to New Brunswick census statistics, there were only 1 116 natives identified as residing in the Province in 1851 [Webster, 1930].

It is unknown if the Maliseet used the lands proposed for *The Crossing*. There is a neighbourhood of Saint John known locally as Indiantown (Figure 41). Based on the name alone it is suspected that the area may have once been used by First Nations peoples; however, this area has been fully developed with multi-unit residential dwellings since the early 1800s and today it is not inhabited by First Nations peoples. The nearest designated First Nations lands are two small islands (*i.e.*, Goat Island and Indian Island) located approximately 5 km to the West of the Project site in the Kennebecasis River. No First Nations Communities are located near the Project site (*i.e.*, Figure 42).

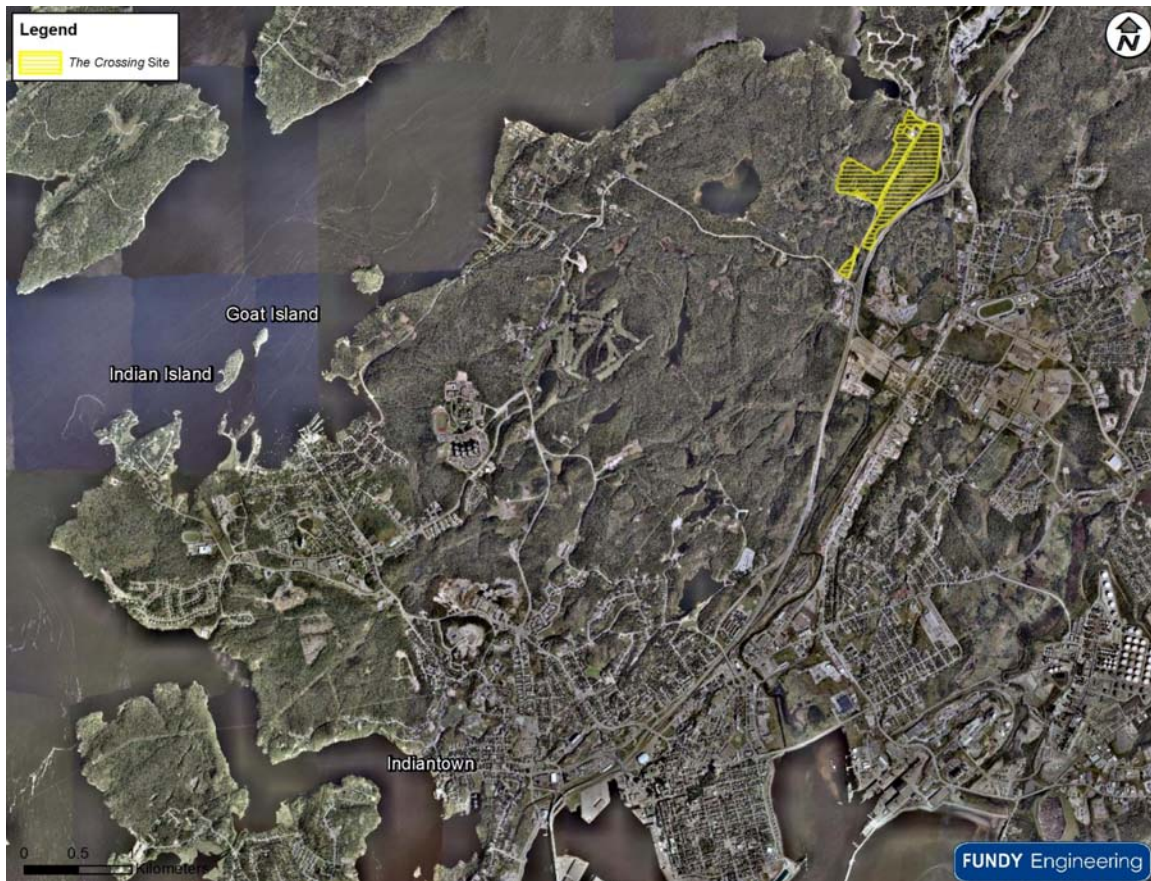


Figure 41. Aerial photograph, circa 2012, showing the location of Indiantown, Goat Island, and Indian Island within the Kennebecasis River and their relation to the lands proposed for *The Crossing* in east Saint John, New Brunswick.

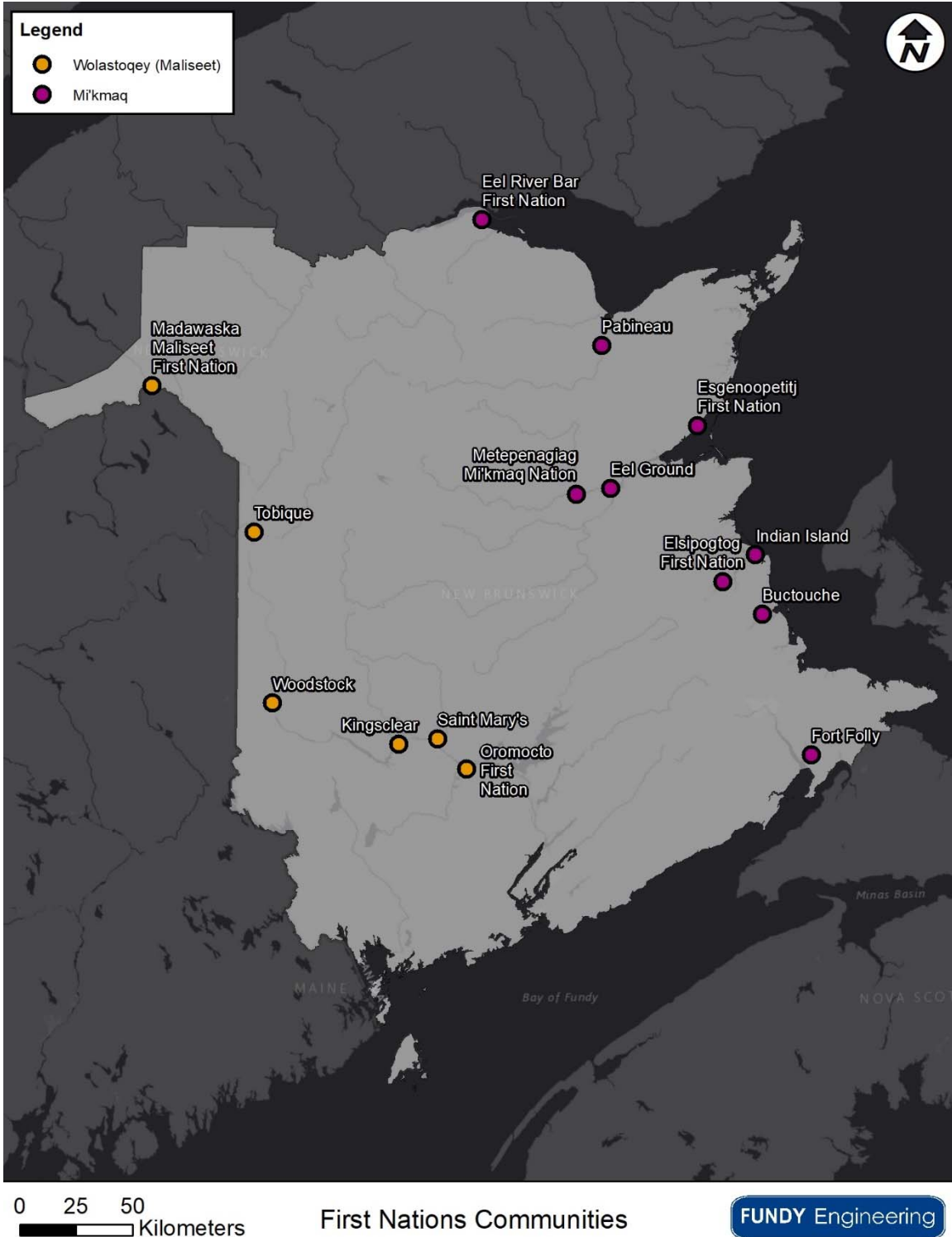


Figure 42. New Brunswick First Nations communities.

### 3.3.4 Historical Land-Use

The area proposed for development lies within the Marsh Creek Watershed. When Samuel de Champlain mapped the St. John Harbour [sic] in 1604 (Figure 43), he noted

Marsh Creek was “an arm of the sea, dry at low tide” [Raymond, 1905]. At that time, the First Nations people referred to the area of Marsh Creek as Sebaskastaggan. A map from 1788 (Figure 44) shows much of the Marsh Creek watershed as being tidal. At that time, following the issuance of the first land grants in the area, aboideaus [sic] were being built by James Simonds to reclaim the “Great Marsh” for use as agricultural land (i.e., hay and other crops). Stewart-Robertson [2009] and Forsythe [2010] refer to a large portion of the Project area as *Drury Pasture*. It is likely that the area was historically used for grazing cattle.

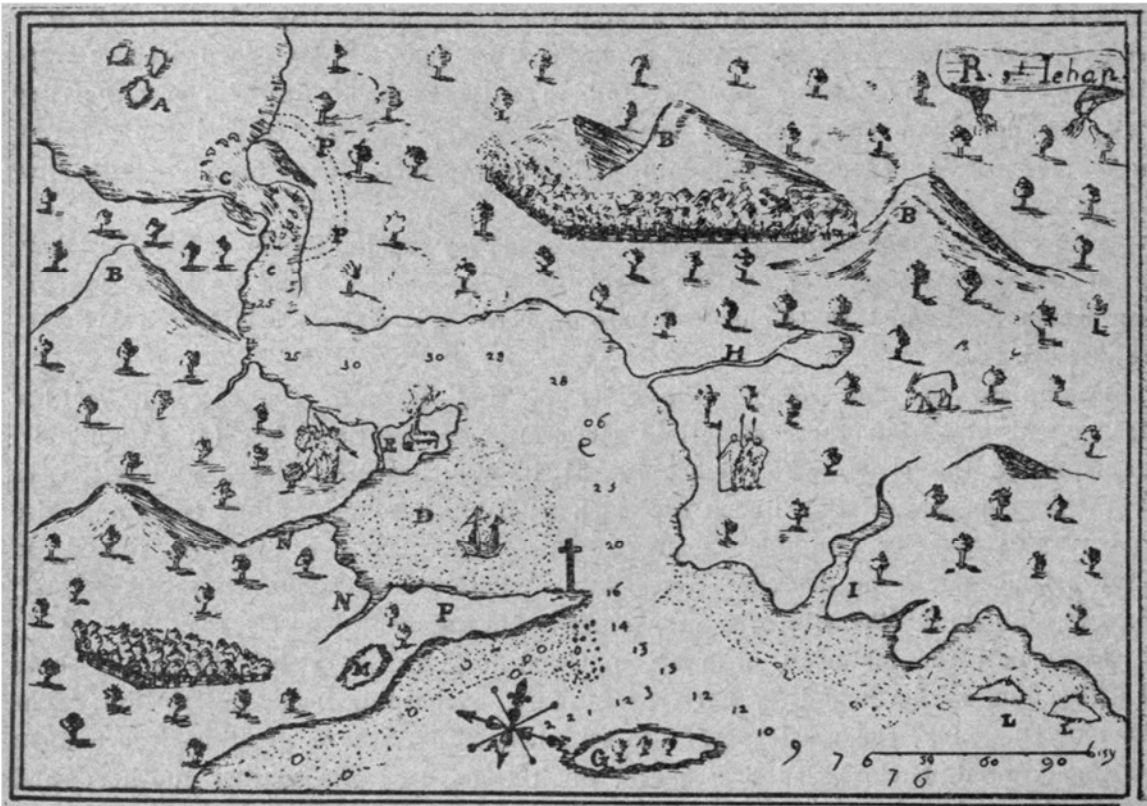


Figure 43. A copy of Samuel de Champlain's 1604 chart of the Saint John Harbour. From Raymond [1905].

The three-masted wooden clipper *Marco Polo* was built on the shores of Marsh Creek by James Smith and launched near its mouth on 17 April 1851. At the time, it was considered to be the fastest ship in the world and was named the *Queen of the Seas* in 1852 [PNB, 2019].

Since first being controlled by James Simonds, Marsh Creek has seen considerable realignment. It was once a slow meandering stream through marshland, but over time has become straightened and highly channelized. Maps from 1862 (Figure 45) and 1875 (Figure 46) show that much of the tidal portion of Marsh Creek had been eliminated, likely as a result of the controls installed by James Simonds and likely others.



Figure 44. 1788 map of east Saint John, New Brunswick. Source: Campbell [1788].



Figure 45. 1862 map of east Saint John, New Brunswick. Source: Waling [1862].



Figure 46. 1875 map of east Saint John, New Brunswick. Source: *Roe and Colby* [1875].

Aerial photographs 1945 (Figure 47), 1976 (Figure 48), 1994 (Figure 49), and 2004 (Figure 50) demonstrate that the lands proposed for *The Crossing* within the Marsh Creek watershed have never been developed and have remained largely covered in forest and wetland. The 1976 aerial photograph shows the McKay Highway under construction adjacent to the Project site.

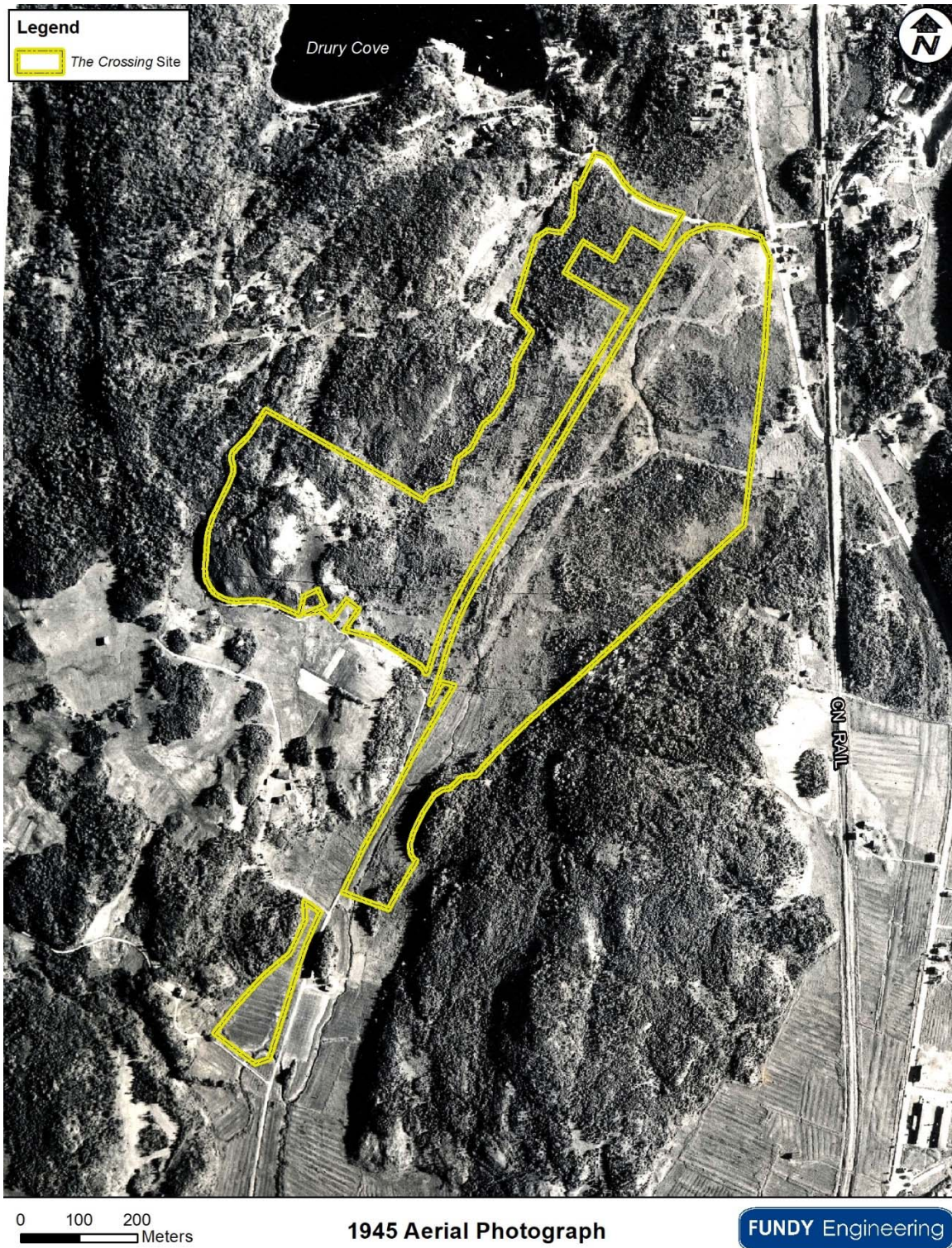


Figure 47. Aerial photograph, circa 1945, showing the lands in east Saint John, New Brunswick being proposed for use as *The Crossing*.

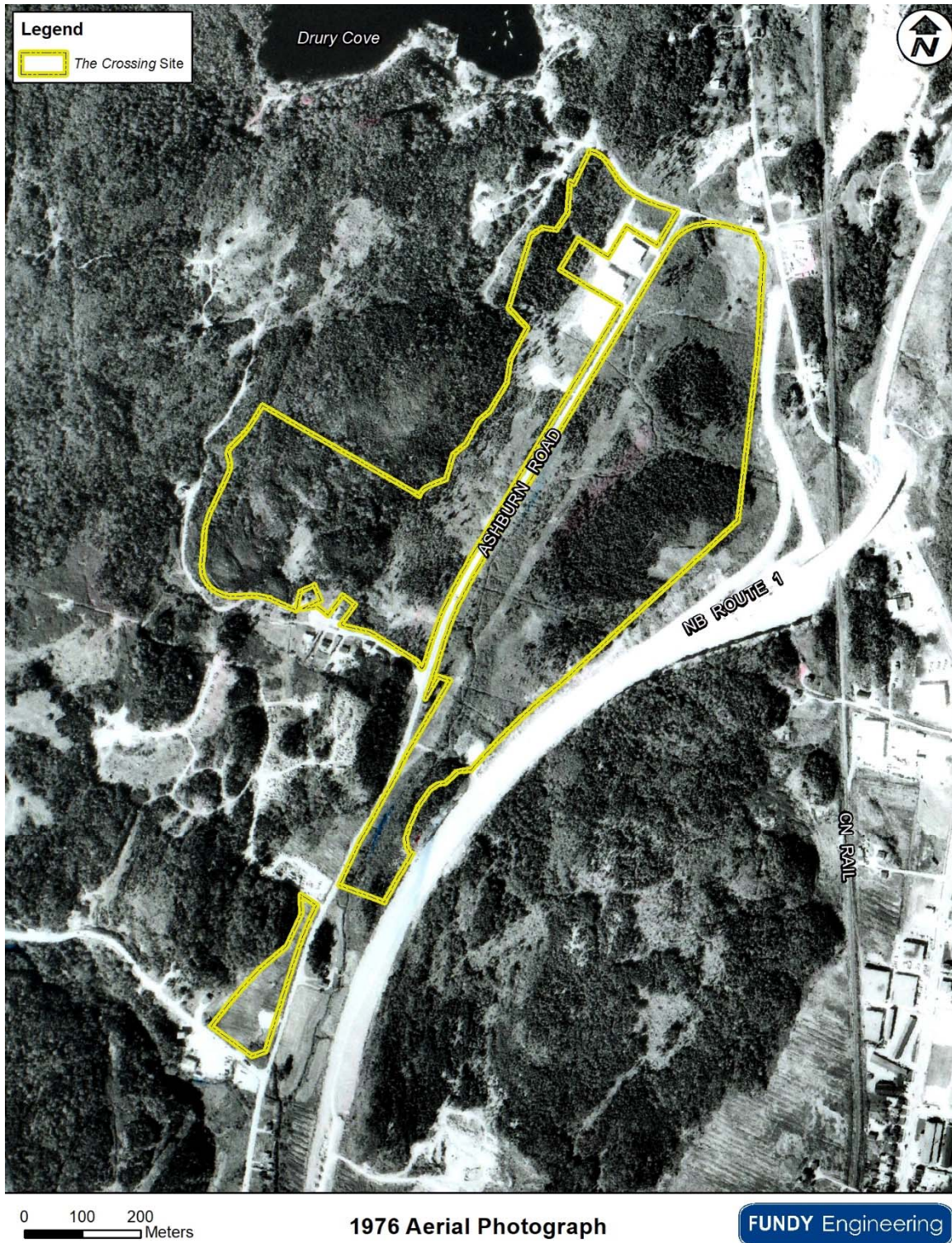


Figure 48. Aerial photograph, circa 1976, showing the lands in east Saint John, New Brunswick being proposed for use as *The Crossing*.





Figure 49. Aerial photograph, circa 1994, showing the lands in east Saint John, New Brunswick being proposed for use as *The Crossing*.

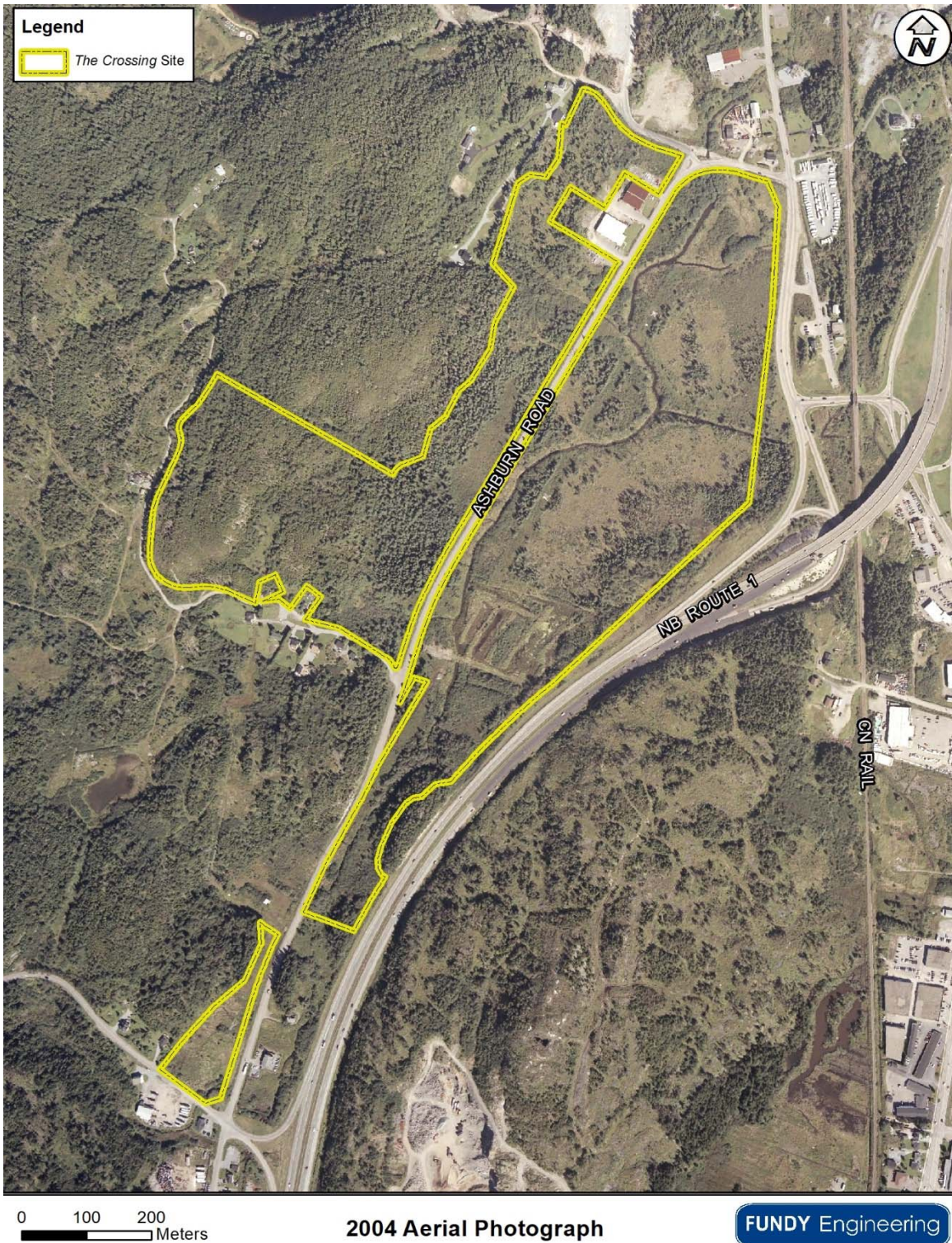


Figure 50. Aerial photograph, circa 2004, showing the lands in east Saint John, New Brunswick being proposed for use as *The Crossing*.

### 3.3.5 Existing Land-Use

Currently, the area proposed for *The Crossing* is a greenfield site. It is believed that flood compensatory storage ponds were constructed on a portion of the site in the 1970s (Figure 5). To construct those storage ponds, the site was accessed from an entrance opposite Jones Drive.

Some of the adjacent properties comprise commercial operations, such as Seamasters Services, Labourers International Union of North America (LUNA) Center Local 900, Alpine Motors, Hatfield Autoglass and Autobody, etc.

### 3.3.6 Health and Safety

#### 3.3.6.1 Police

Saint John is served by the Saint John Police Force (SJPF), one of the oldest police departments in the country, and the largest municipal force in New Brunswick with more than 160 sworn officers. The Force operates using intelligence-led policing and has units involved with community policing, traffic, criminal investigations, and tactical response. The Force operates from their headquarters at One Peel Plaza. Based on the SJPF's Interactive Crime Map, between August 2009 and September 2019, the primary crimes in the Project area included:

- suspicious person ( $n = 1$ );
- disturbing the peace ( $n = 1$ );
- break and enter ( $n = 2$ );
- fire ( $n = 2$ );
- civil matter ( $n = 1$ );
- motor vehicle accident ( $n = 4$ );
- suspended driving ( $n = 1$ ); and
- dispute ( $n = 1$ ).

#### 3.3.6.2 Fire

In Saint John, fire-fighting and protection services are provided by the Saint John Fire Department whose services include: fire rescue and suppression; technical rescue; hazardous materials emergency response; fire prevention; fire investigation; and medical first response. The full-time permanent force operates from seven fire stations strategically located throughout the City.

#### 3.3.6.3 Medical

Ambulance New Brunswick (ANB) provides land (*i.e.*, paramedics) and air (*i.e.*, critical care flight nurses) ambulance services to New Brunswick, which includes Saint John. ANB operates a fleet of 136 ambulances from 67 stations, 12 posts, and two fleet centres.

Saint John has two hospitals that are part of the Horizon Health Network; the Saint John Regional Hospital and St. Joseph's Hospital. The Saint John Regional, with 445 inpatient beds, is the largest tertiary care hospital in New Brunswick and is the primary health care

referral centre for Saint John and to all New Brunswickers for major trauma and cardiac care. St. Joseph's Hospital has 103 inpatient beds and is general care facility known as a center of excellence for geriatric medicine. The Saint John Regional is located in Millidgeville and St. Joseph's is located in Uptown Saint John.

### 3.3.7 Transportation

#### 3.3.7.1 Roadways

Saint John has an intricate web of roadways. A network of provincial and municipal roads provides access to the Project site. The roadways bounding the site include (Figure 51):

- Foster Thurston Drive;
- Ashburn Road;
- Rothesay Road; and
- the Saint John Throughway (*i.e.*, NB Route 1).

Foster Thurston is a municipal arterial that provides access directly on / off the Saint John Throughway from / to Millidgeville via NB Route 1 Exit 128. It is a two-lane asphalt roadway that has a posted speed of  $60 \text{ km} \cdot \text{hr}^{-1}$  near the Project site and  $50 \text{ km} \cdot \text{hr}^{-1}$  at the opposite end near the Saint John Regional Hospital. Foster Thurston is a winding road with some steep grades, sharp turns, and narrow gravel shoulders.

Ashburn Road is a municipal collector. Adjacent to the study area, Ashburn Road extends from Foster Thurston Drive to Rothesay Road. It is a two-lane asphalt roadway with a posted speed limit of  $60 \text{ km} \cdot \text{hr}^{-1}$  and narrow gravel shoulders.

Rothesay Road is a municipal / provincial arterial that extends from Hampton Road in Rothesay to Rothesay Avenue adjacent to the Project site. There is also direct access on / off the Saint John Throughway from / to Rothesay Road via NB Route 1 Exit 129. The posted speed limit adjacent to the Project site is  $50 \text{ km} \cdot \text{hr}^{-1}$  near the Ashburn Road intersection and  $60 \text{ km} \cdot \text{hr}^{-1}$  near Exit 128. Rothesay Road is a two lane asphalt roadway with paved shoulders.

The Saint John Throughway (*i.e.*, NB Route 1) is a four-lane divided controlled access highway that is maintained by Transfield Dexter Gateway Services Ltd. It is a freeway that allows truck traffic to bypass the City of Saint John. Adjacent to the Project site, the posted speed limit is  $100 \text{ km} \cdot \text{hr}^{-1}$ . That roadway is a truck route (Figure 52).

Several two-lane asphalt municipal local streets adjacent to the Project site include (Figure 51):

- Jones Drive;
- Hunters Cove Road;
- Drury Cove Road; and
- Fulton Lane.



Figure 51. Aerial photograph, circa 2004, showing streets in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

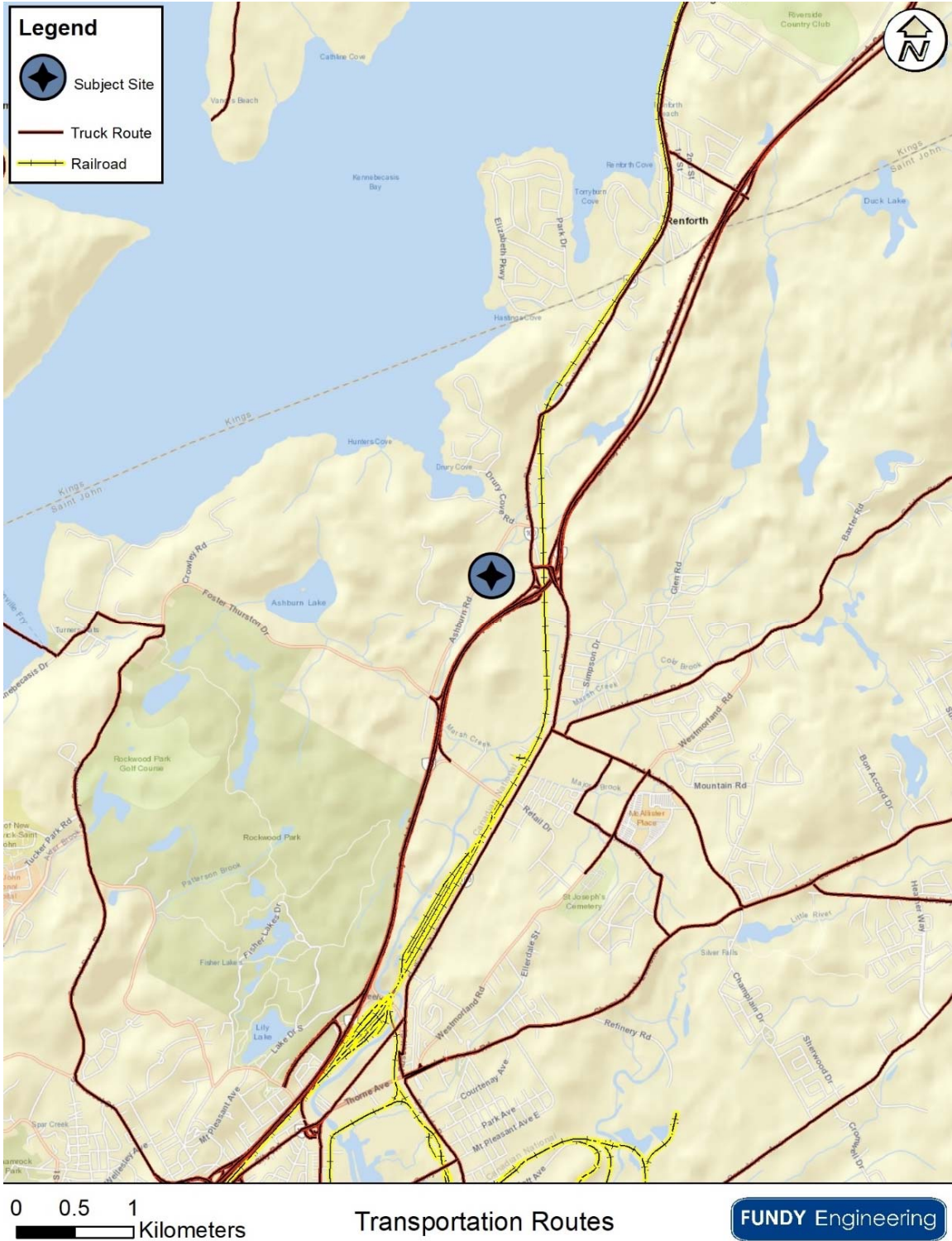


Figure 52. Map showing truck and railway routes in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

### 3.3.7.2 Intersections

There are several intersections adjacent to the Project site and include (Figure 51):

- NB Route 1 Ramps at Exit 128 (*i.e.*, Foster Thurston Drive);
- NB Route 1 Ramps at Exit 129 (*i.e.*, Rothesay Road);
- Foster Thurston Drive / Ashburn Road;
- Ashburn Road / Rothesay Road;
- Ashburn Road / Jones Drive
- Jones Drive / Hunters Cove Road;
- Ashburn Road / Drury Cove Road; and
- Rothesay Road / Fulton Lane.

All of the highway ramps are free-flowing. All intersections, except Rothesay Road / Rothesay Avenue are controlled stops (*i.e.*, via stop signs) without separate turn or slip lanes. The Rothesay Road / Rothesay Avenue intersection is soon to be a three-leg signalized intersection.

### 3.3.7.3 Transit

The Saint John area is serviced by Saint John Transit. Currently, there are no bus stops adjacent to the Project site. Saint John Transit operates a commuter service, Comex, to Rothesay, Quispamsis, and Hampton. Monday through Friday, several buses bring commuters from outlying areas into the City during the morning and return them to the outlying areas in the evening. The Kennebecasis Valley Comex, Quispamsis Comex, and Hampton Comex operate several times during the day. All of those buses travel from / to the outlying areas via NB Route 1.

### 3.3.7.4 Rail

The City of Saint John is served by two railways; the Canadian National (CN) railway, which is the sole Class 1 Railroad in Atlantic Canada, and New Brunswick Southern Railway (NBSR). The NBSR has long line connections to CN, Canadian Pacific, Pan Am, and Maine, Montreal, Atlantic into the Maritimes, Central Canada, the United States East Coast and the Midwest. CN's and NBSR's rail lines are located on the eastern side of the Saint John Throughway (*i.e.*, Figure 52). Transit times for most locations are about a week or less. Passenger rail service is not offered in Saint John.

### 3.3.7.5 Port Saint John

Eastern Canada's largest port, PortSJ, is located at the head of Saint John Harbour near the mouth of the Saint John River. The Port has several berths capable of supporting a large variety of ships. There is also a wide range of facilities to handle all types of cargo and there are several large laydown areas within the Port's land holdings. PortSJ is a recognized port of national significance and one Canada's marine gateways for domestic and international trade and tourism. Port Saint John's facilities are linked to major railroads and highways.

### 3.3.7.6 Saint John Airport

The Saint John Airport, YSJ, is located in the Loch Lomond area of east Saint John. The airport has two asphalt runways; runway 05 / 23 is 2 135 m long and runway 14 / 32 is 1 554 m long. As a gateway to Canadian and trans-border destinations, YSJ is serviced by four airlines: Air Canada; Porter Airlines; Sunwing; and Signature. Although not a major cargo handling facility, Air Canada Cargo does process, store, and ship cargo at YSJ.

### 3.3.7.7 Active Transportation

The Great Trail, formerly known as the Trans-Canada Trail up until September 2016, is a cross-Canada system of greenways, waterways, and roadways that stretches from the Atlantic to the Pacific to the Arctic Oceans. At over 24 000 km, it is the longest recreational, multi-use (*i.e.*, walking / hiking, biking, cross-country skiing, and snowshoeing) trail network in the world. Locally, the Great Trail uses roadways and greenways. The Great Trail extends along Rothesay Road where there is a dedicated lane along the road shoulder. Along Ashburn Road the Great Trail is considered a shared route.

### 3.3.8 Utilities

The City of Saint John has an extensive utilities network. Various components of that network are described below.

#### 3.3.8.1 Potable Water and Fire Water

The current municipal water distribution network near *The Crossing* comprises:

- a 300 mm water main on Rothesay Road;
- a 200 mm water main on Drury Cove Road; and
- a partial 200 mm water main on Ashburn Road (*i.e.*, extends about 90 m from Rothesay Road to civic 901).

#### 3.3.8.2 Sanitary Sewer

The existing sanitary sewer network in the vicinity of the Project consists of:

- a 250 mm sanitary sewer along Rothesay Road;
- a partial 250 mm sanitary sewer along Ashburn Road (*i.e.*, extends about 90 m from Rothesay Road to civic 901);
- a wastewater pumping station at Drury Cove; and
- a 150 mm sanitary force main that conveys wastewater from the Drury Cove wastewater pumping station to the municipal sewer near Simpson Drive.

#### 3.3.8.3 Electricity

Saint John Energy, which is owned by the City of Saint John, provides electricity to customers throughout Saint John. They purchase energy wholesale from NB Power and



distribute it through their network. There are local service lines along Ashburn Road and Rothesay Road. As noted in Section 1.5, NBEPC has a 69 kV transmission line that traverses some of the properties.

#### 3.3.8.4 Communications

Bell Aliant Inc. and Rogers Communications Inc. have underground and aboveground communications lines throughout Saint John.

#### 3.3.9 Aesthetics

As Canada's first incorporated city, Saint John has a rich collection of historic buildings. It is a city that has largely built out, not up; in 2016, the population across the 316 km<sup>2</sup> City was only 67 575 [StatsCan, 2019b]. Only a few tall office buildings (e.g., Bell, Brunswick House, City Hall, JD Irving, Irving Oil, etc.) and churches (e.g., Saint John's Anglican Stone Church, Trinity Church, St. Andrew and St. David, etc.) dominate Uptown Saint John's skyline (Figure 53). Saint John's east-side and west-side skylines are dominated by long-lived industries that are major employers of residents. To the east are industries such as Bayside Power, the Saint John Refinery, and Irving Paper while to the west are industries such as Moosehead Breweries and Irving Pulp and Paper.



Figure 53. Panoramic photographs showing the skyline of the east Saint John, Uptown Saint John, and west Saint John, New Brunswick.

The Project site is located in the valley of Little Marsh Creek and is partially obscured from view due to the presence of bedrock outcrops along NB Route 1 (Figure 54).



Figure 54. Oblique aerial photograph from GoogleEarth showing the location of *The Crossing* site in east Saint John, New Brunswick.

### 3.3.10 Recreation and Tourism

The Project site is privately owned by Horizon Management and / or its affiliates. The lands are not part of any International, National, Provincial, or Municipal park. The site does not comprise a migratory bird sanctuary, ecological reserve, wildlife management area, wildlife refuge, or game sanctuary. The site is not protected environmentally in any manner (*i.e.*, protected watershed, wellfield protection zone, and / or protected natural area). This was confirmed through information reviewed within the ACCDC databases and mapping available from the New Brunswick Department of Natural Resources, the NBDELG, and the City of Saint John.

Hundreds of thousands of people are drawn to the region each year for the rich urban architecture, the region's natural beauty, and the unique maritime culture. A cruise ship business began in 1989 when a ship was forced into port during a hurricane. Since then, more than two million passengers have called on Saint John. There are many attractions that tourists are encouraged to visit as shown in Figure 55. According to *Discover Saint John*, the top attractions are the Reversing Falls / Rapids, the Saint John City Market, and the New Brunswick Museum.

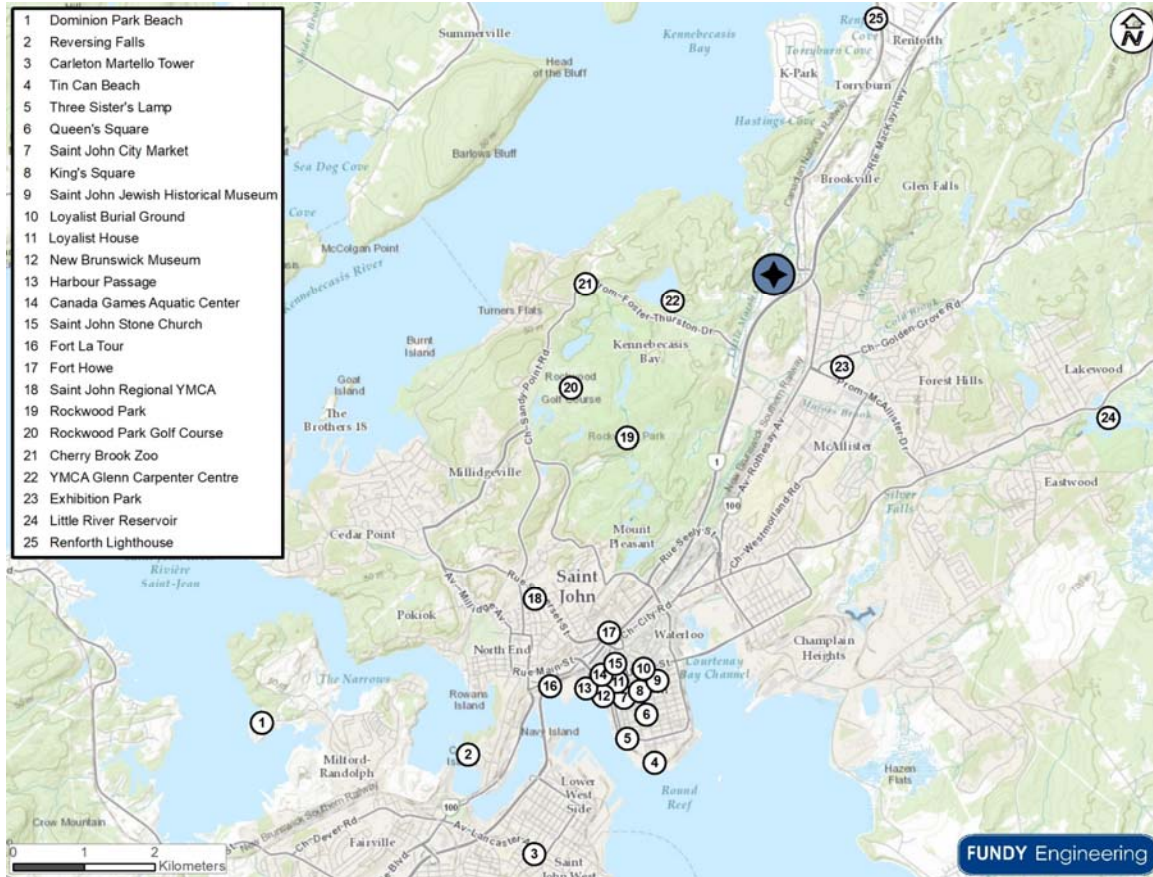


Figure 55. Several tourist attractions in the vicinity of *The Crossing* proposed for east Saint John, New Brunswick.

Saint John has several National Historic sites that tourists are lured by. Those sites include:

- Carleton Martello Tower;
- Fort Howe;
- Fort La Tour;
- Loyalist House;
- Saint John City Market; and
- St. John's Anglican Stone Church.

### 3.3.11 Natural Resources

The only known historic and existing economically viable natural resources in the area are farming, timber, hunting and trapping, aggregates and minerals, and fishing. Those natural resources are briefly discussed below.

#### 3.3.11.1 Farming, Hunting, and Trapping

Farming was likely one of the first activities in the area when land grants were issued. Although some of the land grants were fairly large in size (Figure 56), the shallow soils

were not likely conducive to large agricultural operations. *Stewart-Robertson* [2009] and *Forsythe* [2010] refer to a large portion of the Project area as *Drury Pasture*. It is likely that the area was historically used for grazing cattle and / or other farm animals.

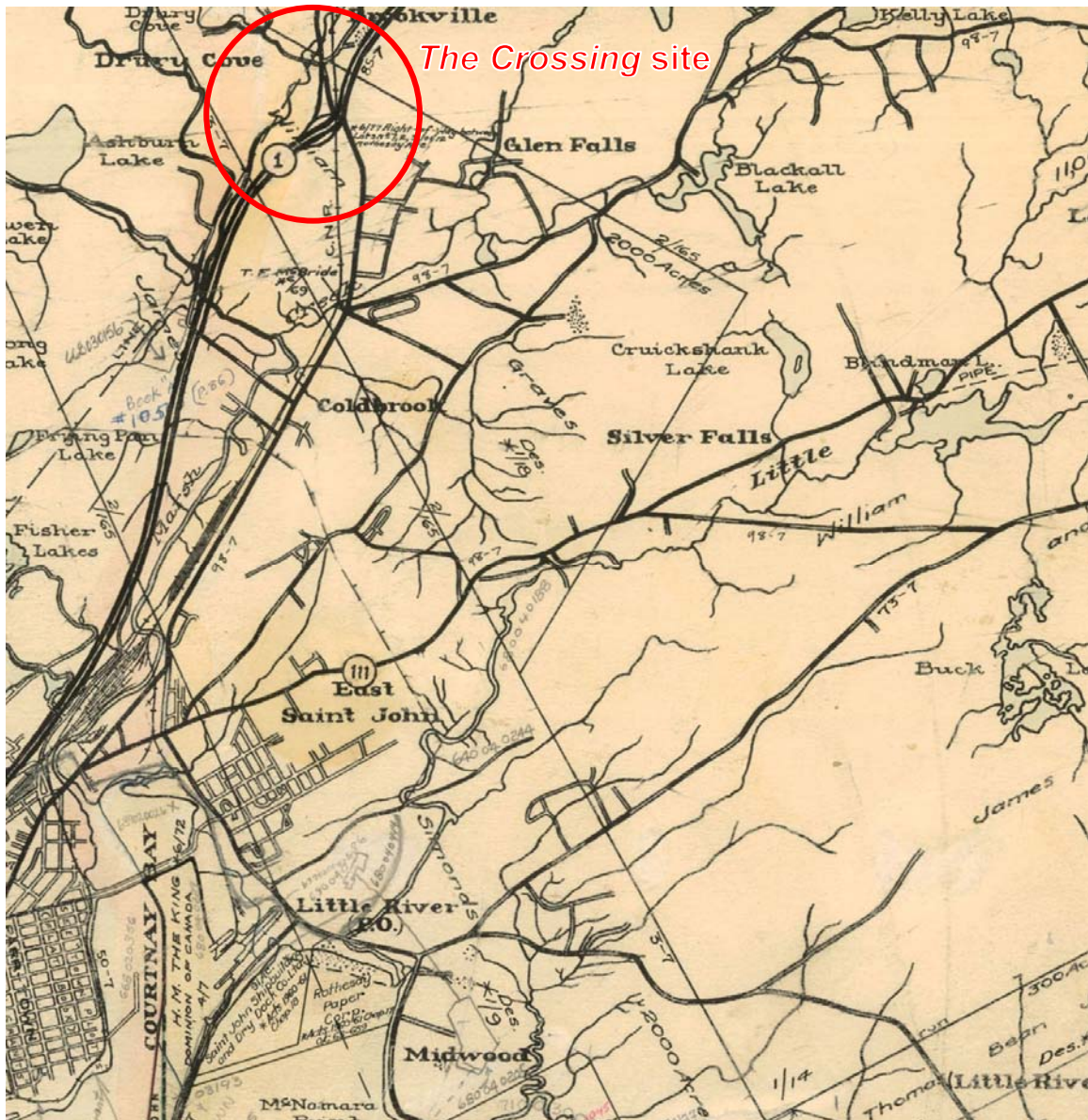


Figure 56. Provincial Archives New Brunswick Cadastral Map 166, which shows some of the original land grantees in east Saint John, New Brunswick.

There are no known uses of the land for hunting and trapping. The proximity of the land to nearby residences likely makes it unusable for hunting.

### 3.3.11.2 Forestry

The lands are not part of any forestry operation. The standing timber would likely not be useful for anything other than harvesting by a fuelwood contractor.

### 3.3.11.1 Mining

Because of the local geology, pits and quarries are found throughout the Greater Saint John region. Limestone has been quarried at the nearby Brookville Lime Quarry (*i.e.*, 1360 Rothesay Road) since about the 1920s. In the 1930s, Brookville Manufacturing, the St. John Lime Company, and the Adams Line Works were all located in Brookville [Goss and Wright, 2011]. Deby Resources also has a quarry on Ashburn Lake Road, downstream of the proposed Project, and one located at the Fox Farm Road Interchange of the McKay Highway, upstream of the proposed Project.

Between 1974 and 1986, granular aggregate resources were mapped within the Province. As shown in Figure 57, there are no identified aggregate resources located on the Project lands [Finamore *et al.*, 1976]; however, the mapping does show that at that time there was a bedrock quarry located to the west of Hunters Cove Road (*n.b.*, it is believed that the former quarry is now a small pond that feeds an unnamed tributary to Little Marsh Creek as described in Section 3.1.5.1).

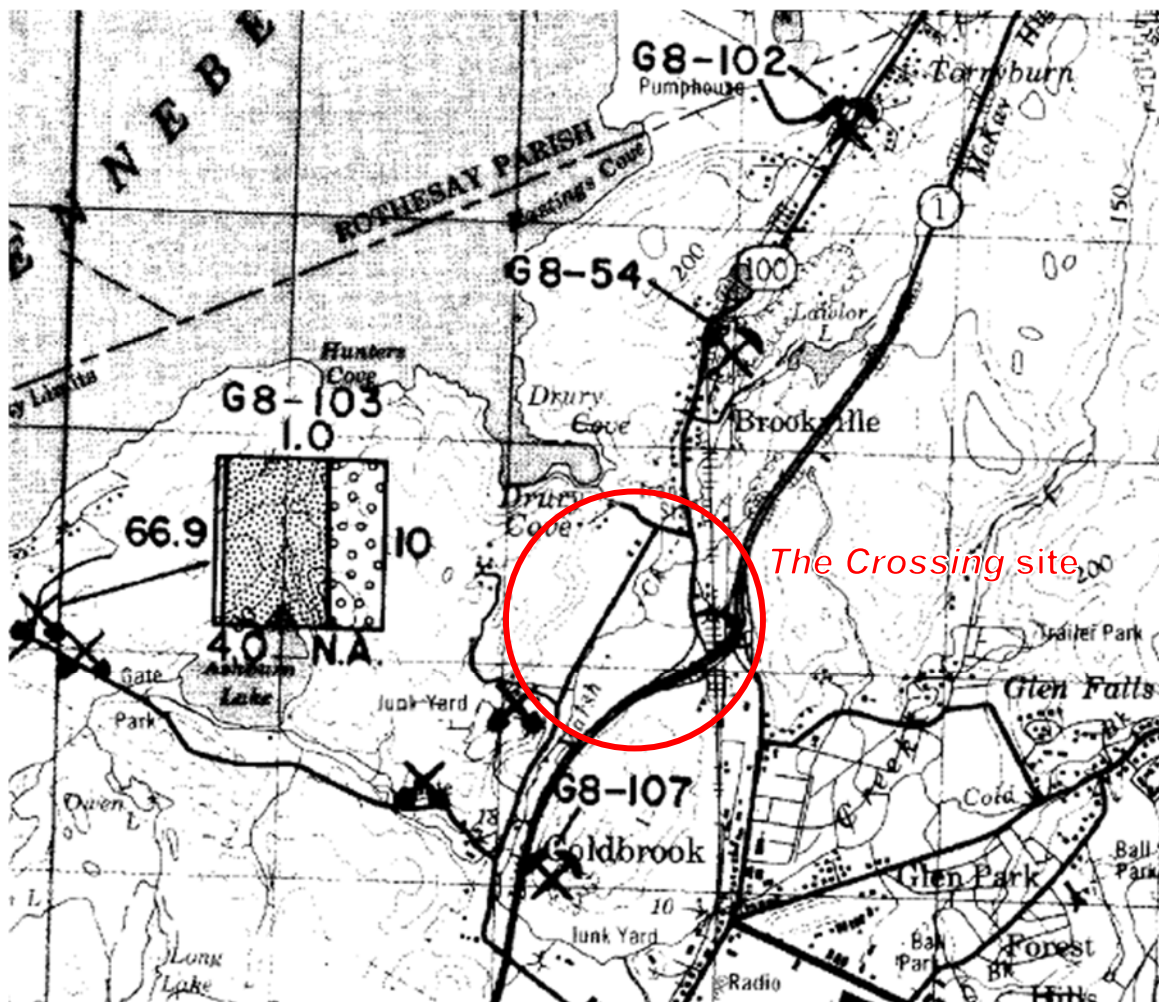


Figure 57. Portion of Map Plate 76-19 showing the granular resources of east Saint John, New Brunswick. A pick axe and shovel symbol denotes a bedrock quarry and a two shovel symbol denotes a gravel pit.

### 3.3.11.2 Fishing

The Bay of Fundy supports commercial fisheries that provide an important source of income for local fishermen. Fishing licenses are issued for the Saint John County area for several species, including dogfish, eel, gaspereau, groundfish, herring, lobster, mackerel, rockweed, scallops, sea urchins, shad, and sturgeon. Though some fishing activity of each of these species may occur in limited quantities, the commercial fisheries in the area are dominated by the lobster fishery and to a lesser extent the scallop fishery in both number of participating harvesters and landings value.

Although there is no commercial fishing on the Project lands, sometimes people are observed to be angling recreationally within Little Marsh Creek. It is likely those people are fishing for brook trout or brown trout.

## 4.0 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION

### 4.1 PROJECT INTERACTIONS / SCOPING

As noted in Section 2.8, there are five Project stages. Different activities are associated with each stage and not all stages interact with the environment. For this EIA, environmental interactions are strictly limited to the spatial and temporal boundaries of this Project. A high-level assessment of the Project stages and potential environmental interaction is summarized in Table 31. Accordingly, only Stages II, III, and V require further assessment here as they are the only stages that have potential interactions with the environment that can be identified.

Table 31. Project stages for *The Crossing* in east Saint John, New Brunswick. Included are the activities associated with each stage and whether or not there is an interaction with the environment.

Stage	Activities	Interaction
I – Environmental permitting, monitoring, and compliance	<ul style="list-style-type: none"> <li>• Desktop reviews</li> <li>• Non-intrusive field investigations</li> <li>• Permit applications</li> <li>• Site reviews and inspections</li> <li>• Development and review of best management practices</li> </ul>	No
II – Construction	<ul style="list-style-type: none"> <li>• Building up site (<i>i.e.</i>, importing fill materials)</li> <li>• Installing infrastructure</li> <li>• Foundation excavation</li> <li>• Constructing buildings</li> </ul>	Yes
III – Operation and maintenance	<ul style="list-style-type: none"> <li>• Selling of goods and services</li> <li>• Transporting and distributing goods</li> <li>• Promoting the region</li> <li>• Clearing snow</li> <li>• Mowing lawns and caring for the grounds</li> <li>• Collecting solid waste</li> </ul>	Yes
IV – Decommissioning	<ul style="list-style-type: none"> <li>• Removing buildings and infrastructure</li> <li>• Site grading and leveling</li> <li>• Reclaiming the site</li> </ul>	Yes, but will be defined at a later date
V – Mishaps, errors, and / or unforeseen events	<ul style="list-style-type: none"> <li>• Potential for spills, contaminant releases, and fires</li> </ul>	Yes

Fundy Engineering's Project Team, based on previous environmental impact assessment experience and professional judgment, assessed potential interactions between Stages II, III, and V (*i.e.*, those with an environmental interaction as identified in Table 32) and all of the environmental components described in Section 3.0. Through that exercise, it was determined that there are 12 environmental components that require detailed assessment with respect to *The Crossing* (*i.e.*, those with a potential Project interaction). Those environmental components are identified below as Valued (socially, economically, culturally and / or scientifically) Environmental Components (VECs).

Table 32. Assessment of potential interactions of various stages of *The Crossing* in east Saint John, New Brunswick and the environment. Check marks indicate that there is potential for interaction and requires further assessment.

Environmental Component	Stage and Environmental Interaction		
	II: Construction	III: Operation and Maintenance	V: Mishaps, Errors and Unforeseen Events
<b><u>PHYSIO-CHEMICAL ENVIRONMENT</u></b>			
Climate	NA	NA	NA
Air quality	✓	✓	✓
Sound emissions	✓	✓	✓
Topography	NA	NA	NA
Hydrology	✓	✓	✓
Geology	NA	NA	NA
Hydrogeology	✓	✓	✓
<b><u>BIOLOGICAL ENVIRONMENT</u></b>			
Terrestrial flora & fauna	✓	✓	✓
Aquatic flora & fauna	✓	✓	✓
<b><u>SOCIO-ECONOMIC ENVIRONMENT</u></b>			
Labour and economy	✓	✓	✓
Archaeological and cultural features	NA	NA	NA
Land-use	✓	✓	✓
Transportation network	✓	✓	✓
Aesthetics	✓	✓	✓
Protected areas	NA	NA	NA
Recreation and tourism	✓	✓	✓
Health and safety	✓	✓	✓

## 4.2 OVERVIEW OF VALUED ENVIRONMENTAL COMPONENT ANALYSIS

Fundy Engineering employs a visual method of impact level when assessing VECs through the EIA process. Our proven method (Table 33) is a way for reviewers (*i.e.*, Regulator(s), stakeholders, and the general public) to quickly and easily review the impacts without having to understand a complex environmental assessment process. In the analysis of Project impacts on the environment, there are several terms that must be considered.

Project impact green lights are considered those activities that may yield short-term impacts. Those impacts would be experienced for a brief period of the Project (*i.e.*, a day or week during a Project Stage). For example, a green light may be applied to sound emissions if a pile driver were to be used for a one week period over a year-long construction period where the only loud activity anticipated is the driving of piles. Green lights are also applied to activities that have a positive outcome. Creating long-term employment through the development of a recreational facility, for example, would be a positive impact that would be assigned a green light in our analysis. If the impact is not entirely positive, then mitigation measures are likely required for green lights.







Project yellow lights are considered to be those activities that extend between the short-term and long-term. Impacts considered long-term are those that may be experienced for a prolonged period of time, such as during the entire duration of the Project. With yellow lights, long-term impacts are not permanent (*i.e.*, they are reversible and with the application of environmental protection methods, the impact may be further reduced). An example of a yellow light would be increased erosion along a linear corridor resulting from the clearing and grubbing of a forest. The impact is reversible (*i.e.*, replanting of vegetation to return to pre-impact conditions) or can be mitigated (*i.e.*, through the implementation of best-management practices, such as silt fences and sedimentation basins). Mitigation measures are required for yellow lights.

Red lights are applied when long-term impacts are considered to be permanent. That is they may cause irreversible change in the environment. An example would be a large and persistent oil spill to a major drinking water aquifer. After halting the spill, considerable effort may be required to remediate the contamination. During remediation, which would likely be prolonged, a new source of drinking water would be required. Red lights require that mitigation measures be developed.

When there is no anticipated change to the component as a result of the project, a blue light is applied. Blue lights do not require mitigation because there is no change.

Table 33. Fundy Engineering's Valued Environment Component Assessment visual coding method, which is analogous to a traffic light.

Assessment Symbol	Description
	<b><i>Favourable or little to no impact:</i></b> criteria receiving this impact level have no significant problems associated with them; they are green lights for the Project.
	<b><i>Potential impacts that may require some degree of mitigation:</i></b> criteria receiving this impact level do not appear to have significant problems associated with them; they are yellow lights for the Project and should be approached with caution.
	<b><i>Not favorable or a major impact:</i></b> criteria receiving this impact level rating would be difficult to implement; they are red lights for the Project.
	<b><i>No change in existing impact:</i></b> criteria receiving this impact level have no additional potential impact from the Project than already currently exists.

**NOTE TO READERS:** It is important to read the comments and mitigation measures listed below each VEC assessment table in order to understand how the assessment symbol was derived and what mitigation measures are anticipated.

Residual effects are also considered in the assessment of potential project environmental impacts. A residual effect is any measurable or demonstrable environmental impact that remains following the implementation of mitigation measures. Each Project activity, component, and associated mitigation measure is assessed on different attributes of the potential for environmental impact (*i.e.*, intensity, spatiotemporal extent, frequency, and reversibility). The potential for residual effects is described for each VEC below. In the instance where a residual effect is expected to occur, the potential impact is further assessed to determine whether any cumulative effects may arise through the interaction

between the Project-specific impacts and similar effects from past, present, and / or reasonably foreseeable activities.

### 4.3 POTENTIAL PROJECT IMPACTS ON THE ENVIRONMENT

#### 4.3.1 Valued Environmental Components Assessed

The following VECs were assessed for *The Crossing* proposed for east Saint John, New Brunswick:

- physio-chemical environment:
  - air quality;
  - sound emissions;
  - surface water quantity and quality; and
  - groundwater quantity and quality;
- biological environment:
  - terrestrial flora and fauna; and
  - aquatic flora and fauna; and
- socio-economic environment:
  - labour and economy;
  - transportation network;
  - aesthetics;
  - land-use
  - recreation and tourism; and
  - health and safety.

The identified VECs were assessed with consideration given to risks associated with the construction stage, the operation and maintenance stage, and any mishaps, errors, and / or unforeseen events (*i.e.*, malfunctions or accidents) that may occur as a result of the proposed Project. The assessment of the VECs listed above is described in detail in the sections that follow.

#### 4.3.2 Physio-Chemical Environment

##### 4.3.2.1 Air Quality

Air quality was selected as a VEC because it has the potential to be affected during all aspects of the Project (*e.g.*, construction, operation and maintenance, and mishaps, errors, and / or unforeseen events). The following potential impacts associated with air quality were assessed:

- micro-climate (*i.e.*, temperature and precipitation) of the local area;
- emissions of CO;
- emissions of NO<sub>x</sub>;
- emissions of SO<sub>2</sub>;
- emissions of VOCs; and

- emissions of PM (*i.e.*, from exhausts and dusts).

#### 4.3.2.1.1 Potential Impacts

The complete assessment of potential impacts of the potential Project on air quality is provided in Table 34. Overall, the assessment yielded two green lights and 16 yellow lights.

The micro-climate is expected to be minimally affected during all Phases of construction. This is largely because of vegetation loss, which will reduce temperature moderation (*i.e.*, loss of shade and evapotranspiration) and increase the amount of precipitation reaching the ground surface and infiltrating the ground. During operation and maintenance, the micro-climate will also be affected. This includes the heat island effect where buildings and roadways accumulate and store heat during the day and then release it at night (*i.e.*, reduces nighttime cooling). Erecting buildings, paving roads and parking lots, and placing concrete for curbs and sidewalks will reduce the area of permeable surfaces in the area; thus increasing the amount of surface water runoff and decreasing the amount of groundwater recharge. Wind patterns will also be affected by the change in landscape; winds will be deflected when they reach buildings and other solid structures, much more so than when encountering a forest.

Because the overall Project is still in the conceptual stage, no final details are available at this time regarding the three construction Phases. As a result, estimates of GHG emissions could not be made; however, there will be an increase in GHG emissions compared to the baseline environment.

Emissions by heavy equipment will be the greatest during site preparations, construction, and operation and maintenance activities. For example, the majority of construction equipment used will likely have diesel or gasoline combustion engines, which will increase atmospheric emissions (*i.e.*, CO, NO<sub>x</sub>, SO<sub>2</sub>, VOCs, and PM). The operation of various mechanical systems for tenant buildings, such as heating, ventilation, air-conditioning, communication, and lighting systems, will increase atmospheric emissions. Traffic generated as a result of the Project, such as local traffic, visitors, and servicing vehicles, will also release emissions to the atmosphere; however, it is likely that improved emissions control equipment on vehicles and the rise in the use of electric vehicles throughout the Project's lifecycle will help moderate the increase in GHG emissions resulting from the operation and maintenance of the Project.

Fugitive dusts may be released to the atmosphere while clearing trees, moving materials, and operating vehicles on local gravel and dirt roadways (*i.e.*, within the Project site during construction activities). They may also be generated during routine maintenance activities, such as street and parking lot sweeping and blowing cut grass and fallen leaves.

Should a mishap, error, and / or unforeseen event occur, there is a potential that impacts could be realized to air quality. Therefore, yellow lights were applied to all potential impacts. Overall, the potential impacts identified for air quality related to this Project can be reduced or eliminated using the mitigation measures described below.

#### 4.3.2.1.2 Proposed Mitigation

At a minimum, the mitigation measures outlined below should be undertaken by Project personnel to ensure that potential impacts to air quality are minimized.

- Heavy equipment should only be operated at optimum loading rates.
- Heavy equipment should be turned off when not in use and / or when practical.
- The number of vehicle kilometers traveled should be kept to a minimum (*i.e.*, there should be no unnecessary operation of equipment in and around the site).
- Heavy equipment should be operated at moderate and steady speeds and when travelling on surfaces where dusts can be generated (*i.e.*, gravel or dirt roadways).
- Heavy equipment should be operated using clean fuels (*i.e.*, ultra-low sulphur diesels), where available and practical.
- Heavy equipment exhaust systems should meet the recommended standards.
- Equipment should be maintained according to manufacturer servicing periods.
- Heavy equipment should only be refueled using a protocol designed to mitigate any risk to the environment.
- No solid waste should be burned on-site.
- If the application of water as a dust suppressant is deemed necessary (*n.b.*, this is the preferred method of dust suppression), it should be applied using suitable equipment (*e.g.*, a tanker truck equipped with spray bars and methods of controlling water flow, *etc.*).
- Material stock piles (*e.g.*, soil, sand, aggregate, *etc.*) and spoils piles should be sited in locations that minimize the impact from prevailing winds.
- Allowing vegetation, such as grasses and shrubs, to re-establish itself should reduce impacts to air quality, especially those associated with fugitive dusts generated from wind blowing over bare soils.
- Planting vegetation or allowing vegetation, including grasses, shrubs, and trees, to regenerate / grow, can moderate the micro-climate changes at the Project site. This could include creating green / living roofs on buildings.
- Developers and tenants should be encouraged to design energy efficient buildings and implement methods to conserve energy.
- Developers and tenants should be encouraged to implement renewable energy sources into their buildings.
- Traffic patterns should be designed throughout the development to reduce vehicle idling.
- The Proponent should work with Saint John Transit to develop convenient and frequent bus routes to and from the Project site, which should include connecting to COMEX routes.
- The Proponent should implement active transportation routes into the overall design, where possible and practical, and those routes should connect to existing active transportation routes near the Project site.
- Diesel and gasoline storage tanks and fuel distribution systems, where possible and practical, should have vapour recovery systems.

- Emergency response and contingency plans should be designed to prevent any major and / or sustained environmental damage during any mishaps, errors, and / or unforeseen events.

#### 4.3.2.1.3 *Potential Post-Mitigation Residual Impacts*

Overall, this Project is expected to result in moderate impacts to local air quality as summarized in Table 34. There are no residual impacts anticipated to air quality as a result of this Project.

#### 4.3.2.2 *Sound Emissions*

Sound is emitted by all construction, operational, and maintenance equipment (Figure 58). This sound is often above ambient sound levels. When they become too high, sound levels may be a nuisance to nearby residents and businesses and may cause disturbance to local wildlife. Additionally, sound levels can be a hazard to all Project personnel if appropriate precautions are not taken. Because of this, sound emissions were selected as a VEC. The following potential impacts were assessed for the Project:

- sound levels;
- sound duration;
- sound repetition; and
- ground vibration.

Sound waves generate ground vibration hence the reason for assessing the impact of the Project on ground vibrations.

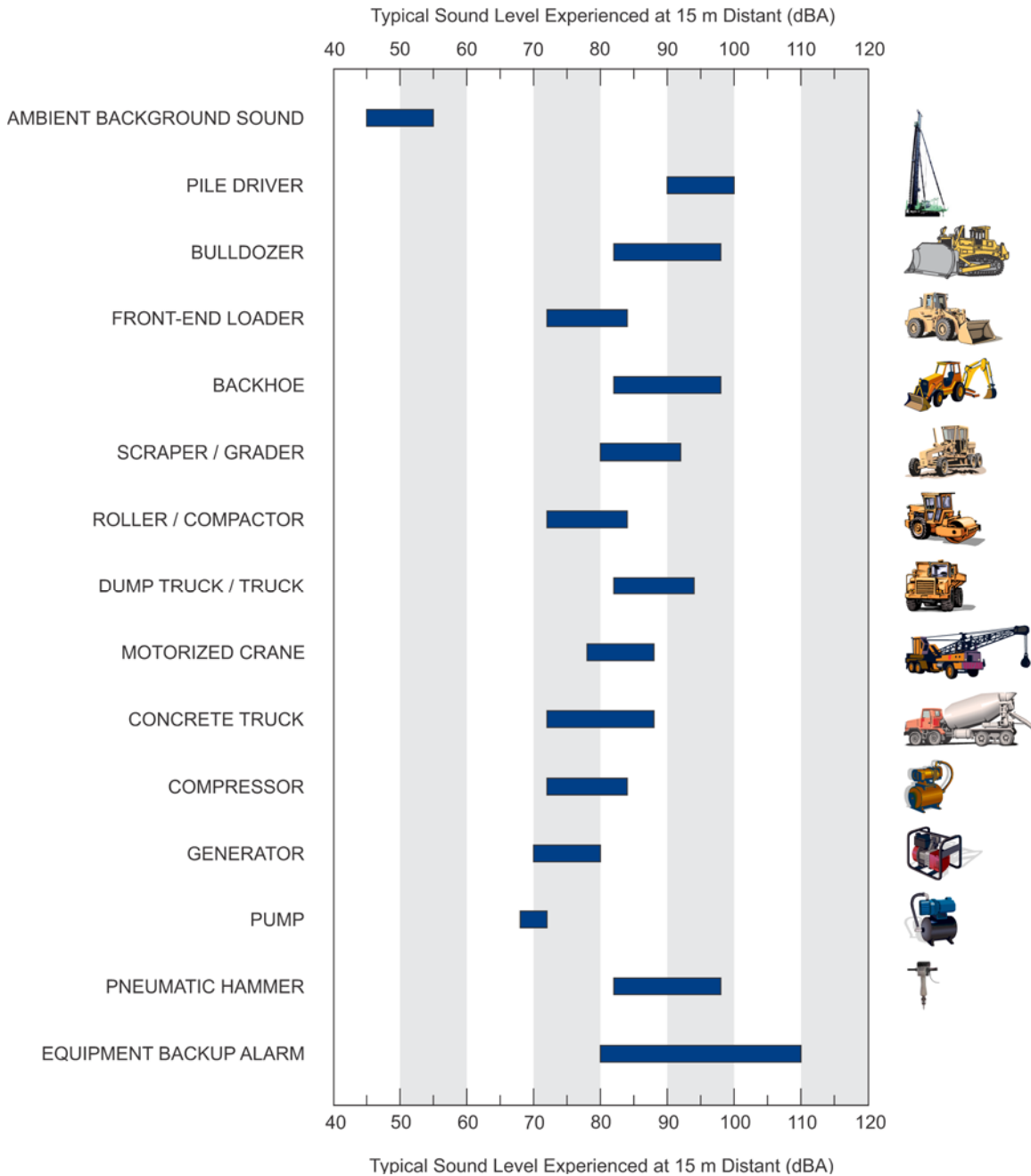


Figure 58. Typical sound levels from construction equipment experienced by a receptor at 15 m distant. After USEPA [1971].

#### 4.3.2.2.1 Potential Impacts

Table 35 is the complete assessment of potential impacts conducted for sound emissions associated with the Project. Although low in numbers, there are some residences ( $n \approx 46$ ) located in close proximity to the Project site. Furthermore, some of those houses are at a higher elevation (*i.e.*, along Jones Drive and Hunters Cove Road) causing them to be potentially more exposed to sound emissions emitted from the site (*i.e.*, there are limited sound absorbing materials between them and the site).

All 12 potential impacts were assigned yellow lights (Table 35). The primary reason for that assignment is that sound levels will increase above baseline conditions during all three Phases of the Project.

#### 4.3.2.2.2 Proposed Mitigation

The mitigation measures provided below should be implemented by Project personnel to minimize the potential impact of sound emissions to nearby receptors (*i.e.*, residents and the general public), particularly during Project construction and operation and maintenance.

- All heavy equipment should be equipped with the appropriate manufacturer designed sound emission abatement equipment (*i.e.*, mufflers).
- Shrouding on equipment should be inspected regularly to ensure that it is in good condition and limits the level of sound emitted.
- The exhaust systems of all heavy equipment should be inspected regularly to ensure that mufflers are operating properly.
- Heavy equipment should be maintained according to manufacturer recommended servicing periods.
- The idling of all heavy equipment should be kept to a minimum.
- Heavy truck traffic should be minimized, where possible and practical.
- Any loud equipment (*i.e.*, > 90 dBA at the source) should be sited as far away as possible from the nearest sensitive receptor (*i.e.*, residents and businesses).
- If pile driving is required, the pile driver should be equipped with the appropriate manufacturer designed sound emission abatement equipment.
- Where practical, shrouds should be used to help minimize sounds emitted from pile driving activity.
- Where possible, hydraulic impact pile drivers should be used instead of conventional diesel drop hammers in order to reduce sounds emitted from pile driving activity.
- Contractors should notify nearby residents and businesses at least one week prior to the start of any pile driving activities required for the Project.
- Loud construction activity should be scheduled / planned to occur during normal workday / daylight hours (*i.e.*, 7 AM to 7 PM Monday through Friday), where possible.
- Strobe lights, if permissible, should be used instead of backup alarms on heavy equipment if nighttime operations occur.
- Contractor(s) / subcontractor(s) should ensure that all equipment has proper functioning noise abatement equipment.
- Pneumatic hammers should be used instead of blasting, where practical and feasible, to breakup rock. If blasting is required, then the following additional measures should be undertaken by Project personnel:
  - no blasting shall occur within 600 m of any residence unless approved by the NBDELG, which would include completing well testing and pre-blast surveys;
  - no blasting shall be conducted daily between 7 PM and 7 AM;

- no blasting shall be conducted on a Saturday, Sunday, or Statutory Holiday unless otherwise permitted by the municipal by-laws and approved by the NBDELG; and
- concussion and vibration as a result of blasting be controlled by following the appropriate standards.

#### 4.3.2.2.3 Potential Post-Mitigation Residual Impacts

Project construction may result in some short-term loud sounds. Those potential impacts can be mitigated as noted above. During operation, it is anticipated that sound emissions will be greater than currently exist, but that they will be no different than other commercial areas throughout the Greater Saint John region and those in close proximity to the Project site (e.g., the Brookville Manufacturing Co. Quarry, Debly Resources Rock Quarry and Asphalt Plant, the CN Rail line, etc.).

#### 4.3.2.3 Surface Water Quantity and Quality

The Project site is located on the bank of Little Marsh Creek and some of its tributaries and contiguous wetlands. Some of the Project construction and operation and maintenance activities have the potential to impact surface water. Therefore, surface water quantity and quality was selected as a VEC. The following potential impacts were assessed for the Project:

- turbidity / suspended sediment;
- surface water quantity (*i.e.*, increased runoff);
- surface water quality (*i.e.*, general chemistry and trace metals);
- contamination by hydrocarbons / hazardous chemicals; and
- surface water drainage characteristics.

##### 4.3.2.3.1 Potential Impacts

Table 36 presents the potential impact assessment to surface water quantity and quality. All impacts assessed yielded a yellow light.

To facilitate Project development, tributaries of Little Marsh Creek will require alteration. The potential impacts to on-site watercourses will be as follows (Figure 59):

- an unnamed tributary between Fulton Lane and Ashburn Road, ~ 178 m long and 1 m to 2 m wide (*i.e.*, ~ 270 m<sup>2</sup>) will be piped;
- an unnamed tributary near Rothesay Road / Rothesay Avenue intersection, ~ 165 m long and 2 m to 4 m wide (*i.e.*, ~ 500 m<sup>2</sup>) will be realigned within an open channel;
- an unnamed tributary near Jones Drive / Ashburn Road intersection, ~ 220 m and 0.5 m to 1 m wide (*i.e.*, ~ 170 m<sup>2</sup>) may be realigned within an open channel / pipe; and
- an unnamed tributary near Foster Thurston / Ashburn Road intersection, ~ 40 m long and 1 m to 1.5 m wide (*i.e.*, ~ 50 m<sup>2</sup>) will be piped.



The overall combined linear length of the proposed alterations is ~ 600 m and the overall combined area of the proposed alterations is ~ 540 m<sup>2</sup>. The actual linear length and area will be determined during detailed design and during permitting as will the design / sizing of piping and open channels.

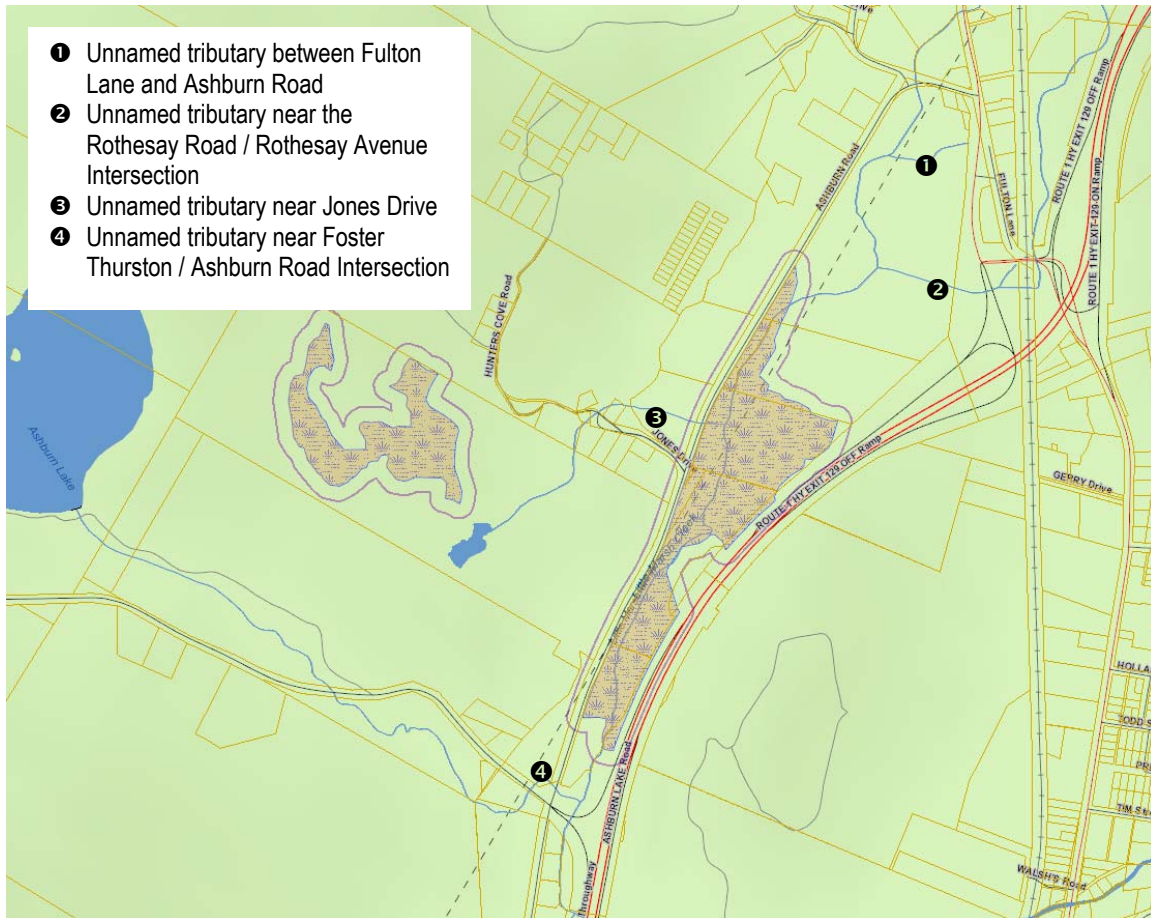


Figure 59. GeoNB map showing the four unnamed tributaries of Little Marsh Creek that will require alteration for *The Crossing* proposed for east Saint John, New Brunswick to be constructed.

It is anticipated that Little Marsh Creek will remain largely untouched, but portions of the regulated 30 m buffer will be impacted to increase channel capacity through the Project site; however, it is anticipated that the remaining vegetated buffer will be an average of 10 m wide on each side of Little Marsh Creek.

The above-noted alterations will affect surface water drainage characteristics, such as causing conditions to be more-flashy in response to high surface water runoff events, if mitigation measures are not implemented. There are many BMPs, which can help mitigate impacts and Horizon Management will be incorporating several into the overall design of *The Crossing*, such as detention and retention ponds as discussed in Section 2.8.2.10.

Wetlands provide many ecological and socio-economic functions and New Brunswick has adopted a *no-net-loss* approach to wetlands consistent with the Federal government. Under that approach, wetland avoidance is preferred and is achieved by choosing an

alternate project, alternative project design, or alternate development. Minimization and compensation, respectively, follow avoidance. Horizon Management has avoided direct impacts as a result of this Project to regulated wetlands by changing its conceptual design, as described in Section 2.6.2, to be outside of the wetland contiguous with Little Marsh Creek (*n.b.*, some portions of the regulated buffer may be impacted). Should any wetlands be impacted, it will only be done through regulatory approval. It is understood that compensation will be required for the loss of any regulated wetland area and that the compensation ratio would likely be 2:1. Furthermore, any wetland compensation required would be done within the City of Saint John and most likely within the Marsh Creek watershed on lands owned by the Proponent.

Vegetation serves as an important ground cover to slow surface water runoff, retain water, remove sediments and some contaminants from surface water runoff, moderate surface water temperatures, and supplying nutrients to surface water systems. Construction activities, especially those that involve removing vegetation and exposing soils, have the potential to alter all of the aforementioned functions. For example, turbidity and suspended sediment concentrations can be impacted within surface water systems when vegetation is removed. Development of *The Crossing* will be done in Phases whereby vegetation will be removed only when necessary for the Phase under construction. Revegetation of disturbed areas soon after they are impacted will be an important measure for protecting surface water quantity and quality. Erosion and sedimentation control BMPs can further mitigate potential impacts.

Heavy equipment travelling in and around the Project site and being operated during various activities as well as normal traffic during operation and maintenance can disturb soils and deposit grit, fuels, oils, lubricants, and floatables into surface water systems. Implementing BMPs that remove those materials from surface water runoff before entering surface water drainage systems will be an important mitigation measure for the Project.

*The Crossing* site is located within the Glen Falls Flood Risk Zone, which is protected under the City of Saint John's Flood Risk Area By-Law [CP-11]. The by-law was established in order to minimize the impact of flooding on existing developed areas within the Glen Falls area of the Marsh Creek Watershed. Developing the lands may result in the loss of existing flood water storage. Horizon Management understands that each Project Phase will have to obtain a Flood Risk Area Development Permit to proceed as detailed in Section 6.1.3. If any existing flood storage volume is to be lost than compensatory storage volume must be created coincident with that loss.

Several other potential impacts are listed below the potential impact assessment work sheet for surface water quantity and quality (Table 36). Many mitigation measures are provided in the section that follows.

#### 4.3.2.3.2 Proposed Mitigation

Horizon Management realizes New Brunswick's watercourses and wetlands are protected under the Watercourse and Wetland Alteration (WAWA) Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1]. Any proposed alterations within watercourses, wetlands, and / or their 30 m regulated buffers as part of the Project will require permitting under WAWA. This includes alterations to all regulated watercourses (*i.e.*, Figure 19) and wetlands (*i.e.*, Figure 20) within the Project footprint.

The Proponent recognizes that fish and fish habitat are protected under Section 35 of the *Fisheries Act* [R.S.C. 1985, c. F-14] and includes all activity that results in the harmful alteration, disruption, or destruction of fish habitat. The *Act* prohibits anyone from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where such deleterious substance or any other deleterious substance that results from the deposit of such deleterious substances may enter such water. They also appreciate that alterations to watercourses and wetlands in the Province are protected under the Watercourse and Wetland Alteration Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1]. Horizon Management will apply for regulatory permission before conducting any work within 30 m of a watercourse and / or wetland and / or altering, disrupting, or destroying fish and fish habitat. This would include constructing crossings across Little Marsh Creek and its unnamed tributaries within the Project site or piping / channelizing any sections of a watercourse.

Horizon Management understands that migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act*, 1994 [S.C. 1994, c. 22] and includes all seabirds, with the exception of cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds. It is also understood that bird species not listed under the *Act* may be protected under other provincial and / or federal legislation. As per the *Act*, no person shall deposit or permit to be deposited oil, oily wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.

The Proponent appreciates that the Project site is located within the Glen Falls Flood Risk Area of Saint John and building within Flood Risk Areas of the City is guarded under the Flood Risk Area By-Law of the City of Saint John [CP-11]. Any loss of flood storage within a flood risk area requires that compensatory storage be provided in time to ensure that there is at no time any reduction in the flood water storage capacity of the area as a result of the development. Water storage maintenance measures can include on-site storage on roof and parking lots, temporary detention ponds, and retention ponds.

The mitigation measures listed below should be employed to minimize the chance of activities related to the Project from affecting surface water environs.

- Horizon Management will ensure Project activities are managed so as to ensure conformity with the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1] and associated regulations, which includes any work within 30 m of a watercourse and / or wetland.
- Horizon Management will ensure that Project activities are managed so as to ensure compliance with the *Migratory Birds Convention Act*, 1994 [S.C. 1994, c. 22] and associated regulations.
- Horizon Management will ensure that Project activities are managed so as to ensure compliance with the *Fisheries Act* [R.S.C. 1985, c. F-14], which includes any impact to fish-bearing waters.
- Horizon Management will ensure that flood storage lost as a result of the Project is compensated for within either the Glen Falls Flood Risk area or the Lower Marsh Creek Flood Risk area to ensure compliance with the Flood Risk Area By-Law of the City of Saint John [CP-11].
- All Project personnel should be briefed on the potential impacts that the Project could have on surface water quantity and quality.

- Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues.
- An erosion and sediment control plan should be developed and implemented prior to initiating construction for any part of the various Project Phases in order to limit and control erosion and sedimentation. Erosion control measures should be used to minimize and / or prevent erosion and may include the following: topsoil; mulching; hydro-seeding; jute mats; riprap; sod; trees and shrubs; polyethylene film; gravel; and gabions (*n.b.*, each measure has benefits and challenges that must be reviewed prior to using). Sedimentation control measures should be used to minimize and / or prevent the transportation and deposition of sediment as a result of erosion and may include the following: sediment control fences; sediment ponds; erosion control structures; and flumes (*i.e.*, slope drains).
- Project work in exposed soil areas should be limited or halted during and immediately following intense precipitation events that result in unusually high surface water runoff (*i.e.*, precipitation events > 40 mm in a 24 hour period).
- Off takes, ditches, and dykes should be used to divert runoff flow into vegetated areas away from watercourses and / or wetlands.
- Compensatory storage will be required for any fill placed within the flood zone of the Glen Falls Flood Risk Zone. Compensatory storage options may include: on-site constructed channel storage; on-site rock fill void storage; on-site constructed detention and retention ponds; on-site expansion of existing compensatory storage ponds; and off-site downstream constructed compensatory storage ponds.
- Compensatory storage will be adequately designed to ensure that flooding is not induced or aggravated upstream and / or downstream of the Project.
- Vegetation removal should be limited to that necessary for constructing the various facilities during each Project Phase.
- Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction activity to help slow surface water runoff from the site.
- Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.
- Refuelling and maintenance of equipment should occur in designated areas, on level terrain, a minimum of 30 m from any watercourse and / or wetland.
- Fuel storage and / or the storage of hazardous materials should be located > 30 m from watercourses and / or wetlands.
- All potential contaminants and contaminated materials should be stored in a contained area where they cannot become mobilized or access the ground surface (*i.e.*, be placed atop and within spill containment pads).
- Regular maintenance and inspection of equipment should be performed to minimize the risk of oil-based fluid spills that pose a threat to surface water systems.
- Appropriate spill response equipment (*i.e.*, spills kits) should be kept in designated areas, close to any designated fueling stations or potential contaminant storage areas and equipment operators on-site should be trained in the use of such equipment.

- Piping and / or realigning watercourses should be kept to a minimum in order to limit impacts to the natural drainage characteristics of Little Marsh Creek and its tributaries.
- Site-specific measures should be developed for piping and / or realigning any watercourses and those measures should be submitted for review and approval when applying for regulatory permits / authorizations. If fish passage is interrupted during any piping and / or realigning of watercourses, then that interruption should be kept to a minimum during the summer low-flow period between 1 June and 30 September.
- Any surface water runoff collected from parking lots and roadways within the Project site should be directed to a hydrodynamic separator, or similar product, before being discharged to any watercourse and / or wetland in order to remove hazardous materials, such as grit, fuels, oils, lubricants, and floatables.
- Surface water runoff attenuation measures should be incorporated into the Project design to account for impacts during operation and maintenance activities. Options for surface water attenuation may include: parking lot ponding; landscaped dry detention ponds; green / living roofs; and roof rainwater infiltration galleries.
- Green space should be maximized within the Project footprint to retain areas where surface water can infiltrate the ground surface and / or be captured by vegetation.
- The finished floor elevation of all buildings within the development should be at a level above the maximum surface water elevations modelled under existing and proposed conditions.
- Snow cleared from on-site roadways and parking lots should either be piled and stored on-site or transported off-site to an appropriate snow dump. No snow should be pushed onto (*i.e.*, during ice cover conditions) or into Little Marsh Creek and its associated tributaries.
- No greywater or blackwater generated within *The Crossing* should be directly discharged to surface water systems. Instead, those waters should be collected and treated via the municipal sewerage collection and wastewater treatment systems.
- Surface water runoff retention, detention, and cleansing systems (*i.e.*, hydrodynamic separators) should be maintained during the lifespan of the Project in order to ensure a surface water storage volume balance is maintained and water surface elevations within Little Marsh Creek are not negatively affected.
- Emergency response / contingency plans should be designed to prevent any major and / or sustained environmental damage during any errors, mishaps, and / or unforeseen events.

#### 4.3.2.3.3 Potential Post-Mitigation Residual Impacts

As noted in Section 3.1.5, the Project site is located within the Glen Falls Flood Risk Area of Saint John, which is immediately upstream of the Lower Marsh Creek Flood Risk Area. To ensure that there are no residual impacts as a result of this Project, it will be important, as outlined in Section 6.1.3, to obtain a Flood Risk Area Development Permit and to adhere to all conditions. One of those conditions will be to comprehensively determine through hydraulic and hydrological modelling the anticipated impact to existing flood storage volumes and to provide compensatory storage coincident with the flood storage

volume loss. As previously noted (*i.e.*, Section 1.5), Horizon Management owns lands along Rothesay Avenue, which are located downstream of the Project, where compensatory storage can be developed within the Lower Marsh Creek watershed.

Assuming hydraulic and hydrological modelling are undertaken and compensatory storage is constructed prior to or during development of the Project site, there should be a minimal risk of residual impacts occurring; however, the modelling should be reviewed between the various Project Phases to ensure that assumptions and results remain valid.

#### 4.3.2.4 Groundwater Quantity and Quality

Groundwater was identified as a VEC because surface water and groundwater systems generally have strong communication systems and because there are nearby residences that rely on individual groundwater wells for potable water (*i.e.*, refer to Section 3.1.7). The specific potential impacts assessed were:

- groundwater quality (*i.e.*, microbiology, general chemistry, and trace metals);
- groundwater quantity;
- contamination by hydrocarbons; and
- groundwater recharge areas.

##### 4.3.2.4.1 Potential Impacts

Results of the groundwater quantity and quality impact assessment are provided in Table 37. One green light, five yellow, three no change, and three red lights were applied to the potential impacts. It is realized that contamination may occur to the groundwater system and potential impacts could be long-lasting depending on the degree of the spill and the initial clean-up efforts. That is the reason why the red lights were assigned to three of the potential impacts associated with mishaps, errors, and / or unforeseen events. It is also realized that there is an extremely remote possibility of those impacts being realized. Therefore, those red lights are not considered showstoppers.

##### 4.3.2.4.2 Proposed Mitigation

The mitigation measures listed below should be employed to minimize the chance of Project activities from impacting the groundwater regime by eliminating the potential pathways where hydrocarbons and other pollutants may enter the system (*n.b.*, the mitigation measures are nearly identical to some of those provided for surface water protection and is because the two systems are often interconnected).

- All Project personnel should be briefed on the potential impacts that the Project could have on groundwater quality and quantity.
- During construction activities, all sanitary waste associated with those construction activities should be collected, handled, and disposed of by a licensed waste disposal operator.
- Fuel storage and fueling / lubricating activities should only be performed in designated safe areas that are located such that minimum effects would be felt from a spill and harmful substances would in no circumstances enter groundwater systems.

- Fuel storage and fueling / lubricating activities should only be performed in designated safe areas that are located > 30 m from a watercourse and / or wetland.
- All potential contaminants and contaminated materials should be stored in a contained area where they cannot become mobilized or access the ground surface (*i.e.*, be placed atop and within spill containment pads).
- Regular maintenance and inspection of equipment on site should be performed to minimize the risk of spills of oil based fluids that pose a threat to groundwater systems.
- Appropriate spill response equipment (*i.e.*, spill kits) should be kept in designated areas, close to designated fueling stations and all appropriate personnel on site should be trained in the use of such equipment.
- All spills of hazardous materials should be reported immediately to the appropriate Regulator(s).

#### 4.3.2.4.3 *Potential Post-Mitigation Residual Impacts*

If a spill migrates to the groundwater system, the potential impacts could be significant and permanent because groundwater environments are complex and often difficult to remediate. It is an extremely remote possibility that the groundwater system would be contaminated or otherwise impacted during a mishap, error, and / or unforeseen event. The environmental protection measures set forth in the Project-specific EPP should be followed to protect against the remote possibility.

Table 34. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on air quality.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Micro-climate ( <i>i.e.</i> , temperature and precipitation)		1	A, B, C		5	P		1, 2, 10	A, B, C, X
CO emissions		2, 3	A to L		6, 7	Q to U		1, 2, 10	A, B, C, X
NO <sub>x</sub> emissions		2, 3	A to L		6, 7	Q to U		1, 2, 10	A, B, C, X
SO <sub>2</sub> emissions		2, 3	A to L		6, 7	Q to U		1, 2, 10	A, B, C, X
VOC emissions		2, 3	A to L		6, 7, 8	Q to V		1, 2, 10	A, B, C, X
PM emissions ( <i>e.g.</i> , exhausts and dusts)		2, 3, 4	A to O		6, 7, 9	Q to T		1, 2, 4, 10	A, B, C, X

### COMMENTS













- 1 There will be a slight change in the micro-climate during construction. Vegetation loss will reduce temperature moderation and increase the amount of precipitation reaching the ground surface and infiltrating the ground.
- 2 An increase in personal and construction vehicles could impact the local air quality.
- 3 Construction equipment is a major source of combustion emissions, which potentially will have an effect on local air quality. Because the overall development is in the conceptual stage, no final details are available at this time regarding the three construction Phases so estimates of greenhouse gas emissions cannot be made.
- 4 Fugitive dusts may be generated while clearing trees, moving materials, and operating vehicles on local gravel and dirt roadways.
- 5 Although considerable greenspace is envisioned within the overall development, converting a large portion of existing undeveloped greenspace to commercial and residential development will change the overall micro-climate of the area. Some impacts will likely include: the heat island effect from buildings and roadways; reduction in groundwater recharge due to an increase in impermeable surfaces; the change in wind patterns due to the presence of solid structures; and an increase in surface water runoff.
- 6 Operation of the various tenant buildings will increase atmospheric emissions (*i.e.*, heating, ventilation, air-conditioning, lighting, and communications equipment).
- 7 Traffic generated as a result of the development (*i.e.*, vehicles entering and exiting and travelling through the Project site) will increase atmospheric emissions.
- 8 Highway services are planned for Phase 1 of the Project, which will include the construction and operation of a gasoline and diesel fueling station. An increase in VOC emissions is generally related to the operation of a petrol station.
- 9 Fugitive dusts may be generated during operation and maintenance activities, such as street and parking lot sweeping, cut grass and fallen leaf blowing, *etc.*
- 10 In the event of an emergency, equipment with pollutant reduction technologies may not be readily available; however, it will be more important to correct the mishap, error, and / or unforeseen event.

### MITIGATING MEASURES

- A A Project-specific environmental protection plan will be developed to provide best-management practices that all Project personnel should follow in order to limit the potential for impacts to air quality to occur.
- B All Project personnel should be briefed on the potential impacts that equipment emissions can have on the quality of the local airshed and briefing information should range from describing emissions that are released from equipment during operation to how those emissions can be reduced.
- C Mitigation measures developed and included in the Project-specific environmental protection plan should be adhered to in order to adequately address potential impacts.
- D Construction, operation, and maintenance equipment should only be operated at optimum loading rates.
- E Heavy equipment should be turned off when not in use and / or when practical.
- F The number of vehicle kilometers travelled should be kept to a minimum (*i.e.*, there should be no unnecessary operation of equipment in and around the site).
- G Construction, operation, and maintenance vehicles should comply with the posted / recommended speed limits and, as appropriate, reduce speed when travelling on surfaces where dusts are generated (*i.e.*, local gravel or dirt roadways).
- H Heavy equipment should be operated using clean fuels (*i.e.*, ultra-low sulphur diesels), where available and practical.
- I Heavy equipment exhaust emission systems should meet the recommended standards.
- J Equipment should be maintained according to manufacturer recommended servicing periods.
- K Heavy equipment should only be refueled using a protocol designed to mitigate any risk to the environment.
- L No solid waste should be burned on site.
- M If the application of water as a dust suppressant is deemed necessary on local gravel or dirt roadways (*n.b.*, this is the preferred method of dust suppression), it should be applied using suitable equipment (*e.g.*, a tanker truck equipped with spray bars and methods of controlling water flow, *etc.*).
- N Material stock piles (*e.g.*, soil, sand, aggregate, *etc.*) and spoils piles should be sited in locations that minimize the impact from prevailing winds.
- O Allowing vegetation to re-establish itself should reduce impacts to air quality, especially those associated with fugitive dusts generated from wind blowing over bare soils.
- P Planting vegetation or allowing vegetation, including grasses, shrubs, and trees, to regenerate / grow, can moderate the micro-climate changes at the Project site. This could include creating green / living roofs on buildings within the Project site.
- Q Developers and tenants should be encouraged to design energy efficient buildings (*e.g.*, LEED certification, Green Globes certification, *etc.*) and implement methods to conserve energy (*e.g.*, programmable building systems that turn down when buildings are unoccupied, such as reducing heating and cooling, turning off lights, *etc.*).
- R Developers and tenants should be encouraged to implement renewable energy sources into their buildings (*e.g.*, rooftop solar panels, *etc.*).
- S Traffic patterns should be designed throughout the development to reduce vehicle idling (*i.e.*, reducing the amount of traffic lights through the use of other traffic calming methods).
- T The Proponent should work with Saint John Transit to develop convenient and frequent bus routes to and from the Project site, which should include connecting to COMEX routes.
- U The Proponent should implement active transportation routes into the overall design, where possible and practical, and those routes should connect to existing active transportation routes near the Project site (*i.e.*, The Great Trail).
- V Diesel and gasoline storage tanks and fuel distribution systems, where possible and practical, should have vapour recovery systems.
- X Emergency response and contingency plans should be designed to prevent any major and / or sustained environmental damage during any errors, mishaps, and / or unforeseen events.



Table 35. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on sound emissions.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Sound levels		1	A to D		9	C, G		11	H
Sound duration		2	A, B, D		10	C, G		11	H
Sound repetition		3, 4	A, B, D, E		10	C, G		11	H
Ground vibration		5, 6, 7, 8	A, B, D to F		10	C, G		11	H

#### COMMENTS

- 1 Heavy equipment required for constructing the Project will emit loud sounds, which will be a new source of sound emissions for local residents and businesses who already experience some loud sounds with other nearby commercial and industrial activities in addition to continuous vehicle noise on NB Route 1. Back-up alarms on heavy equipment emit sounds at 120 dBA, which will be some of the loudest sounds emitted from the site.
- 2 Although construction noise will be intermittent and infrequent depending on market conditions, it will be protracted over a long period of time as it is anticipated full build-out will take between 10 and 20 years.
- 3 Based on the subsurface conditions, it is expected that the majority of buildings constructed for the Project within the area between NB Route 1 and Ashburn Road will be founded on H piles driven to bedrock. Pile driving emits repetitive sounds, which can be an annoyance to nearby human receptors.
- 4 In areas where bedrock is at a shallow depth, it may be necessary to break bedrock using a pneumatic hammer. Rock breaking via a pneumatic hammer typically emits repetitive sounds that can be an annoyance to nearby human receptors.
- 5 Heavy equipment travelling along local roadways can sometimes result in ground vibrations.
- 6 Pile driving causes ground vibration as the hammer forces the steel pile into the subsurface. The vibration can sometimes be disturbing to nearby human receptors.
- 7 Rock breaking via a pneumatic hammer causes vibration as the hammer repeatedly hits the rock. The vibration can sometimes be disturbing to nearby human receptors.
- 8 In instances where bedrock cannot be practically and feasibly broken up with pneumatic hammers, blasting may be required. Blasting, although much shorter in duration than breaking rock with pneumatic hammers, can sometimes result in considerable ground vibration if not properly controlled.
- 9 Regular traffic associated with Project operation, including employees, patrons, and maintenance personnel, will result in increased sound emissions. Mechanical and electrical equipment installed for the buildings will also emit sounds above baseline conditions.
- 10 The Project has an anticipated lifespan of 50+ years. Initially sounds experienced by nearby receptors will seem loud, but over time they will become acclimated to the new normal.
- 11 Equipment brought in to mitigate any mishaps, errors, and / or unforeseen events may not have appropriate noise dampening measures or vibration reduction devices, but their operation would be expected to be of short duration.

#### MITIGATING MEASURES

- A All Project personnel should be briefed on the potential impacts that heavy equipment can have on the sound levels in the area.
- B Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues.
- C Horizon Management should limit land clearing to that necessary for the Project Phase they are working. For example, clearing of lands for the multi-residential buildings should be delayed until such time that construction is pending. Leaving vegetation in place will help absorb sounds emitted from the site and help mitigate the sounds experienced by off-site receptors.
- D Heavy truck traffic should be minimized, where possible and practical.
- E Pile driving and rock breaking work should be restricted to normal work hours (*i.e.*, 7 AM to 7 PM Monday through Friday) to limit annoyance of repetitive sounds and vibrations for nearby human receptors.
- F Pneumatic hammers should be used instead of blasting, where practical and feasible, to breakup rock. If blasting is required then additional measures should be undertaken by Project personnel to mitigate impacts associated with blasting activities, such as adhering to municipal by-laws and other legislation.
- G The conceptual plan for the Project envisions and abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment. Those soft surface plantings will help absorb sounds emitted from the site and help mitigate the sounds experienced by off-site receptors.
- H In the event of an emergency, equipment with proper sound abatement technologies may not be readily available. What will be more important at this stage is correcting the error, mishap, and / or unforeseen event to limit any and all permanent environmental impact(s).

Table 36. Assessment of potential impacts of the *The Crossing* proposed for east Saint John, New Brunswick on surface water quantity and quality.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Turbidity / suspended sediment	9	1	A to E	9	9	A, B, R	9	14	Y
Surface water quantity ( <i>i.e.</i> , change in runoff regime)	9	2, 3, 4	A, B, F to J	9	10	S, T, U, V	9	14	Y
Surface water quality ( <i>i.e.</i> , change in general chemistry, trace metals)	9	1, 5	A, B, H, I	9	11, 12, 13	R, W	9	14	Y
Hydrocarbon / hazardous chemical contamination	9	6	A, B, K to O	9	6	K to O	9	14	Y
Surface water drainage characteristics	9	7, 8	A, B, H, I, J, P, Q	9	7	X	9	14	Y

### COMMENTS

- Construction activities, especially those activities that occur in the presence of exposed soils and / or within 30 m of a watercourse and / or wetland, have the potential to increase the amount of sediment entering watercourses and / or wetlands, which can increase turbidity / suspended sediment concentrations.
- The Project site is located within the Glen Falls Flood Risk Zone, which is protected under the City of Saint John's Flood Risk Area By-Law [CP-11]. The flood zone provides an area to contain flood waters in undeveloped areas so that the impact on existing developed areas can be minimized, which is done by establishing setbacks, minimum building elevations, and requirements for compensatory storage for when fill is placed within a flood zone.
- The Project has the potential to displace considerable flood water storage volume in the Marsh Creek drainage basin.
- Vegetation removal will reduce the amount of water retained on-site and the time it takes for water to runoff the site and enter the surface water drainage system.
- Vegetation removal may alter the quality of water entering watercourses and wetlands, such as affecting nutrient levels, dissolved oxygen levels, temperature, woody debris, and sediment concentrations.
- If a hydrocarbon or hazardous chemical spill migrates to the surface water drainage system, the potential impacts could be severe (*i.e.*, fish kills) and difficult to clean up.
- The Project may increase the amount of water discharged to the surface water drainage system.
- Piping and / or realigning tributaries to Little Marsh Creek on the Project site will alter the surface water drainage characteristics, such as causing conditions to be more-flashy in response to surface water runoff events.
- General operation and maintenance activities may introduce sediments to the surface water drainage system (*e.g.*, vehicles depositing sediments as they travel on road surfaces that are subsequently washed into the surface water drainage system, *etc.*).
- The replacement of permeable surfaces with impermeable surfaces will affect the timing and volume of surface water runoff from the Project site.
- Stormwater runoff collected from parking lots and roadways may contain some environmental contaminants (*e.g.*, grits, fuels, oils, lubricants, floatables, *etc.*) harmful to aquatic species and their habitats.
- Snow piled on-site during the winter months has the potential to increase surface water runoff from the site in the spring. Clearing of snow can also result in contaminants (*e.g.*, sand, salt, garbage, hydrocarbons, *etc.*) being contained in piles left on-site, which could enter surface water systems.
- Greywater and blackwater generated within *The Crossing* could impact surface water quality if not properly disposed of.
- If a major mishap, error and / or unforeseen event were to occur at the site (*e.g.*, a fuel deliver truck flips over, the tank ruptures, and hydrocarbons spill, *etc.*), there is a possibility that the on-site watercourses and / or wetlands and / or downstream off-site watercourses and / or wetlands could be impacted.

### MITIGATING MEASURES

- All Project personnel should be briefed on the potential impacts that the Project could have on surface water quality.
- Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues.
- An erosion and sediment control plan should be developed and implemented prior to initiating construction for any part of the various Project Phases in order to limit and control erosion and sedimentation. Erosion control measures should be used to minimize and / or prevent erosion and may include the following: topsoil; mulching; hydro-seeding; jute mats; riprap; sod; trees and shrubs; polyethylene film; gravel; and gabions (*n.b.*, each measure has benefits and challenges that must be reviewed prior to using). Sedimentation control measures should be used to minimize and / or prevent the transportation and deposition of sediment as a result of erosion and may include the following: sediment control fences; sediment ponds; erosion control structures; and flumes (*i.e.*, slope drains).
- Project work in exposed soil areas should be limited or halted during and immediately following intense precipitation events that result in unusually high surface water runoff (*i.e.*, precipitation events > 40 mm in a 24 hour period).
- Off takes, ditches, and dykes should be used to divert runoff flow into vegetated areas away from watercourses and / or wetlands.
- Compensatory storage will be required for any fill placed within the flood zone of the Glen Falls Flood Risk Zone. Compensatory storage options may include: on-site constructed channel storage; on-site rock fill void storage; on-site constructed detention and retention ponds; on-site expansion of existing compensatory storage ponds; and off-site downstream constructed compensatory storage ponds.
- Compensatory storage will be adequately designed to ensure that flooding is not induced or aggravated upstream and / or downstream of the Project.
- Vegetation removal should be limited to that necessary for constructing the various facilities during each Project Phase.
- Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction activity to help slow surface water runoff from the site.
- Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.
- Refuelling and maintenance of equipment should occur in designated areas, on level terrain, a minimum of 30 m from any watercourse and / or wetland.
- Fuel storage and / or the storage of hazardous materials should be located > 30 m from watercourses and / or wetlands.
- All potential contaminants and contaminated materials should be stored in a contained area where they cannot become mobilized or access the ground surface (*i.e.*, be placed atop and within spill containment pads).
- Regular maintenance and inspection of equipment should be performed to minimize the risk of oil-based fluid spills that pose a threat to surface water systems.
- Appropriate spill response equipment (*i.e.*, spills kits) should be kept in designated areas, close to any designated fueling stations or potential contaminant storage areas and equipment operators on-site should be trained in the use of such equipment.
- Piping and / or realigning watercourses should be kept to a minimum in order to limit impacts to the natural drainage characteristics of Little Marsh Creek and its tributaries.
- Site-specific measures should be developed for piping and / or realigning any watercourses and those measures should be submitted for review and approval when applying for regulatory permits / authorizations. If fish passage is interrupted during any piping and / or realigning of watercourses, then that interruption should be kept to a minimum during the summer low-flow period between 1 June and 30 September.
- Any surface water runoff collected from parking lots and roadways within the Project site should be directed to a hydrodynamic separator, or similar product, before being discharged to any watercourse and / or wetland in order to remove hazardous materials, such as grit, fuels, oils, lubricants, and floatables.
- Surface water runoff attenuation measures should be incorporated into the Project design to account for impacts during operation and maintenance activities. Options for surface water attenuation may include: parking lot ponding; landscaped dry detention ponds; green / living roofs; and roof rainwater infiltration galleries.
- Green space should be maximized within the Project footprint to retain areas where surface water can infiltrate the ground surface and / or be captured by vegetation.
- The finished floor elevation of all buildings within the development should be at a level above the maximum surface water elevations modelled under existing and proposed conditions.
- Snow cleared from on-site roadways and parking lots should either be piled and stored on-site or transported off-site to an appropriate snow dump. No snow should be pushed onto (*i.e.*, during ice cover conditions) or into Little Marsh Creek and its associated tributaries.
- No greywater or blackwater generated within *The Crossing* should be directly discharged to surface water systems. Instead, those waters should be collected and treated via the municipal sewerage collection and wastewater treatment systems.
- Surface water runoff retention, detention, and cleansing systems (*i.e.*, hydrodynamic separators) should be maintained during the lifespan of the Project in order to ensure a surface water storage volume balance is maintained and water surface elevations within Little Marsh Creek are not negatively affected.
- Emergency response / contingency plans should be designed to prevent any major and / or sustained environmental damage during any errors, mishaps, and / or unforeseen events.

Table 37. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on groundwater quantity and quality.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Groundwater quality ( <i>i.e.</i> , change in microbiology, general chemistry, trace metals)		1, 2	A					6	A, C, D, E
Groundwater quantity ( <i>i.e.</i> , decreased well yields)		1, 2	A					6	A, C, D, E
Hydrocarbon / hazardous chemical contamination		3	C, D, E, F		3	C, D, E		3, 6	C, D, E
Groundwater recharge areas		4	G		5	H			

**COMMENTS**

- 1 Many of the surrounding residences served by individual on-site groundwater wells for potable water are located upgradient of Phase 1 of the Project. Therefore, no impact is anticipated.
- 2 Pneumatic rock breaking and / or blasting is anticipated within the high-ground areas adjacent to Jones Drive and Hunters Cove Road during Phase 2 and 3 of the Project in order to achieve suitable elevations for construction the multi-residential buildings. Changes in groundwater quality and quantity within wells are sometimes experienced following nearby pneumatic rock breaking and / or blasting activities.
- 3 Some residences in the surrounding area are served by individual on-site groundwater wells for potable water. If a hydrocarbon or hazardous chemical spill migrates to the groundwater system, the potential impacts could be long lasting because groundwater systems are complex and often difficult to remediate once contaminated.
- 4 Currently, almost the entirety of the Project lands is undeveloped. Developing the lands and installing impermeable surfaces, such as concrete and asphalt, would reduce the amount of space available for groundwater recharge.
- 5 Once the lands are developed, a new equilibrium will likely be created and there would be minimal change in groundwater recharge from one year to the next.
- 6 Depending on the mishap, error, and / or unforeseen event, the impact to groundwater quality or quantity could be significant and permanent.

**MITIGATING MEASURES**

- A Pre-blast surveys, which include interviewing residents about groundwater quantity and quality and obtaining water samples for analysis of microbiology, general chemistry, and trace metals, should be done for all residences connected to individual on-site groundwater wells within 250 m of pneumatic rock breaking activities and within 600 m of rock blasting activities.
- B If blasting activities are undertaken then the procedures identified in Schedule A of the Blasting Code Approval Regulation [89-108] under the New Brunswick *Local Governance Act* [S.N.B. 2017, c.18] should be followed.
- C All Project personnel should be briefed on the potential impacts that the Project could have on ground water quality.
- D Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues.
- E Connection to alternative water supplies, such as a municipal distribution system or on-site water tanks, is most often required when an aquifer is contaminated.
- F During construction activities, all sanitary waste associated with those construction activities should be collected, handled, and disposed of by a licensed waste disposal operator.
- G Retention of green spaces and the construction of stormwater ponds should be encouraged and promoted throughout the development in order to promote groundwater recharge.
- H Green spaces and stormwater ponds should be maintained (*i.e.*, retained and kept free of non-impermeable structures like sheds) to promote groundwater recharge.

### 4.3.3 Biological Environment

#### 4.3.3.1 Terrestrial Flora and Fauna

The Project site and surrounding area are primarily undeveloped, forested / shrubland with some wetland. Those lands are known to support terrestrial flora and fauna. Based on information obtained from the ACCDC, eBird Canada, and NatureCounts, some COSEWIC and SARA ranked species of terrestrial fauna do exist within a 5 km radial buffer surrounding the Project site (*i.e.*, refer to Section 3.2 for a description of the species, Appendix XX for the ACCDC data, Appendix XXI for the eBird Canada and NatureCounts data reports, and Table 19 for a listing and Figure 26, Figure 28, Figure 31, Figure 32, and Figure 34 for distribution maps). Therefore, the following potential impacts were evaluated with respect to terrestrial flora and fauna:

- SARA, COSEWIC, and / or ACCDC listed species;
- existing vegetation and habitat;
- plant associations and biodiversity;
- wildlife species and habitat;
- wildlife species and habitat fragmentation; and
- natural wildlife migration patterns, nesting, and food chains.

##### 4.3.3.1.1 Potential Impacts

Although no fSARA, pSARA, or COSEWIC listed species were observed during the various field assessments completed at the Project site, one sensitive ACCDC ranked terrestrial flora species was observed. The Boreal Aster was detected at three locations during the 9 September 2015 rare plants survey (*i.e.*, refer to Section 3.2.5.1). The ACCDC report revealed other observations of Boreal Aster within 5 km of the Project site (Figure 31). Development of the lands, most likely during Phase 2 and 3 of the Project, will result in the loss of this species from the Project site.

ACCDC records indicate that some flying transient / vagrant / migrant species of special conservation concern, such as Barrow's goldeneye and the eastern wood-pewee, or threatened species, such as the bank swallow and the wood thrush, do exist within a 5 km radius of the site (Figure 27 and Figure 29). Therefore, there is a possibility that they could exist or pass through the site on occasion. Although not observed during the various field assessments, the NBDNRED list several location-sensitive species for the area, such as the wood turtle. During the Project lifecycle, there is a possibility that those species could be encountered.

To facilitate construction of the Project, the lands will have to be cleared, grubbed, and levelled. This will temporarily result in the loss of the vegetative community; however, once the Project is in operation, some vegetation will be planted and maintained in specific areas. It likely will not take long, a growing season or two, for a vegetative community to re-establish itself at the site. The vegetation, which will most likely comprise grasses, shrubs, and trees that will be maintained by third-parties.

Loud sounds emitted by construction equipment and air particulate emissions may limit use of the immediate area by birds and other animals. Clearing of the native vegetation

would remove habitat features, such as food sources and habitat connectivity. The unintentional release of debris and contaminants, in the form of solid waste, hydrocarbons, or construction materials, into the surface water and / or groundwater systems or the atmosphere could also negatively affect terrestrial flora and fauna of all types that exist in the area surrounding the Project site.

The impact assessment for terrestrial flora and fauna is summarized in Table 38. Yellow lights ( $n = 10$ ) were applied to the majority of potential impacts while green lights were applied to the remainder ( $n = 8$ ).

#### 4.3.3.1.2 Proposed Mitigation

Horizon Management understands that migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act*, 1994 [S.C. 1994, c. 22] and includes all seabirds, with the exception of cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds. It is also understood that bird species not listed under the *Act* may be protected under other provincial and / or federal legislation. As per the *Act*, it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird or to be in possession of a live migratory bird, or its carcass, skin, nest, or egg, except under authority of a permit and no permits are issued by the regulator for the incidental take of migratory birds caused by development projects or other economic activities.

The mitigation measures listed below should be employed to minimize the probability of activities related to the Project from affecting surrounding terrestrial flora and fauna.

- Any sensitive flora (e.g., Boreal Aster, etc.) should be salvaged and relocated from the Project site prior to construction activity.
- Horizon Management will ensure that Project activities are managed so as to ensure compliance with the *Migratory Birds Convention Act*, 1994 [S.C. 1994, c. 22] and associated regulations.
- Any tree clearing activity should be undertaken outside of the annual migration and breeding season for migratory birds in the Greater Saint John region, which generally occurs between 5 April and 31 August, in order to protect nesting areas.
- If tree clearing is required within the annual migration and breeding season for migratory birds in the Greater Saint John region (i.e., between 5 April and 31 August), then additional measures should be implemented, such as having a qualified biologist and / or experienced birder conduct a survey of the area prior to clearing to ensure no active nests are present and only after approval from the New Brunswick Department of the Environment and Local Government.
- Tree clearing within 30 m of the highwater mark of any water body should be minimized in order to maintain movement for migratory birds and if any tree clearing is required within 30 m then it will only be done through regulatory approval, such as under the Watercourse and Wetland Alteration Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1].
- If an active nest, den, etc. is encountered, a no-disturbance buffer zone of 30 m+ should be established around the area (n.b., flagging tape should not be used to mark the feature as it increases the chance of predation and representatives with the Canadian Wildlife Service should be contacted to determine the appropriate buffer size) until a qualified biologist determines if the buffer zone shall remain, if

- the size should be increased, or if the buffer zone can be eliminated (*i.e.*, the animal has abandoned the feature).
- Large piles of soil should not be left uncovered / unvegetated during the annual migration and breeding season for migratory birds in the Greater Saint John region (*i.e.*, between 5 April and 31 August) in order to discourage the use by certain species (*i.e.*, bank swallows) for nesting and roosting unless slopes are reduced to < 70 °.
  - Extremely loud, intrusive, or otherwise potentially harassing activities should be avoided or limited during periods of the year when wildlife are under severe environmental and physiological stress, such as the spring breeding season for birds (*i.e.*, between 5 April and 31 August).
  - All clearing limits should be flagged prior to the commencement of clearing activities and clearing should be limited to that necessary for completing the next portion of construction activity.
  - Environmentally sensitive areas should be staked out / flagged prior to Project work to ensure that they remain protected.
  - Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction activity to preserve green spaces and potential habitat.
  - Project personnel should properly dispose of food scraps and garbage in the appropriate receptacles on-site provided by the contractor or operator.
  - Waste stored on-site should be stowed in an appropriate manner and should be transported to an appropriate disposal facility (*e.g.*, Crane Mountain Landfill, *etc.*) on a regular basis.
  - Project personnel should be advised, prior to working on the Project site, to not feed or harass nuisance wildlife (*e.g.*, varmint, pigeons, sea gulls, rodents, *etc.*).
  - No attempt should be made to chase, catch, divert, follow, or otherwise harass wildlife by vehicle or on foot.
  - If injured or diseased wildlife are encountered, then the Department of Natural Resources and Energy Development and the Canadian Wildlife Service should be contacted to determine the appropriate course of action.
  - If deceased animals are encountered, they should be removed and disposed of, as soon as possible, in consultation the Department of Natural Resources and Energy Development and the Canadian Wildlife Service.
  - Heavy equipment and other vehicles used on the Project site should yield the right-of-way to wildlife and should use designated roadways and access points while working within the Project site.
  - No Project personnel should affect wildlife populations by either hunting or trapping and firearms should be strictly prohibited on the Project site.
  - Equipment should arrive at the Project site in a clean condition free of invasive and noxious weeds.
  - Luminaries should be selected to minimize glare and uplighting, which can disorient migrating birds at night (*i.e.*, they are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of deprecation).
  - No Project personnel should deposit or permit to be deposited oil, oil wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.

- If species listed under the federal *Species At Risk Act* [S.C. 2002, C.29] are observed on the Project site, then their sightings will be reported to Environment and Climate Change Canada's Canadian Wildlife Service branch.
- If a species listed under the provincial *Species At Risk Act* [S.N.B. 2012, c.6] are observed on the Project site, then their sightings will be reported to the New Brunswick Department of Natural Resources and Energy Development.
- An oil spill prevention and response plan should be developed as part of the Project-specific environmental protection plan.
- Emergency response and contingency plans should be designed to prevent any sustained environmental damage during any mishaps, errors, and / or unforeseen events.

#### 4.3.3.1.3 Potential Post-Mitigation Residual Impacts

No residual impacts are likely to occur to terrestrial flora and fauna over the duration of the construction and operation of the Project assuming the above mitigation measures are implemented.

#### 4.3.3.2 Aquatic Flora and Fauna

Little Marsh Creek and some unnamed tributaries flow through the Project site (Figure 19). There is also a regulated wetland contiguous to Little Marsh Creek on *The Crossing* site (Figure 20). As demonstrated through field studies on the Project site, those watercourses and wetlands support aquatic flora and fauna. There is potential for the Project to have a negative impact on the aquatic flora and fauna contained within those features. Based on information obtained from the ACCDC, at least one COSEWIC and SARA ranked species (*i.e.*, the shortnose sturgeon; Figure 26) has been observed within a 5 km radial buffer surrounding the Project site (*i.e.*, refer to Section 3.2.1.1 for a description of the species and Appendix XX for the ACCDC data). Therefore, the following potential impacts to aquatic flora and fauna were considered:

- SARA, COSEWIC, and / or ACCDC listed species;
- existing vegetation and habitat;
- plant associations and biodiversity;
- aquatic species and habitat;
- aquatic species and habitat fragmentation; and
- natural fish migration, spawning, and food chains.

##### 4.3.3.2.1 Potential Impacts

The impact assessment for aquatic flora and fauna is summarized in Table 39. As discussed in Section 2.6, the conceptual design for *The Crossing* has undergone several iterations. In the current design, Little Marsh Creek and its contiguous wetland are key design features within the overall Development. Horizon Management intends for those features to remain largely untouched, but where impact is required, it will only be done after first applying for and receiving regulatory approval. The Project footprint has been moved outside of the on-site regulated wetland, but may impact portions of the 30 m regulated buffer. Portions of Little Marsh Creek, which will be determined during detailed engineering design, may require some alteration, such as realignment or crossing as

described in Sections 2.8.2.8 and 2.8.2.9.

Field assessments completed by ACAP Saint John revealed that the American eel, which is listed as a threatened species under pSARA and by the COSEWIC, utilizes Little Marsh Creek and its tributaries. As a result, this species is protected and any impact to it must be mitigated. If any in-water work is required within Little Marsh Creek and / or its tributaries, such as installing culverts to facilitate crossing watercourses or piping / channelizing watercourses, then appropriate precautions should be taken to protect fish that may be present. This would likely involve performing a fish rescue within the area to be impacted and relocating the captured fish either upstream or to another like habitat as near as possible to the Project site.

The ACCDC databases do show observations of shortnose sturgeon within the Kennebecasis River near the site. There is no hydrological connection between the Kennebecasis River and Little Marsh Creek. Furthermore, there are no records of shortnose sturgeon within Marsh Creek or its tributaries and is likely because the habitat is not suitable (*i.e.*, they tend to prefer estuaries).

Surface water runoff from the site currently flows to Little Marsh Creek, its tributaries, and the contiguous regulated wetland. After the site is developed, collected surface water will still be directed to those features; however, it will first pass through a hydrodynamic separator in order to remove environmental contaminants, such as grits, fuels, oils, lubricants, and floatables. The impact of the Project on surface water quantity and quality was assessed in Section 4.3.2.3.

The long-term operation and maintenance of the Project is expected to have little to no impact on any aquatic flora and fauna as shown in Table 39. Overall, the impact assessment for aquatic flora and fauna yielded 10 yellow lights and eight green lights. Any identified potential impacts are easily mitigated.

#### 4.3.3.2 Proposed Mitigation

Horizon Management recognizes that fish and fish habitat are protected under Section 35 of the *Fisheries Act* [R.S.C. 1985, c. F-14] and includes all activity that results in the harmful alteration, disruption, or destruction of fish habitat. The *Act* prohibits anyone from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where such deleterious substance or any other deleterious substance that results from the deposit of such deleterious substances may enter such water. They also appreciate that alterations to watercourses and wetlands in the Province are protected under the Watercourse and Wetland Alteration Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1]. Horizon Management will apply for regulatory permission before conducting any work within 30 m of a watercourse and / or wetland and / or altering, disrupting, or destroying fish and fish habitat. This would include constructing crossings across Little Marsh Creek and its unnamed tributaries within the Project site or piping / channelizing any sections of a watercourse.

Horizon Management understands that migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act*, 1994 [S.C. 1994, c. 22] and includes all seabirds, with the exception of cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds. It is also understood that bird species not listed under the *Act* may



be protected under other provincial and / or federal legislation. As per the *Act*, no person shall deposit or permit to be deposited oil, oily wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.

The environmental protection measures provided below should be implemented by all Project personnel to minimize the potential impact on aquatic flora and fauna.

- Horizon Management will ensure that Project activities are managed so as to ensure compliance with the *Fisheries Act* [**R.S.C. 1985, c. F-14**], which includes any impact to fish-bearing waters.
- Horizon Management will ensure that Project activities are managed so as to ensure compliance with the *Migratory Birds Convention Act, 1994* [**S.C. 1994, c. 22**] and associated regulations.
- Horizon Management will ensure Project activities are managed so as to ensure conformity with the New Brunswick *Clean Water Act* [**S.N.B. 1989, c. C-6.1**] and associated regulations, which includes any work within 30 m of a watercourse and / or wetland.
- Erosion and sediment control measures, as part of the Project-specific environmental protection plan, should be implemented prior to starting any construction activity on-site.
- Any sensitive flora and fauna should be salvaged and relocated from any impact zones prior to construction activity.
- Clearing activities should be limited within 30 m of a watercourse and / or wetland.
- Disturbed areas within 30 m of a watercourse and / or wetland should be reclaimed as soon as possible.
- Refuelling and maintenance of equipment should occur in designated areas, on level terrain, a minimum of 30 m from any watercourse and / or wetland.
- In-water work should only be conducted between 1 June and 30 September in order to minimize impact to fish and fish habitat unless otherwise approved by the Regulator(s). Furthermore, the duration of all in-stream work should be kept to a minimum in order to mitigate any potential impacts.
- Heavy equipment working within or within 30 m of watercourses and / or wetlands should use eco-friendly biodegradable and non-toxic hydraulic fluids as opposed to petroleum-based hydraulic fluids.
- Any surface water runoff collected from parking lots and roadways within the Project site should be directed to a hydrodynamic separator, or similar product, before being discharged to any watercourse and / or wetland in order to remove hazardous materials, such as grit, fuels, oils, lubricants, and floatables.
- Emergency response and contingency plans should be designed to prevent any sustained environmental damage during any mishaps, errors, and / or unforeseen events.

#### 4.3.3.2.3 Potential Post-Mitigation Residual Impacts

No residual impacts are likely to occur to aquatic flora and fauna over the duration of the construction and operation of the Project assuming the above mitigation measures are implemented.

Table 38. Assessment of potential impacts of the *The Crossing* proposed for east Saint John, New Brunswick on terrestrial flora and fauna.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
SARA, COSWEIC, and / or ACCDC listed species		1 to 7	A to G		1, 2	A, B		16, 17	A, B, R, S
Existing vegetation and habitat		8, 9	A, B, C, H, I		14	A, B, G, H		16, 17	A, B, R, S
Plant associations and biodiversity		10	A, B, C		10	A, B, G, H		10, 16, 17	A, B, R, S
Wildlife species and habitat		7, 11 to 13	A, B, D to P		14	A, B, I to P		16, 17	A, B, R, S
Wildlife species and habitat fragmentation		7, 11 to 13	A, B, D to P		14	A, B, I to P		16, 17	A, B, R, S
Natural wildlife migration, nesting and food chains		1, 7, 11 to 13	A, B, C to Q		15	A, B, I to P		16, 17	A, B, R, S

### COMMENTS

- No *Species At Risk Act* (i.e., provincial and federal) or Committee on the Status of Endangered Wildlife in Canada species were observed during the various field assessments completed at the Project site.
- One sensitive Atlantic Canada Conservation Data Centre (ACCDC) listed terrestrial flora species (i.e., the Boreal aster – *Symphyotrichum boreale*) was observed at three locations at the Project site during the 9 September 2016 rare plants survey.
- No sensitive terrestrial fauna species were observed at *The Crossing* site during the 2 and 3 July 2019 breeding bird and wildlife surveys.
- ACCDC records suggest that some flying transient / vagrant / migrant species of special conservation concern, such as Barrow's goldeneye (*Bucephala islandica*) and the eastern wood-pewee (*Contopus virens*), or threatened species, such as the bank swallow (*Riparia riparia*) and the wood thrush (*Hylocichla mustelina*), do exist within a 5 km radius of the site. Therefore, there is a possibility that they could exist or pass through the site on occasion.
- The New Brunswick Department of Natural Resources and Energy Development list the wood turtle (*Glyptemys insculpta*), bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*) as location-sensitive species for the area, but the various assessments completed at the Project site did not yield their presence. Regardless, there is a possibility that they could exist or pass through the site on occasion.
- Some birds or other wildlife, such as deer, could seek out areas of the Project site during construction or when it is in operation. For example, deer moving throughout their home range, which generally averages 260 ha, may pass through the Project site or the common nighthawk (*Chordeiles minor*), which nests in a wide variety of areas that includes open, vegetation-free areas, may find recently cleared sites desirable.
- Sound emitted from heavy equipment and / or construction activity may scare away / displace wildlife from the Project site and / or adjacent areas.
- Almost the entire Project footprint will be cleared and grubbed of vegetation and then leveled to facilitate construction of the various buildings; however, it will be done in stages. Regardless, this will eliminate the native existing flora and fauna habitat within the boundaries of the Project site.
- Increased overland flow due to clearing and grubbing the vegetative cover may reduce the amount of water available, captured, and stored for remaining vegetation.
- Field studies completed at the Project site did not yield any unique plant associations and biodiversity.
- Loss of vegetation may result in the loss of wildlife.
- During clearing, grubbing, and leveling activities, injury or death of invertebrates, amphibians, reptiles, small mammals, and / or vegetation may occur.
- If refuse from Project construction and operation and maintenance is not stored properly, it may be an attraction for wildlife, which could result in unwanted interactions between humans and wildlife.
- Once the various Phases of the Project are in operation, some vegetation (i.e., trees, shrubs, and grasses) will be planted across the site creating some habitat for some fauna, such as birds, that are able to access the site.
- Once the Project site has been established and in operation, new wildlife migration patterns, nesting and roosting sites, and food chains should be created.
- Depending on the mishap, error, and / or unforeseen event, there is a possibility the impact could be long-lasting and could extend off-site to affect a species of special conservation concern.
- Ground spills of hydrocarbons during refueling operations of heavy equipment (i.e., gasoline and diesel) may contaminate food and water sources for wildlife.

### MITIGATING MEASURES

- All Project personnel should be briefed on the potential impacts that the Project could have on terrestrial flora and fauna.
- Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues (e.g., limiting Project lighting during normal bird migration season, etc.).
- Sensitive species are not at risk of extinction or extirpation, but they generally require special attention or protection to prevent them from becoming At Risk. The Boreal Aster was found at three locations on *The Crossing* site in association with cedar (*Thuja occidentalis*). There are similar habitats adjacent to the site and it is possible, if required, that some of the Boreal Aster could be relocated / transplanted to adjacent like habitat. If required, the best time for transplanting would be in early spring.
- Any tree clearing activity should be undertaken outside of the migration and breeding season for migratory birds (i.e., 5 April through 31 August in the Greater Saint John region).
- Extremely loud, intrusive, or otherwise potentially harassing activities (e.g., pile driving, blasting activities, etc.) should be avoided or limited during periods of the year when wildlife are under severe environmental and physiological stress, such as the spring breeding season for birds.
- Project personnel should be on the look-out for those species and report any sightings.
- If species listed under the federal *Species At Risk Act* are observed on the Project site, then their sightings will be reported to Environment and Climate Change Canada's Canadian Wildlife Service branch and if a species listed under the provincial *Species At Risk Act* are observed on the Project site, then their sightings will be reported to the New Brunswick Department of Natural Resources and Energy Development.
- Equipment should arrive at the Project site in a clean condition free of invasive and noxious weeds.
- Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction activity to preserve green spaces and potential habitat.
- Project personnel should properly dispose of food scraps and garbage in the appropriate receptacles provided on-site by the contractor or operator.
- Waste stored on-site should be stowed in an appropriate manner and be transported to an appropriate disposal facility (e.g., Crane Mountain Landfill, etc.) on a regular basis.
- Project personnel should be advised, prior to working on the Project site, to not feed or harass nuisance wildlife (e.g., varmint, pigeons, sea gulls, rodents, etc.).
- No attempt should be made to chase, catch, divert, follow, or otherwise harass wildlife by vehicle or on foot.
- If injured or deceased wildlife are encountered, then the Department of Natural Resources and Energy Development and the Canadian Wildlife Service should be contacted to determine the appropriate course of action.
- If deceased animals are encountered, they should be removed and disposed of as soon as possible in consultation with the Department of Natural Resources and Energy Development and the Canadian Wildlife Service.
- No Project personnel should affect wildlife populations by either hunting or trapping and firearms should be strictly prohibited on the Project site.
- If an active nest, den, etc. is encountered, a no-disturbance buffer zone of 30 m+ should be established around the area (n.b., flagging tape should not be used to mark the feature as it increases the chance of predation and representatives with the Canadian Wildlife Service should be contacted to determine the appropriate buffer size) until a qualified biologist determines if the buffer zone shall remain, if the size should be increased, or if the buffer zone can be eliminated (i.e., the animal has abandoned the feature).
- An oil spill prevention and response plan should be developed as part of the Project-specific environmental protection plan.
- Emergency response and contingency plans should be designed to prevent any sustained environmental damage during any mishaps, errors, and / or unforeseen events.

Table 39. Assessment of potential impacts of the *The Crossing* proposed for east Saint John, New Brunswick on aquatic flora and fauna.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
SARA, COSWEIC, and / or ACCDC listed species		1, 2	A, B, C		5, 6	A, B, C		7	A, C, E
Existing vegetation and habitat		2, 3, 4	A, C		5, 6	A, B, C		7	A, C, E
Plant associations and biodiversity		2, 3, 4	A, C		5, 6	A, B, C		7	A, C, E
Aquatic species and habitat		2, 3, 4	A, B, C, D		5, 6	A, B, C, D		7	A, C, E
Aquatic species and habitat fragmentation								7	A, C, E
Natural fish migration, spawning, and food chains								7	A, C, E

**COMMENTS**

- 1 One *Species At Risk Act* species, American eel (*Anguilla rostrata*), was identified during field assessments within Little Marsh Creek and one Atlantic Canada Conservation Data Centre (ACCDC) listed species was noted in the nearby Kennebecasis River (*i.e.*, shortnose sturgeon).
- 2 The conceptual design for *The Crossing* has undergone several iterations as described in the environmental impact assessment document, such that Little Marsh Creek and its contiguous wetland are now key design features that remain largely untouched.
- 3 The on-site regulated wetland will not be impacted by the Project, but some portions of its regulated 30 m buffer may be minimally impacted.
- 4 Portions of Little Marsh Creek, which will be determined during detailed design, may require some alteration, such as realignment or crossing (*n.b.*, there are no plans to place structures within the watercourse that would interfere with water flow and / or fish passage), and will only be done under the appropriate regulatory permits (*i.e.*, Watercourse and Wetland Alteration and Fisheries Authorization).
- 5 Stormwater runoff collected from parking lots and roadways may contain some environmental contaminants (*e.g.*, grits, fuels, oils, lubricants, floatables, *etc.*) harmful to aquatic species and their habitats.
- 6 The long-term operation and maintenance of the Project is expected to have little to no impact on any aquatic flora and fauna.
- 7 If there is a mishap, error, and / or unforeseen event it may have an impact on aquatic flora and fauna.

**MITIGATING MEASURES**

- A All Project personnel should be briefed on the potential impacts that the Project could have on aquatic flora and fauna, such as implementing erosion and sediment control measures, limiting the extent of clearing activities, reclaiming disturbed areas within 30 m of watercourses and wetlands as soon as possible, refueling equipment at specified locations, conducting work outside of sensitive periods (*i.e.*, during fish hatching and spawning; in water work should only be done between 1 June and 30 September), following all conditions noted in permits and authorizations, and not operating machinery in watercourses and wetlands, unless authorized.
- B If in-water work is required within Little Marsh Creek and / or its tributaries, then appropriate precautions should be taken to protect American eels and other fishes that may be present, which may include performing a fish rescue and relocation either upstream or to another adjacent like habitat.
- C Mitigation measures developed for this Project should be adhered to in order to adequately address those potential issues.
- D Any surface water runoff collected from parking lots and roadways within the Project site should be directed to a hydrodynamic separator before being discharged to any watercourse and / or wetland.
- E Emergency response and contingency plans should be designed to prevent any sustained environmental damage during any errors, mishaps, and / or unforeseen events.

#### 4.3.4 Socio-Economic Environment

##### 4.3.4.1 Labour and Economy

This Project has the potential to substantially and positively affect the local labour market and economy. Therefore, those parameters were chosen as VECs to assess. The potential impacts, positive and negative, that were assessed with respect to labour and economy for the Project were:

- employment / workforce retention;
- skills training;
- local spending; and
- livelihood.

##### 4.3.4.1.1 Potential Impacts

Table 40 presents the anticipated impact of the proposed Project on labour and economy. It is believed that the Project will yield primarily positive and significant economic impacts to Saint John and the surrounding communities. Such economic benefits include the creation of jobs and an increase in local spending (e.g., throughout local suppliers, within local retail establishments and restaurants, etc.). As an example, the Economic Policy Institute estimates that every construction job created leads to two indirect jobs in a region. Those workers foster economic growth by spending a considerable portion of their earnings locally.

Although the total number of construction jobs will be limited, they will be longer term as the full build-out of *The Crossing* is anticipated to occur over 10 to 20 years. This is notable for the regional construction industry that all too often experiences construction work in fits and starts throughout the Greater Saint John region.

The development of new retail, commercial, and industrial spaces will be crucial to fostering economic growth in Greater Saint John. For example, the Region's ability to attract and retain youth and talented workers will be enhanced by the array of new amenities offered, such as attractive shopping spaces, restaurants, and other retail and entertainment facilities developed within *The Crossing*.

Overall, the Project was given green lights for the majority of potential impacts ( $n = 8$ ) related to the local labour market and economy (Table 40). The potential impact associated with labour and economy in the event of a mishap, error, and / or unforeseen event could not be determined with certainty. Therefore, yellow lights were applied to those potential impacts ( $n = 4$ ). For example, if there was a catastrophic event at the Project site, such as a fire, then there is the potential that regular employment at some of the businesses could be reduced until such time that the situation is rectified.

##### 4.3.4.1.2 Proposed Mitigation

This Project is extremely positive for the local and regional labour market and economy because it will provide some much needed construction jobs in the region that will lead to long-term and permanent operational jobs. This will generate considerable benefits to the local and regional economies by generating employment, incomes, taxes, and GDP. No

negative impacts are anticipated. Therefore, no additional mitigation measures, other than those highlighted in Table 40 are required.

#### 4.3.4.1.3 Potential Post-Mitigation Residual Impacts

No residual impacts are likely to be incurred within the local labour market and economy due to this Project; however, this could change depending on regional economic conditions. For example, should a large industrial and / or commercial construction project be announced as sometimes happens in the region (e.g., modernization projects at the Reversing Falls Pulp & Paper Mill, construction of the Irving Oil World Headquarters and Canaport LNG, etc.), there could be a short-term period of increased demand for labour, goods, and services (*n.b.*, unemployment rates along with the number of construction workers in the region as outlined in Section 3.3.1 suggests the region can accommodate anticipated demands); however, this Project is not expected to create a highly competitive labour market that would cause greater wage increases in the region. Nevertheless, it will be important for Horizon Management to reach out to the local construction associations (*i.e.*, the Saint John Construction Association and the Construction Association of New Brunswick) to identify any anticipated labour shortages that could affect construction.

#### 4.3.4.2 Transportation Network

Through this Project, the local transportation network will see a moderate increase in heavy equipment traffic during construction (e.g., the hauling away of excavated material, importing fill and Project infrastructure, etc.) and employee and patron traffic during operation and maintenance. The potential impacts that were assessed with respect to the local transportation network were:

- traffic hazards;
- damage to infrastructure; and
- conflict with existing traffic.

##### 4.3.4.2.1 Potential Impacts

Heavy equipment going to and from the site during construction will slightly increase traffic in the area; however, it is anticipated that it can be adequately accommodated by the existing road network and associated infrastructure (*n.b.*, because overall construction will be protracted over 10 to 20 years, construction traffic will be intermittent and infrequent). Nevertheless, the protracted construction period of 10 to 20 years will result in potential traffic hazards over the long-term by conflicting with existing traffic and potentially damaging existing infrastructure. Because of that, yellow lights were applied to two of the three potential impacts during construction while the third was assigned a green light (Table 41).

Representatives with the City of Saint John and NBDTI, during initial reviews of the Project (*i.e.*, refer to Appendix IX), highlighted concerns related to traffic flow and existing transportation infrastructure. Based on those concerns and the information contained in the *exp Services Inc.* [2017a] Traffic Impact Study (*i.e.*, see Appendix X), the assessment yielded all yellow lights related to Project operation and maintenance (Table 41).

Although yellow lights dominated the impact assessment for the transportation network, the potential impacts can be easily managed by implementing the mitigation measures identified below.

#### 4.3.4.2.2 Proposed Mitigation

The measures provided below should be implemented by all Project personnel to minimize the potential impact on the local transportation network.

- A traffic management program should be developed for Project construction and Project operation and maintenance.
- All vehicles permitted on local roadways should be maintained according to provincial regulations with respect to registration, licensing, insurance, and safety inspection.
- All Project personnel operating vehicles permitted on local roadways should obey the posted speed limits and other posted signs, such as weight restrictions.
- All vehicles permitted on the local roadways, save for personal vehicles, should be operated outside of normal peak traffic hours (*i.e.*, 7 AM to 8:30 AM and 4:30 PM to 6 PM Monday through Friday) and outside peak school bus traffic periods, if applicable.
- Road traffic control measures (*e.g.*, use of flaggers, escort vehicles, *etc.*) should be used when transporting over-sized loads on public roadways.
- Any work that occurs within the right-of-way of a provincial road must conform to the Work Area Traffic Control Manual that provides a uniform set of traffic control guidelines.
- No parking by Project construction personnel should be permitted on the existing roadways surrounding the Project site. Instead, parking should only occur at specified locations (*e.g.*, temporary parking lots, laydown areas, *etc.*).
- Any spillage of material that occurs on provincial roadways during the hauling of material from the Project site should be kept to a minimum and promptly removed from them following appropriate safety procedures.

Additionally, the minor improvements to the existing road network detailed in Section 2.8.3.2.1 and the major improvements detailed in Section 2.8.3.2.2 should be undertaken to adequately and safely accommodate the increased traffic associated with Phase 1 and Phases 2 and 3 of the Project, respectively.

#### 4.3.4.2.3 Potential Post-Mitigation Residual Impacts

No residual impacts are likely to be incurred to the local transportation network due to this Project assuming the mitigation measures described above are followed.

#### 4.3.4.3 Aesthetics

There will be a change to the landscape and skyline as a result of the Project. During Project construction, there may be several large cranes on-site that will be used for aerial lifting and erecting. The Project is located in a topographically low area (*i.e.*, located within the valley of Little Marsh Creek). Tall, large signs will likely be required to attract / direct travelers of NB Route 1 into the Project site. For personnel and public safety, there are

requirements to light equipment and work areas and buildings and parking lots during low-light and evening hours. Therefore, the following potential impacts to aesthetics were assessed:

- visual pollution;
- light pollution;
- locale consonance; and
- odour.

#### 4.3.4.3.1 Potential Impacts

The impact assessment for aesthetics, which is summarized in Table 42, yielded six green lights and six yellow lights.

During construction, there are likely to be impacts to aesthetics of the local area. For example, cranes used for erecting structures may be visible for many kilometers. Temporary construction lighting, used for personnel safety during low-light and night-time conditions, may spill beyond the work areas and into adjacent commercial and residential areas. Any odours generated by construction equipment should dissipate before reaching nearby residential receptors.

Horizon Management's conceptual design for *The Crossing* includes an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment (*i.e.*, Figure 7). Therefore, once construction is completed, *The Crossing* should blend well into the natural surroundings. Tall, large signs designed to attract travelers into the site may create some visual pollution. Permanent Project lighting may spill beyond the Project site and into adjacent commercial and residential areas. Overall, *The Crossing* should compliment other commercial developments throughout the Greater Saint John region.

#### 4.3.4.3.2 Proposed Mitigation

The mitigation measures provided below should be undertaken by all Project personnel to ensure that the potential impacts to aesthetics are minimized.

- Use of cranes should be limited to that necessary for erection and construction work.
- Temporary construction lighting should be confined to the areas actively being worked.
- Temporary construction lighting should be oriented such that it does not shine directly towards residential areas and / or high-traffic areas.
- The extent of clearing activities should be limited to that necessary to complete the next Project Phase and no unnecessary storage of equipment and / or materials should be undertaken within undeveloped areas of the Project site.
- Heavy equipment should be turned off when not in use and / or when practical.
- Heavy equipment exhaust systems should meet the recommended standards.
- Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction to preserve green spaces and mitigate impacts to overall aesthetics of the area.

- Roadway signs should be designed to limit visual pollution, which may include limiting the number of signs erected and / or the size of individual advertising blocks.
- Permanent Project lighting should be designed to minimize light trespass, which may include tilting or aiming luminaires away from neighbouring spaces, using LED lights that provide targeted lighting levels, and controlling lights to turn off or dim when not necessary.
- The Proponent should ensure tenants incorporate odour abatement technologies into their designs.
- Mitigation measures developed for this Project should be adhered to in order to adequately address any potential impacts.

#### 4.3.4.3.3 Potential Post-Mitigation Residual Impacts

No residual impacts are likely to occur to local aesthetics over the duration of Project construction and operation of *The Crossing* assuming the above mitigation measures are implemented.

#### 4.3.4.4 Land-Use

The Project will affect the current land-use in the immediate area. Therefore, land-use was selected as a VEC. The specific impacts assessed were:

- land-use conflicts (*i.e.*, zoning);
- land value (*i.e.*, developed and undeveloped land);
- strain on public infrastructure (*i.e.*, water and sewerage); and
- traditional uses by First Nations.

#### 4.3.4.4.1 Potential Impacts

On 15 March 2016, the City of Saint John's Planning Advisory Committee dealt with a Municipal Plan Amendment for the Project site as described in Section 2.8.1.1. As such, the lands received conditional zoning as Commercial Corridor (CC) and Mid-Rise Residential (RM), as shown in Figure 60, prior to submission of the EIA.

Presently, the Project site comprises undeveloped greenfield lands. Development of the lands will increase their existing value. During construction, there should be minimal strain on public infrastructure. This is because services, such as sanitary waste collection, are typically handled through temporary facilities not connected to the public systems.

Although there is no apparent adverse impact to Aboriginal or treaty rights resulting from the Project, there is always the possibility an impact could occur considering the lands are within the traditional territory of Wolastoqiyik. The St. Mary's First Nation has rights in this area.

Operating the various Project Phases will require upgrades to municipal infrastructure, such as water and sanitary systems as noted in Section 2.8.3.3. The *exp Services Inc.* [2017b] water and sanitary servicing report (*i.e.*, refer to Appendix XIII) proposes possible approaches to provide water and sewerage services to *The Crossing*. Any upgrades



required to those systems will be determined during detailed engineering design. It is understood that the City requires a comprehensive understanding of the Project's impacts on those system prior to providing Section 39 / 59 approval. As more details become available regarding the Project Phases, Horizon Management will submit a revised Water and Sanitary Servicing Study to the City.

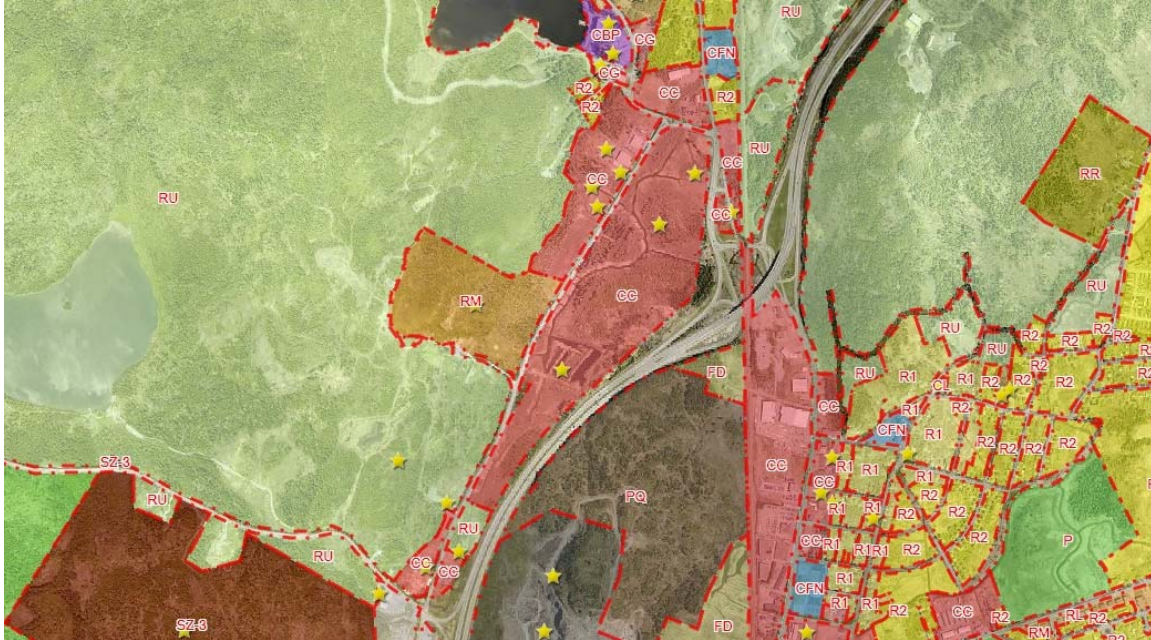


Figure 60. Screen capture from the ZoneSJ Mapping App showing the conditional zoning (i.e., stars) applied to the lands in east Saint John, New Brunswick being proposed for *The Crossing*.

The impact assessment for land-use is summarized in Table 43. The assessment yielded three no-change lights, four green lights, and five yellow lights.

#### 4.3.4.4.2 Proposed Mitigation

Horizon Management understands that the Project is subject to several conditions outlined in Section 2.8.1.1. As such, the Proponent will work directly with the City on impacts, such as upgrades to the existing municipal infrastructure required to service *The Crossing*.

The mitigation measures provided below should be undertaken by all Project personnel to ensure that the potential impacts to land-use are minimized.

- Mitigation measures provided in the Project-specific environmental protection plan should be adhered to in order to ensure any negative impacts to land value are minimized.
- Temporary facilities, such as sanitary waste collection systems, should be maintained by a licensed operator.
- There is a duty to consult First Nations through the various regulatory approval processes for the Project. There will be an obligation to further consult First Nations when obtaining Project permits, such as a Fisheries Authorization.

- One of the Section 39 / 59 conditions applied to the Project in 2016 as part of conditional approval for rezoning was that the Proponent would be responsible for any upgrades to existing municipal infrastructure; however, it is understood that any cost-sharing agreement proposed for upgrades would be subject to Common Council approval.
- Actual upgrades to the municipal water and / or sewerage system should be developed in cooperation with City staff as the Project design and municipal process proceeds.
- Emergency response and contingency plans should be designed to prevent any major and / or sustained impacts on land-use.

#### 4.3.4.4.3 Potential Post-Mitigation Residual Impacts

No residual impacts were identified assuming the above mitigation measures are implemented.

#### 4.3.4.5 Recreation and Tourism

There are several tourist attractions within 5 km of the Project site (Figure 55) that are visited by locals and visitors to the region. As a result, the following potential impacts to recreation and tourism were assessed:

- site visitation and access;
- visitor numbers;
- economy and revenue generation; and
- scenic character.

##### 4.3.4.5.1 Potential Impacts

Table 44 summarizes the potential impacts the Project may have on local recreation and tourism. Five yellow lights were applied to the Project and are particularly associated with mishaps, errors, and / or unforeseen events. The assessment also yielded two no change lights and four green lights. As described in Sections 2.2, 2.4, and 2.6.1, *The Crossing* is intended to attract travelers of NB Route 1 to the area by creating a convenient stopover area. Discouraging travelers from driving by and instead stopping in will drive revenue generation and increase economic growth in the region.

##### 4.3.4.5.2 Proposed Mitigation

It is difficult to develop mitigation measures related to tourist attractions that are not located on the Project site; however, the mitigation measures provided below should be implemented to mitigate impacts to recreation and tourism.

- There may be some concern that the Project may have an impact on some existing businesses, but a market study suggests that the development will compliment rather than compete with existing businesses.
- Horizon Management should limit land clearing to that necessary for the Project Phase they are working. For example, clearing of lands for the multi-residential buildings should be delayed until such time that construction is pending.

- Emergency response and contingency plans should be designed to prevent any major and / or sustained environmental damage to the site.

#### 4.3.4.5.3 Potential Post-Mitigation Residual Impacts

No residual impacts were identified.

#### 4.3.4.6 Health and Safety

The proposed development has the potential to affect the health and safety of Project personnel, as well as the general public. For this reason, health and safety was selected as a VEC. The following potential impacts pertaining to health and safety were assessed for the Project:

- occupational and personal hazards;
- local airshed contamination;
- solid waste and sanitary waste generation; and
- traffic hazards.

##### 4.3.4.6.1 Potential Impacts

The impact assessment for health and safety is summarized in Table 45. Maintaining a safe work site is of paramount importance to Horizon Management; however, there are always health and safety risks. Yellow lights ( $n = 8$ ) were assigned to all of the potential impacts during construction or those that may occur as a result of mishaps, errors, and / or unforeseen events. Green lights ( $n = 4$ ) were applied to all operational and maintenance potential impacts on the basis that the hazards associated with health and safety are well defined and understood and can be mitigated. Almost all workplace incidents resulting in bodily harm or death can be attributed to mishaps, errors, and / or unforeseen events. Despite the rigorous mitigation measures implemented to prevent such incidents from happening, impacts may result.

##### 4.3.4.6.2 Proposed Mitigation

To mitigate any potential impact associated with health and safety, all Project personnel should be briefed on health and safety issues prior to implementing their tasks associated with the Project (e.g., during a site safety orientation session, toolbox meeting, tail gate meetings, etc.). They should be instructed on what Personal Protective Equipment (PPE) they must wear, what guards are to be in place, what measures are to be undertaken to protect the general public, and how rules and regulations with respect to roadways and equipment must be followed at all times. In addition to this, safety areas, such as first aid stations, fire extinguisher storage areas, eye wash stations, and spill clean-up stations, should be erected in various strategic locations around the Project site. Project personnel should be briefed on their general use, capabilities, and limitations.

Various safety procedures and protocols should be put in place, not only to protect those working on the site, but also used to protect the general public and visitors from any harm. The mitigation measures provided below should be undertaken by all Project personnel to ensure that the potential risks to Project personnel and public health and safety are minimized.

- All Project personnel should make occupational health and safety and public health and safety a primary objective in all of their activities related to the Project.
- All laws and regulations related to health and safety should be followed and all of those laws and regulations are applicable to all Project personnel, with no exceptions.
- All Project personnel should be adequately trained to do their job so that they conform to the occupational health and safety standards and public health and safety standards.
- Horizon Management or the responsible contractor should ensure that occupational health and safety standards and general public health and safety standards are part of the Project working environment.
- All Project personnel should wear appropriate personal protective equipment for the tasks they are performing.
- Horizon Management or the responsible contractor should ensure that Project personnel wear appropriate personal protective equipment for the tasks they are performing.
- All Project personnel should report any fatal or serious incident that results in lost time or property damage and those reports should be submitted promptly by Horizon Management to the appropriate regulatory authorities.
- Horizon Management or the responsible contractor should be vigilant in ensuring that non-authorized persons do not circulate in designated Project areas. They should provide appropriate means by use of barricades, fences, warning signs, temporary lighting and security guard as deemed necessary to protect the site against entry by non-authorized persons during the day and night.

#### *4.3.4.6.3 Potential Post-Mitigation Residual Impacts*

No residual impacts are anticipated, with respect to health and safety, over the construction and operation of the Project, if the above mitigation measures are implemented.

Table 40. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on labour and economy.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Employment / worker retention		1	A		5			9	C
Skills training		2	B		6			9	C
Local spending		3			7			9	C
Livelihood		4			8			9	C

#### COMMENTS

- There will be an increase in employment for the local and regional construction labour market. A Project of this duration (*i.e.*, a build-out of 10 to 20 years) should have the ability to retain construction workers in the region, which currently comprises ~ 5 000 people.
- Many of the Project construction jobs require skilled labour, such as engineers, heavy equipment operators, and electricians. There will likely be some skills training spin-offs (*i.e.*, increased enrollment in trades courses at local colleges and trade schools) as a result of this Project.
- The Crossing* has an anticipated capital expenditure of several tens of millions of dollars, which should result in considerable spending in the local and regional economy for many goods and services (*e.g.*, workers will patronize service businesses and eateries, pay income taxes and residential property taxes, *etc.*).
- This Project may allow some individuals in the local and regional area to maintain their livelihood as construction workers instead of having to look outside the region during periods when they are looking for work. It is not expected that this Project will specifically lead people to launch a career in skilled trades.
- At full build-out, it is anticipated that there will be ~ 1 040 new full-time and permanent retail jobs. This is considered significant as it represents about 1.6 % of the region's 2016 labour force. This could attract workers to the region and lead to population growth, which would be beneficial considering the region experienced a population decline between the 2011 and 2016 census. Furthermore, it could result in demand for housing that is planned as part of the overall Project.
- Depending on the types of businesses that locate within the Project site, employees may require initial detailed skills training and then routine skills development in order to operate and maintain the various businesses (*e.g.*, an automotive repair shop would require some employees to have skills training surrounding vehicle maintenance and repair, *etc.*).
- Local spending (*e.g.*, housing, transportation, recreation, *etc.*) is expected to increase as a result of the addition of ~ 1 040 new full-time and permanent retail jobs to the region. Economic spin-offs related to servicing the Project (*e.g.*, landscaping, snow removal, delivery services, *etc.*) are also expected to increase local spending.
- The Crossing* will provide an opportunity for many individuals to maintain a livelihood (*i.e.*, ~ 1 040 new full-time and permanent retail jobs will be created at full build-out). Studies show that the majority of retail employees are in their mid-30s, they often have some level of post-secondary education, and they contribute a significant portion to their household income.
- In the event of a major mishap, error, and / or unforeseen event (*e.g.*, fire, flood, storms, *etc.*), there may be a temporary reduction in the permanent staff until the impacts are mitigated. It would be expected that any employment reduction would be short-lived.

#### MITIGATING MEASURES

- Data indicate that there is ample room to grow employment in the local and regional labour market (*i.e.*, unemployment rate in Greater Saint John is currently between 8 % and 9 %).
- Local and regional construction associations and labour unions may have to coordinate the quantity of available workers with the contractors should a large-scale industrial project be announced for the region.
- Mitigation measures developed for this Project should be adhered to in order to adequately address any potential impacts in order to minimize the amount of lost work time.

Table 41. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on the transportation network.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Traffic hazards		1	A, B		4, 5	E, F		8	H
Damage to infrastructure		2, 3	C		6	G		2	H
Conflict with existing traffic		1	D		7	E, F, G		8	H

#### COMMENTS

- There will be an increase in heavy equipment traffic going to and from the Project site during construction. The protracted construction period of 10 to 20 years will result in potential traffic hazards over the long-term between heavy equipment and normal traffic.
- Existing infrastructure is and future infrastructure will be designed to standards capable of supporting the movement of heavy equipment to and from the Project site (*e.g.*, truck routes are designed for specific load limits, turning radii, *etc.*). Shippers are required to ensure that loads do not exceed specified limits (*i.e.*, seasonal weight restrictions and load limits) in order to protect and maintain infrastructure.
- New property tax, income tax, and HST revenues that will result from this Project, will increase the amount of money available to the municipal government (*i.e.*, Gas Tax Funding) and provincial government for maintaining and / or improving public infrastructure surrounding *The Crossing* site.
- Projected traffic associated with Phase 1 of the Project can be adequately accommodated with relatively minor improvements to the existing road network.
- Projected traffic associated with Phase 2 and 3 of the Project will require major modifications to the existing road network.
- Some of the existing municipal and provincial infrastructure may require updating to adequately and safely accommodate the traffic associated with the various Project Phases.
- There will be an overall increase in traffic, primarily on Ashburn Road, Drury Cove Road, Foster Thurston Drive, and Rothesay Road, as a result of this Project.
- In the event of a major mishap, error, and / or unforeseen event, there may be an increase in traffic temporarily until the impacts are mitigated. It would be expected that any traffic increase would be short-lived.

#### MITIGATING MEASURES

- Traffic control measures, such as using construction warning signs and / or flagging crews, should be implemented to mitigate potential traffic hazards when increased levels of heavy equipment are going to and from the Project site.
- Any work that occurs within the right-of-way of a provincial road must conform to the Work Area Traffic Control Manual that provides a uniform set of traffic control guidelines.
- Heavy equipment haulers should adhere to weight restrictions and load limits.
- To avoid traffic congestion, movement of heavy equipment to and from the Project site should be scheduled outside of normal peak traffic hours for the area (*i.e.*, 7 AM to 8:30 AM and 4:30 PM to 6 PM Monday through Friday).
- Minor improvements to the existing road network as described in the *exp Services Inc.* [2017a] Traffic Impact Study should be implemented to adequately and safely accommodate the increased traffic during Phase 1 of the Project.
- Major improvements to the existing road network as described in the *exp Services Inc.* [2017a] Traffic Impact Study should be implemented to adequately and safely accommodate the increased traffic during Phase 2 and 3 of the Project.
- Some infrastructure will require upgrading as a result of the Project. For example, the City of Saint John has indicated that Ashburn Road will require upgrading to a full suburban standard.
- Mitigation measures developed for this Project should be adhered to in order to adequately address any potential impacts.

Table 42. Assessment of potential impacts of the *The Crossing* proposed for east Saint John, New Brunswick on aesthetics.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Visual		1	A		5, 6	G, H		10	K
Light pollution		2	B, C		7	I		10	K
Locale consonance		3	D		5, 8	G, H		10	K
Odour		4	E, F		9	J		10	K

**COMMENTS**

- 1 Cranes may obstruct skyline views as they may be visible for many kilometers; however, it is recognized the Project site is in a topographically low area.
- 2 Temporary construction lighting may spill beyond the work areas and into adjacent commercial and residential areas.
- 3 Construction activities at the site will conform with other developments generally undertaken throughout the City.
- 4 Any odours generated through Project construction (*e.g.*, exhausts, *etc.*) will likely dissipate before reaching nearby residential receptors.
- 5 Once construction is complete, *The Crossing* should blend into the surroundings as it is being designed with environmental issues at top of mind and includes an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment.
- 6 Tall, large roadway signs designed to attract travelers into the site may create some visual pollution.
- 7 Permanent Project lighting may spill beyond the Project site and into adjacent commercial and residential areas.
- 8 *The Crossing* will compliment other commercial developments throughout the Greater Saint John region.
- 9 There will be some facilities within the overall development that could release odours to the surrounding environment (*i.e.*, restaurants, such as food odours, and highway services, such as fuel odours).
- 10 In the event of a major mishap, error, and / or unforeseen event, there may be short-lived impacts to aesthetics (*e.g.*, the use of additional temporary lighting, the release of an unpleasant odour from a facility, *etc.*).

**MITIGATING MEASURES**

- A Use of cranes should be limited to that necessary for erection and construction work.
- B Temporary construction lighting should be confined to the areas actively being worked.
- C Temporary construction lighting should be oriented such that it does not shine directly towards residential areas and / or high-traffic areas.
- D The extent of clearing activities should be limited to that necessary to complete the next Project Phase and no unnecessary storage of equipment and / or materials should be undertaken within undeveloped areas of the Project site.
- E Heavy equipment should be turned off when not in use and / or when practical.
- F Heavy equipment exhaust systems should meet the recommended standards.
- G Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction to preserve green spaces and mitigate impacts to overall aesthetics of the area.
- H Roadway signs should be designed to limit visual pollution, which may include limiting the number of signs erected and / or the size of individual advertising blocks.
- I Permanent Project lighting should be designed to minimize light trespass, which may include tilting or aiming luminaires away from neighbouring spaces, using LED lights that provide targeted lighting levels, and controlling lights to turn off or dim when not necessary.
- J The Proponent should ensure tenants incorporate odour abatement technologies into their designs.
- K Mitigation measures developed for this Project should be adhered to in order to adequately address any potential impacts.

Table 43. Assessment of potential impacts of the *The Crossing* proposed for east Saint John, New Brunswick on land-use.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Land-use conflicts ( <i>i.e.</i> , zoning)									
Land value ( <i>i.e.</i> , developed and undeveloped land)		1	A		1	A		6	F
Strain on public infrastructure ( <i>i.e.</i> , water and sewerage)		2	B		4, 5	D		6	F
Traditional uses by First Nations		3	C		3	C		6	C, F

**COMMENTS**

- 1 Presently, the Project site comprises undeveloped greenfield lands. Development of the lands will increase their existing value.
- 2 There should be minimal strain on public infrastructure during construction of the various buildings of *The Crossing* as sanitary wastes will likely be collected via temporary facilities.
- 3 The lands are within the traditional Maliseet territory of Wolastoqiyik and the St. Mary's First Nation has rights in this area. Representatives with the New Brunswick Aboriginal Affairs Secretariat have indicated there is no apparent adverse impact to Aboriginal or treaty rights resulting from the Project; however, there is always a possibility of an impact.
- 4 There may be a need to upgrade municipal infrastructure to accommodate the Project. Any upgrades required will be determined during detailed engineering design.
- 5 *exp Services Inc.* [2017b] water and sanitary servicing report proposes possible approaches to provide water and sewerage services to *The Crossing*. Actual upgrades required will be determined during detailed engineering design. As more details become available regarding the Project Phases, the Proponent will submit a revised Water and Sanitary Servicing Study to the City that includes detailed site plans showing design average daily and peak daily flows. It is understood that the City requires a comprehensive understanding of the Project's impacts on these systems prior to providing approval.
- 6 During a mishap, error, and / or unforeseen event, there is always a possibility that an impact could result to land-use.

**MITIGATING MEASURES**

- A Mitigation measures provided in the Project-specific environmental protection plan should be adhered to in order to ensure any negative impacts to land value are minimized.
- B Temporary facilities, such as sanitary waste collection systems, should be maintained by a licensed operator.
- C There is a duty to consult First Nations through the various regulatory approval processes for the Project. There will be an obligation to further consult First Nations when obtaining Project permits, such as a Fisheries Authorization.
- D One of the Section 39 / 59 conditions applied to the Project in 2016 as part of conditional approval for rezoning was that the Proponent would be responsible for any upgrades to existing municipal infrastructure; however, it is understood that any cost-sharing agreement proposed for upgrades would be subject to Common Council approval.
- E Actual upgrades to the municipal water and / or sewerage system should be developed in cooperation with City staff as the Project design and municipal process proceeds.
- F Emergency response and contingency plans should be designed to prevent any major and / or sustained impacts on land-use.

Table 44. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on recreation and tourism.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Site visitation / access					3			4	C
Visitor numbers					4			4	C
Economy and revenue generation		1	A		1, 5			4	C
Scenic character		2	B, C		6			4	C

**COMMENTS**

- By increasing the local employment rate and local spending, locals may have more disposable income for spending on extra-curricular activities like recreation and tourism.
- The Project site is located in a low-lying area adjacent to NB Route 1 and is currently a vacant greenfield site. Construction of new buildings will be an extension of the existing built-up portions of Saint John along the Saint John Thoroughway and Ashburn Road.
- The Crossing* is a gateway development designed to attract travelers of NB Route 1. The conceptual plan for the Project envisions that a tourist information centre will be included in the overall development. This will be a draw for tourists who after visiting the centre will likely visit some of the many recreation and tourism sites throughout Greater Saint John.
- The Project is focused on attracting travelers of NB Route 1 to east Saint John by being a convenient stopover; this will shift the focus from Saint John being a drive by location to a drive in location, which is expected to increase the number of visitors to regional tourism and recreation sites.
- Regional economic growth and revenue generation will increase as travelers stop at the Project site and spend money at the various establishments.
- Horizon Management's concept is for *The Crossing* to have an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment. This will help it blend into the surrounding landscape.
- Depending on the type / degree of event, there may be a possibility that access to the visitor information centre could be restricted for a short period of time, which could reduce the number of visitors.

**MITIGATING MEASURES**

- There may be some concern that the Project may have an impact on some existing businesses, but a market study suggests that the development will compliment rather than compete with existing businesses.
- Horizon Management should limit land clearing to that necessary for the Project Phase they are working. For example, clearing of lands for the multi-residential buildings should be delayed until such time that construction is pending.
- Emergency response and contingency plans should be designed to prevent any major and / or sustained environmental damage to the site.

Table 45. Assessment of potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on health and safety.

Potential Impact	Stage II: Construction			Stage III: Operation and Maintenance			Stage V: Mishaps, Errors, and / or Unforeseen Events		
	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation	Degree of Impact	Comment	Mitigation
Occupational and personal hazards		1, 2, 3	A to I		1, 2, 3, 7	A to I		8	A to I, L
Local airshed contamination		4	B, J		4, 7	B, J		4, 8	B, J, L
Solid waste and sanitary waste generation		5	B		5, 7	B		5, 8	B, L
Traffic hazards		6	B, K		6, 7	B, K		6, 8	B, K, L

**COMMENTS**

- Workers may be involved in activities that may include the potential exposure to dust, noise, hazardous chemicals (*e.g.*, hydrocarbons, paints, solvents, *etc.*), excavations, working at heights, working in confined spaces, *etc.*
- Accidents could cause personal injury and infrastructure damage (*e.g.*, if back-up alarms are not used, if inattentiveness occurs during operation, if necessary precautions, based on climatic conditions, are not considered, *etc.*).
- The general public could be harmed if adequate precautions are not taken to keep them from accessing areas under construction or redevelopment.
- As noted in the Air Quality Valued Environmental Component Impact Assessment table, there is expected to be a moderate, though localized, impact on air quality during all Project stages primarily as a result of the increased operation of heavy equipment emitting pollutants to the airshed.
- Sanitary and solid wastes generated during Project construction and operation and maintenance activities should be handled appropriately (*e.g.*, sanitary waste should be collected and disposed of using a licensed wastewater hauler, approved construction debris and operation and maintenance waste will be sent to the Crane Mountain Landfill, *etc.*).
- As noted in the Transportation Network Valued Environmental Component Impact Assessment table, there is expected to be an increase in potential traffic hazards throughout all Project stages, but it will be greater during construction.
- There will still be risks during operation and maintenance, but they will be considerably lower than during construction.
- All mishaps, errors, and / or unforeseen events by their nature pose potential impacts to the health and safety of Project personnel and the general public.


**MITIGATING MEASURES**

- All Project personnel should make occupational health and safety and public health and safety a primary objective in conducting all of their activities related to the Project.
- All Project personnel should be instructed on what personal protective equipment is required to be worn, what guards should be in place, what measures should be taken to protect other workers and the general public, and how rules and regulations with respect to the environment, roadways, and equipment should be strictly adhered to with no exceptions.
- All Project personnel should be adequately trained to do their job so that they conform to the occupational health and safety standards and public health and safety standards.
- Horizon Management should ensure that occupation health and safety standards and general public health and safety standards are part of the Project working environment and should ensure that Project personnel have appropriate personal protective equipment available to wear for the tasks they are performing.
- All hazardous materials (*e.g.*, paints, solvents, hydrocarbons, *etc.*) should be labelled appropriately and stored as per the manufacturer's recommendations.
- Project personnel working with hazardous chemicals should be trained appropriately for their safe use, handling, and storage, they should be provided with the appropriate personal protective equipment for their safe use, handling, and storage, and they should have access to the Material Safety Data Sheet Information.
- Project personnel working at heights and / or within confined spaces should be trained appropriately for working at heights and / or confined spaces and should be provided with the appropriate personal protective equipment for working at heights and / or within confined spaces.
- Project personnel should immediately report any serious accident that results in lost time or property damage to their supervisor and those reports should be promptly submitted by Horizon Management to the appropriate regulatory authority.
- A perimeter security fence or other satisfactory barrier system should be erected to protect against non-authorized persons circulating within the Project site.
- Mitigation measures noted in the assessment of the Air Quality Valued Environmental Component should be implemented and followed.
- Mitigation measures noted in the assessment of the Transportation Network Valued Environmental Component should be implemented and followed.
- Emergency response and contingency plans should be designed to prevent any major and / or sustained environmental damage.

#### 4.3.5 Summary of Potential Environmental Impacts

As described above, 12 VECs were assessed for potential impacts to the environment by the proposed Project. An overall VEC impact assessment summary is provided in Table 46. The results indicate that in many instances, there are minimal or moderate impacts anticipated as a result of this Project.

Table 46. Summary of the potential impacts of *The Crossing* proposed for east Saint John, New Brunswick on selected valued environmental components.

VEC	Number of Lights For Stage II / III / V				Overall VEC Impact Assessment*
	Green	Yellow	Red	No Change	
<b>PHYSIO-CHEMICAL ENVIRONMENT</b>					
Air quality	1/0/1	5/6/5	0/0/0	0/0/0	
Sound emissions	0/0/0	4/4/4	0/0/0	0/0/0	
Surface water quantity and quality	0/0/0	5/5/5	0/0/0	0/3/0	
Groundwater quantity and quality	0/1/0	4/1/0	0/0/3	0/2/1	
<b>BIOLOGICAL ENVIRONMENT</b>					
Terrestrial flora and fauna	1/6/1	5/0/5	0/0/0	0/0/0	
Aquatic flora and fauna	4/4/0	0/0/6	0/0/0	2/2/0	
<b>SOCIO-ECONOMIC ENVIRONMENT</b>					
Labour and economy	4/4/0	0/0/4	0/0/0	0/0/0	
Transportation network	1/0/1	2/3/2	0/0/0	0/0/0	
Aesthetics	2/4/0	2/0/4	0/0/0	0/0/0	
Land-use	2/2/0	1/1/3	0/0/0	1/1/1	
Recreation and tourism	1/4/0	1/0/4	0/0/0	2/0/0	
Health and safety	0/4/0	4/0/4	0/0/0	0/0/0	
<b>TOTALS</b>	<b>48</b>	<b>99</b>	<b>3</b>	<b>15</b>	

NOTES: \*No change lights are excluded from the determination of the overall VEC impact; the coloured light that received the greatest number of assignments in the environmental assessment determines the ultimate VEC impact

All told, 165 specific possible impacts were assessed (Table 46). Of those, 79 % yielded either green ( $n = 48$ ) or yellow ( $n = 99$ ) lights. The three red lights were assigned to potential long-lasting impacts that could be realized to the groundwater system should a specific mishap, error, and / or unforeseen event occur (*i.e.*, severe hydrocarbon contamination). There is an extremely remote possibility of those impacts being realized considering the mitigation measures that have been identified. Therefore, those red lights are not considered Project showstoppers.

As an ultimate overall VEC potential impact assessment (*i.e.*, based on the summation of all possible impacts for the 12 VECs), the proposed Project is expected to have moderate to little impact on the environment, especially in light of the mitigation measures developed. Therefore, the Project should be permitted to proceed as detailed within this EIA document.



## 4.4 POTENTIAL ENVIRONMENT IMPACTS ON THE PROJECT

As part of the NBDELG's EIA process, the environment's impact on a project should also be assessed (e.g., seasonal flooding and extreme events, such as maximum precipitation, wind, and climate change scenarios, which may be pertinent to long-term facilities). No government agency provides specific guidance on how to properly assess the impacts of the environment on a project, but instead it is left up to the proponent. Several impacts of the environment on the proposed Project are considered here including: temperature; precipitation; floods; wind; erosion; forest fires; and seismic events. One particular theme of interest in assessing the impact of the environment on a project is climate change.

### 4.4.1 Notes on Climate Change

The international scientific community generally agrees that climate change is occurring and that the impacts are currently being felt globally [GC, 2004]. Since the 1950s, observations have been made with regards to the warming of the atmosphere, the warming of the ocean, the decrease in the amounts and duration of snow and ice cover, the increase in sea level, and the increased concentrations of greenhouse gases present in the atmosphere. Changes observed in recent years are unprecedented when compared with historical data over similar timeframes in the past [IPCC, 2013]. For example, the period between 1983 and 2012 in the northern hemisphere was likely the warmest 20 year period of the last 1 400 years [IPCC, 2013]. As the phenomena of climate change continues, the effects are predicted to increase at an accelerating rate.

The IPCC, through climate modeling scenarios, estimates that mean global temperatures are likely to increase 1.1 °C to 6.4 °C during the twenty-first century [IPCC, 2013], depending on the GHG emission scenario used. Warming is anticipated to be most prominent over land and at high northern latitudes [IPCC, 2013], which means that Canada, because it is a high latitude country, is expected to have more pronounced warming [Bruce *et al.*, 2000]. Although temperatures are predicted to increase over time, seasonal variations are still expected. According to the IPCC [2013], recent climate warming has already shown to have had an effect on terrestrial biological systems such as the timing of spring events (e.g., bird migration and egg laying, leaf unfolding, and northern shifts in the habitable ranges of various flora and fauna, *etc.*).

The rate of sea level rise since the mid-nineteenth century has been larger than the mean rate during the previous two millennia. Sea levels increased by 0.17 m to 0.21 m between 1901 and 2010 and a 0.26 m to 0.82 m increase in global mean sea level is predicted by the year 2100 [IPCC, 2013]. Rising sea levels and the increased rate in change can be attributed to thermal expansion resulting from an increase in ocean temperatures and a loss of frozen ice mass from glaciers and ice sheets [IPCC, 2013]. Water levels along the southeastern coast of New Brunswick could increase by 50 cm to 70 cm by the end of this century [Parkes *et al.*, 2006].

Climate changes will not be homogenous, but instead vary regionally. In Atlantic Canada, inland areas may be subject to drier summers where increased evaporation of water may exceed increased precipitation. Coastal regions may be subjected to frequent flooding caused by a rising sea level coupled with an anticipated increase of high intensity weather systems [Vasseur and Catto, 2008]. Zweirs and Kharn [1998] speculate that the most acute effects under a changing climate may be the increased intensity and frequency of extreme events, and in particular precipitation events.

*Bruce et al.* [2000] predict climate changes for Atlantic Canada if a doubled CO<sub>2</sub> atmosphere is attained by 2050. Under a doubled CO<sub>2</sub> atmosphere, summer temperatures are likely to be 4 °C warmer than current, while winter temperatures may increase by about 6 °C. *Vasseur and Catto*, [2008] estimate that Atlantic Canada temperatures will increase by 2 °C to 4 °C in the summer and 1.5 °C to 6 °C in the winter by 2050. In Charlo, the nearest New Brunswick modelled location, the maximum and minimum temperatures are expected to increase by 2.9 °C to 3.9 °C and 2.1 °C to 3.1 °C, respectively [*Lines et. al.*, 2006].

Precipitation amounts under a doubled CO<sub>2</sub> atmosphere may increase by 20 % in the winter, and although unpredictable, summer precipitation amounts are also expected to increase. Studies by *Lewis* [1997] show that precipitation in Atlantic Canada between 1948 and 1995 increased by about 10 % [*Vasseur and Catto*, 2008]. Predictions by *Lines et. al.*, [2006] suggest that by 2080, precipitation for Saint John could increase by as much as 12 % in the winter and 35 % in the summer. Extreme precipitation events are expected, according to *Zweirs and Kharn* [1998], to increase and may result in decreasing return periods by half (e.g., a 100 year event will become a 50 year event under a doubled CO<sub>2</sub> environment).

The following guidance is offered by the *Canadian Environmental Assessment Agency* [2003] for assessing climate change:

*The objective [of the guidance document] is to help practitioners assess, reduce, and manage the adverse impacts that climate change may have on projects and ensure that these impacts will not pose a risk to the public or the environment. The consideration of climate change impacts on a project is a component of the standard EA practice of considering possible changes to a project caused by the environment. The consideration of climate change impacts in EA should reflect regional variations in climate and environment, and jurisdictional practices.*

Design engineers and architects generally follow specific guidelines with respect to design criteria. Those design criteria consider the environmental effects of climate change and the potential cumulative effects on the structures (e.g., increased streamflow through a culvert, increased snow loads on a roof, etc.). Engineers will account for impacts of climate change on the proposed Project in their design. Mitigation of potential effects of the environment on the proposed Project are also inherent in the planning (i.e., the EIA document), construction (e.g., environmental protection / management plans), and planned operation of the Project (e.g., capture and handling of surface water runoff).

The information contained in this section of the document provides information on how the environment will affect the Project. A considerable adverse effect of the environment on the proposed development is considered one that would result in:

- a long-term interruption in schedule (i.e., a construction season) or in service (i.e., several days);
- damage to infrastructure that is not economically feasible to repair (i.e., > 150 % of the total original cost); and / or
- causes a considerable negative effect on an established VEC for the Project as per the criteria established for that VEC.

Many planning, designing, and construction strategies are available to minimize the potential effects of the environment on the Project so that risk of serious damage to infrastructure, human health, or interruption of service can be reduced to acceptable levels. The National Codes of Canada, which will be strictly adhered to for this Project, identify many codes and standards that address environmental considerations during all aspects of a project.

The scope of the assessment of the environment on the Project is limited by spatial and temporal boundaries. Analysis is done only for inside the Project boundaries. All seasons were analyzed. Consideration was given to construction, operation, maintenance, and mishaps, errors, and / or unforeseen events.

#### 4.4.2 Notes on Extreme Weather

The frequency and severity of extreme weather is on the rise globally (Figure 61) and it appears to be a product of climate change [Carey, 2012]. The number of extraordinary severe floods, storms, and other weather related events that have occurred during the previous few decades seem to suggest that extreme weather events are becoming more common [Francis and Hengeveld, 1998]. Over the past few decades in Atlantic Canada, the most-costly extreme weather events have been hurricanes [ICLR, 2012].

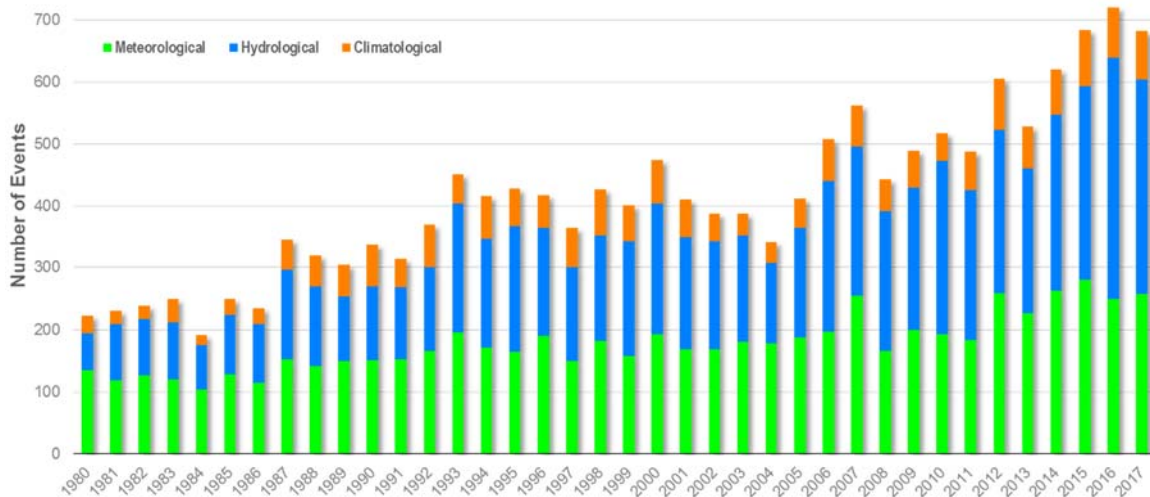


Figure 61. Global natural loss extreme weather related events between 1980 and 2017 with at least one fatality and / or produced normalized losses over the threshold assigned by the World Bank [NatCatSERVICE, 2018].

Public Safety Canada (PSC) maintains the Canadian Disaster Database (CDD). The CDD contains detailed disaster information for 84 natural disasters that have occurred in New Brunswick since 1900. About 45 % of those natural disasters have occurred in the past 25 years. The events are broken down as shown in Figure 62. The most-costly event on record was the 1998 Ice Storm (*n.b.*, the event extended across Ontario, Quebec, and Atlantic Canada).

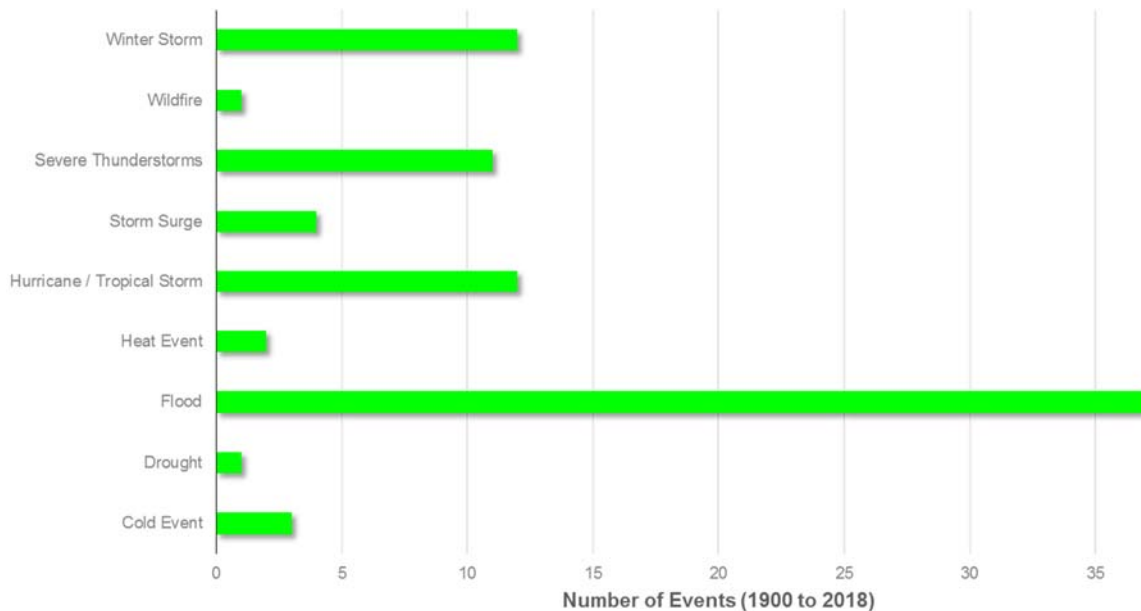


Figure 62. Characterization of the 83 natural disasters for New Brunswick between 1900 and 2018 as recorded in the Canadian Disaster Database [PSC, 2018].

#### 4.4.3 Precipitation

Occasionally, tropical storms and hurricanes pass through the region bringing with them extreme precipitation. Heavy bursts of rain during thunderstorms are typically short-lived and occur on an infrequent basis in the Saint John region. Heavy snowfalls are common in New Brunswick, but they do not typically cause any considerable impacts (*n.b.*, snowfall amounts in the Saint John region are typically lower than other areas of the Province due to temperature moderation by the Bay of Fundy). As noted above, climate change is expected to increase the amount of annual precipitation in the Saint John region. Increased temperatures from a changing climate could increase the frequency and intensity of thunderstorms.

In Atlantic Canada, increased precipitation in the winter, coupled with expected elevated temperatures, may result in the increased frequency of rain on snow events resulting in larger volumes of precipitation being discharged as runoff and a smaller percentage of precipitation infiltrating the surface and recharging groundwater systems [Vasseur and Catto, 2008]. This phenomenon also increases the risk of flooding due to the reduced lag time associated with runoff entering watercourses versus groundwater infiltrating watercourses after precipitation events. Contamination of flood waters may pose further damage to the environment, should they come into contact with sewage, domestic or industrial waste, or agricultural pesticides and fertilizers [Vasseur and Catto, 2008].

Design engineers will use appropriate codes and standards for planning the Project, which has an estimated operational lifespan of 50 years. Best design practices dictate that those professionals consider a changing climate, which is being completed for this Project.

The following is a list of concerns associated with increased precipitation events that could result under a changing climate:

- unsafe work conditions;
- unsafe travel conditions;
- increased overland flow;
- increased erosion;
- localized flooding;
- increased insurance costs; and
- increased stress and strain on structures (e.g., snow loads).

Because potential impacts are being planned for in the design, considerable impacts are not expected to occur; however, the mitigation measures provided below should be followed to reduce the likelihood of impacts being realized.

- Work should be halted when extreme precipitation causes unsafe working conditions (i.e., > 50 mm events).
- Workers should use their own discretion for safety concerns when travelling to and from the site during unfavourable weather conditions (i.e., extreme rainfall events or snowstorms).
- As much as practicable, the Proponent should retain or develop green space in order to mitigate localized flooding.
- A surface water management plan, which includes an erosion and sedimentation control plan during construction, should be developed for the Project site.
- Structures that could be impacted by overland flow and / or flooding, should be located well above ground-level.
- Structural engineers should account for increased snow loads in their design to accommodate increased potential snow loads under a changing climate.

#### 4.4.4 Winds

Winds are weaker at the ground surface compared to higher up in the atmosphere because of increased resistance afforded by vegetation and structures [Henry and Heinke, 1996; Lutgens and Tarbuck, 2001]. No predictions that the authors are aware of have been made with respect to wind directions and speeds under a changing climate; however, it is likely that winds could increase / decrease in speed as a result of changing temperature patterns. The following is a list of concerns related to wind:

- increased stress and strain on structures; and
- blowing and drifting snow;

Below are mitigation measures offered for changing winds.

- Structural engineers should account for increased wind stress and strain in their design to accommodate increased potential snow loads under a changing climate.

#### 4.4.5 Wet and Dry Acid Deposition

An estimated 21 % to 75 % of Atlantic Canada's landmass receives an amount of acid deposition that exceeds critical loads where adverse environmental effects are evident [Meteorological Service of Canada, 2004]. Fossil fuel combustion in power generating

plants, smelting operations, petroleum refining, and motor vehicles produce large quantities of sulfur and nitrogen oxides that are emitted to the atmosphere [Sawyer *et al.*, 1994; Craig *et al.*, 1996]. Those oxides (*i.e.*, acid gases) are often emitted through tall stacks that introduce the pollutants to areas of the atmosphere where there are stronger and more persistent winds [Lutgens and Tarbuck, 2001]. This helps reduce local pollution, but through the process of long-range transport it can aggravate downwind regional pollution problems [Langmuir, 1997].

Once in the atmosphere, those acid gas emissions can be scavenged by water droplets and fall to the earth's surface as acid precipitation (*i.e.*, having a pH < 5.0 and in the form of dew, drizzle, fog, sleet, snow, and rain) in the form of sulfuric and nitric acid [Murphy and Nance, 1998]. Dry deposition (*i.e.*, particulates, gases, and aerosols) can also occur and once on the ground surface those deposits can be entrained by water to also form acids [Henry and Heinke, 1996].

Wet and dry deposition of acids can be problematic in New Brunswick. That is because fallout from the heavy industrialized areas of Michigan, Indiana, Ohio, western Pennsylvania, and southern Ontario and Quebec generally occurs in the region. Those emissions can wreak havoc on the region's environment. Because the deposition is sourced from far away, there is little that can be done locally to curb the potential impacts. Instead, design and mitigation measures must be developed to account for the potential impacts.

In October 1998, federal, provincial, and territorial Energy and Environment Ministers signed *The Canada-Wide Acid Rain Strategy for Post 2000* [CCME, 2006]. Part of that strategy called for reducing domestic acidifying emissions in New Brunswick. In that vein, emissions caps and stack emissions limits were introduced for existing facilities. Air emissions from new major sources became regulated through the issuance of Approvals To Operate (ATOs) under the *Clean Air Act*. A facility's ATO stipulates emissions limits and conditions under which reporting is required. Similar programs to New Brunswick's have been applied to emissions in other Atlantic provinces. Overall, implementation of those programs has yielded a reduction in emissions (Figure 63) and the subsequent decline in the production of sulfuric and nitric acid formation from those pollutants; however, progress can still be made.

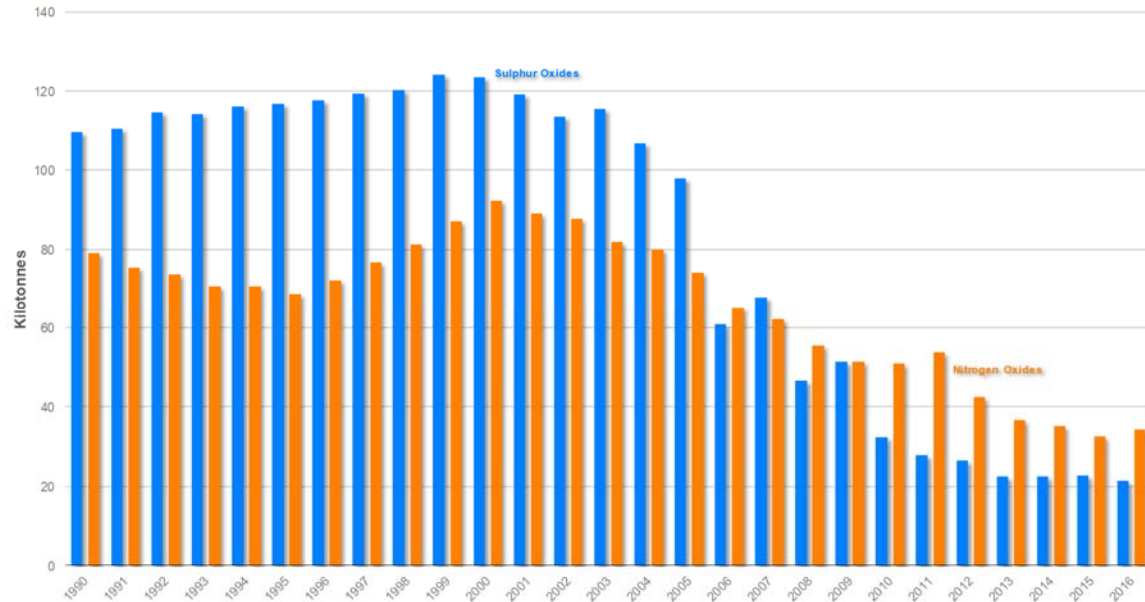


Figure 63. Historical sulphur oxide and nitrous oxide emissions for New Brunswick as reported by the *ECCC* [2018].

It is possible that wet and dry acid deposition will have an impact on the proposed Project. Although it is likely that some structures (e.g., concrete foundations, etching on glass surfaces, etc.) will be affected, the damage is expected to be minimal or occur in a manner that is not mechanically or operationally destructive to the structure during its expected lifetime. Climate change could have a negative impact on the amount of acid precipitation contacting the Project. For example, predicted increases in precipitation could yield more wet acid deposition leading to increased destruction to the facilities. Therefore, it is important that design professionals use sound engineering practices to provide mitigation and ensure that those concerns are addressed.

#### 4.4.6 Forest Fires

Forests cover almost 85 % (61 000 km<sup>2</sup>) of New Brunswick [*New Brunswick Forest Products Association*, 2014] and more than 7 million hectares of forested lands are managed throughout the Province. Forest fires set by lightning strikes and people are a major threat to the management of New Brunswick's forests [*Bates et al.*, 1957]. For example, the Great Miramichi Fire in October 1825 destroyed more than 19 300 km<sup>2</sup> of forest [*Morison*, 1938; *Brown*, 1950] and the Kedgwick Fires in June 1919 destroyed 25.9 km<sup>2</sup> of forest [*Prince*, 1919]. Between 1998 and 2016, there were about 261 ± 88 forest fires annually (Figure 64), destroying approximately 3.45 km<sup>2</sup> ± 2.69 km<sup>2</sup> of forest each year [*NBDNR* and *NBDERD* Annual Reports].

Because forest fires are somewhat of a common occurrence in New Brunswick, there is potential for one to affect the construction and / or operation and maintenance of *The Crossing*. The Forest Fire Management Section of the NBDNRED) is tasked with protecting provincial forest resources and personal property from fire. That group forecasts and tracks fire weather at 28 stations across the province according to the Canadian Forest Fire Weather Index System. If a forest fire occurred, they have at their disposal ground attack and air attack units, which drastically aid in knocking down the fire

and preventing its spread. Those resources would be available should a forest fire occur near the Project site at any time, thereby considerably reducing the magnitude and extent of a forest fire on the Project.

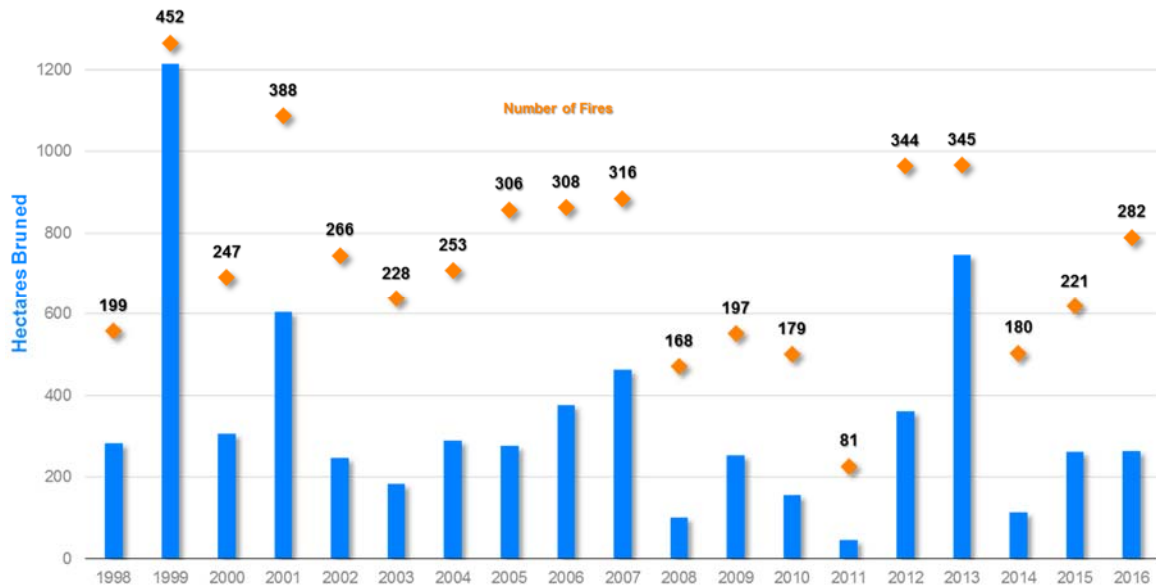


Figure 64. Annual New Brunswick forest area burned and number of fires as reported by the NBDNR and NBDERD [Annual Reports].

Increased incidence of forest fires under a changing climate may be realized due to warmer temperatures, drier conditions, higher winds, *etc.* The occurrence of forest fire activity is anticipated to increase 25 % by 2030 in Canada [ICLR, 2012]. The Project site is located within the City of Saint John where considerable firefighting resources exist. If a fire were to break out in the local area, it would likely be quickly noticed and called in for response. Therefore, it is not likely that a forest fire will have a considerable effect on the proposed Project.

#### 4.4.7 Seismic Activity

New Brunswick lies within the northeastern corner of the Northern Appalachians seismic zone (NAP; Figure 65). According to the *Geological Survey of Canada* [2014], approximately 330 earthquakes greater than magnitude (M) 2.5 occurred within the NAP between 1764 and 2001 (*n.b.*, pre-1960s, the M was estimated based on newspaper articles and historical documents while post-1960s, Earthquakes Canada's seismograph network has been used to detect earthquakes whose  $M > 2.5$ ). On average, approximately three events greater than an M 5 occur each decade (*i.e.*, those earthquakes that are potentially damaging to structures).



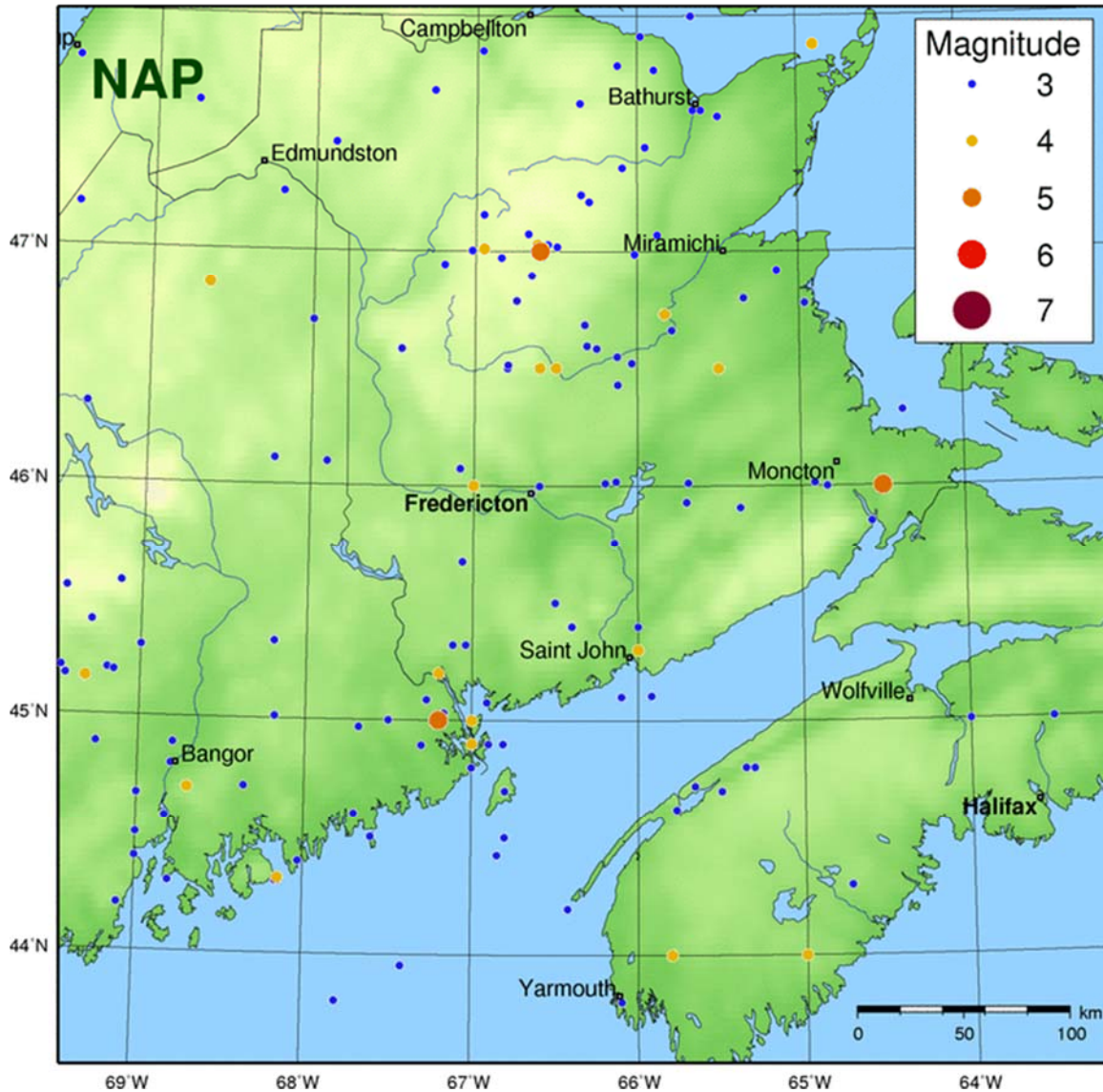


Figure 65. Map showing the Northern Appalachian (NAP) Seismic Zone from Geological Survey of Canada [2014].

Burke [1984] noted that the epicentres of recent earthquakes in the NAP coincide with larger historical earthquakes; those regions that were lively in the past remain active today. The New Brunswick earthquake records show a clustering of earthquake epicentres in three sub-zones: Passamaquoddy Bay (PB); Central Highlands (CH); and MOncton (MO) [Burke, 2004]. Halchuk *et al.* [2004] calculated the maximum likelihood probability estimates for the three subzones with respect to the entire NAN. Activity rates were higher by a factor of two for the CH, higher by a factor of two to three for PB, and lower by a factor of 0.5 for MO (*n.b.*, MO was identified by Burke [1984] as a sub-zone because an earthquake with an  $M > 5$  was recorded there). The intraplate earthquakes in those three sub-zones are thought to be a result of either old fault line reactivation, the concentration of stress at pluton boundaries, or glaciostatic movements.

Significant Canadian earthquakes for the period 1600 to 2006 were catalogued by Lamontagne *et al.* [2007]. Of the 160 significant events, seven occurred within the NAP

(Table 47). The largest historically reported event for the NAP struck the PB sub-zone on 21 March 1904. Foreshocks and aftershocks accompanied that earthquake, which reportedly caused minor building damage (e.g., throwing of chimneys) and was felt throughout the Maritimes [Burke, 2013]. The 9 January 1982 Miramichi earthquake, which produced two sizeable aftershocks (i.e., an M 5.1 and an M 5.4, respectively, 3.5 hours and 2.5 days after the mainshock), was the most recent significant event and was also the most comprehensively studied in the NAP [Broster and Burke, 2011].

Table 47. Significant earthquakes recorded in New Brunswick between 1600 and 2006 as reported by Lamontagne et al. [2007].

Date	Sub-Zone*	Latitude (° N)	Longitude (° W)	Magnitude	Magnitude Type†
22 May 1817	PB	45.0	67.2	4.8	m <sub>N</sub>
8 February 1855	MO	46.0	64.5	5.2	m <sub>N</sub>
22 October 1869	CH	46.5	66.5	5.7	M <sub>f</sub> (IV)
21 March 1904	PB	45.0	67.2	5.9	M <sub>f</sub> (IV)
22 July 1922	CH	46.5	66.6	4.9	M <sub>FA</sub>
30 September 1937	CH	47.4	66.3	4.8	M <sub>FA</sub>
9 January 1982	CH	47.0	66.6	5.8	m <sub>N</sub>

NOTES:

\*PB = Passamaquoddy Bay, MO = MOncton, and CH = Caledonia Highlands

†m<sub>N</sub> = Nuttli or body wave magnitude, M<sub>FA</sub> = felt area magnitude, and M<sub>f</sub> (IV) = magnitude based on the Modified Mercalli Intensity IV area

Seismic threat studies for the NAP place most of New Brunswick in the moderate hazard range [Burke, 1984 and Broster and Burke, 2011]. When significant earthquakes strike, they can cause minor damage to buildings and some effects on natural features (e.g., floods from embankment failure, alteration to flow of rivers and springs, mass movements, tsunami along coasts, seiches in lakes, ground disturbance, etc.).

The Greater Saint John region is not considered to be within a defined active seismic zone. Statistics indicate that all of the recent earthquakes in the region have resulted in little significant damage (i.e., no considerable damage to structures). There is no evidence in the region to support any surface displacement in recent geologic time. It is likely that recent earthquakes in the region were a result of deep geological activity rather than shallow surface fault systems. Potential for disturbance and seismic activity within the region is considered low.

Standards dictate that all structures be designed and built to withstand earthquakes in the area (i.e., based on the probability of specific magnitude earthquakes within a specific return period). Those criteria ensure the integrity of the structure based on the level of earthquake risk in the area. If a minor earthquake were to occur in the area, construction on and / or operation of the Project site could be moderately affected. It is unlikely that a minor earthquake would cause extensive damage to Project structures. In the event of an extreme earthquake, the solar facility could receive damage such that it would not be economically feasible to repair; however, this is an unlikely event. An earthquake in between minor and extreme could cause moderate damage to Project structures, but it is likely that they could be repaired.

The Geological Survey of Canada regularly updates seismic hazard maps for Canada. The most recent edition of those maps was produced for the 2015 National Building Code Canada (NBCC; Figure 66). To determine the 2015 NBCC seismic hazard values at the Project site, Natural Resources Canada's seismic hazard calculator was used (<http://www.seismescanada.rncan.gc.ca/hazard-alea/interpolat/calc-en.php>). The ground motion probabilities are summarized in Table 48.

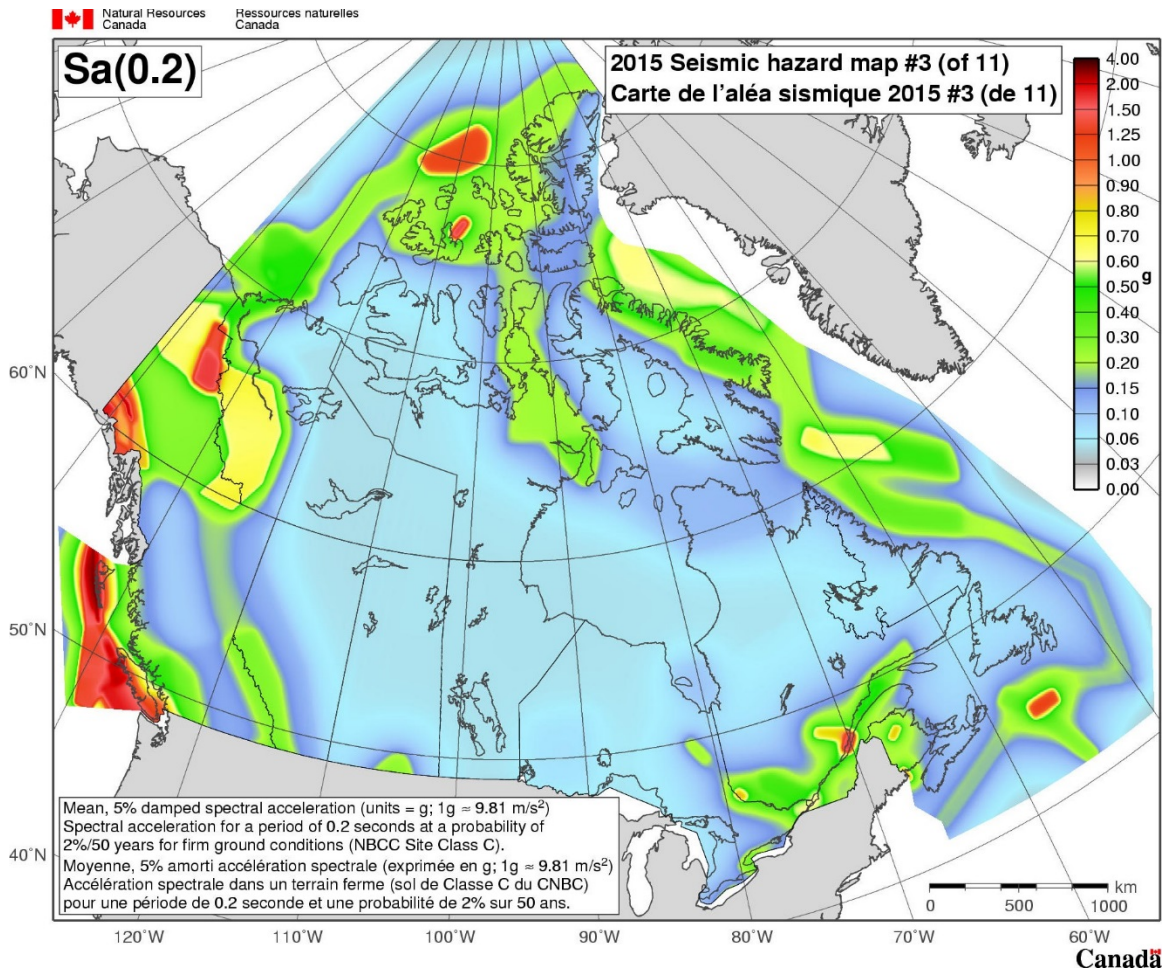


Figure 66. Spectral acceleration ( $S_a$ ) for a period of 0.2 s at a probability of 2% · 50 yr<sup>-1</sup> for firm ground conditions (*i.e.*, NBCC soil class C) from *Natural Resources Canada* [2016].

Table 48. 2015 National Building Code interpolated ground motions calculated for *The Crossing* proposed for east Saint John, New Brunswick using Natural Resources Canada's seismic hazard calculator.

Probability of exceedance per annum	0.010	0.0021	0.001	0.000404
Probability of exceedance in 50 years	40 %	10 %	5 %	2 %
Sa(0.2 s)	0.031 g	0.083 g	0.126 g	0.196 g
Sa(0.5 s)	0.021 g	0.054 g	0.078 g	0.119 g
Sa(1.0 s)	0.012 g	0.031 g	0.045 g	0.067 g
Sa(2.0 s)	0.005 g	0.015 g	0.023 g	0.034 g
Sa(5.0 s)	0.001 g	0.004 g	0.006 g	0.009 g
Sa(10.0 s)	0.001 g	0.002 g	0.002 g	0.004
Peak Ground Acceleration	0.017 g	0.049 g	0.077 g	0.122 g
Peak Ground Velocity	0.014 m · s <sup>-1</sup>	0.041 m · s <sup>-1</sup>	0.063 m · s <sup>-1</sup>	0.099 m · s <sup>-1</sup>

NOTES: Spectral and peak hazard values are determined for firm ground (NBCC 2015 soil class C: average shear wave velocity 450 m · s<sup>-1</sup>). The values were interpolated from a 10 km spacing grid of points. More than 95 % of the interpolated values yielded by the seismic hazard calculator are within 2 % of the calculated values.

#### 4.4.8 Sea Level Rise

Sea level rise estimates for Saint John County, based on information from the IPCC, are provided in *Daigle* [2017]. Total predicted changes are as follows:

- 0.17 m ± 0.07 m between 2010 and 2030;
- 0.31 m ± 0.14 m between 2010 and 2050;
- 0.86 m ± 0.38 m between 2010 and 2100; and
- 1.51 m + 0.38 m between 2010 and 2100 with 0.65 m increase related to potential rise due to the melting of the Antarctic Ice Sheet.

The Project site is inland from Courtenay Bay. Significant flooding of other sites downstream would have to occur before *The Crossing* is affected from sea level rise. If water levels at Courtenay Bay were to rise to a point where downstream infrastructure was affected (*i.e.*, Courtenay Bay Causeway), it is likely that work would be done to halt the inland advancement of the Bay.

Climate Central, Inc.'s coastal risk screening tool<sup>2</sup> was used to predict land projected to be below the 2030 (Figure 67), 2050 (Figure 68), and 2070 (Figure 69) annual flood level. The screening tool is used to identify the water level at the shoreline that local coastal floods exceed on average once annually. In the three figures, the red shaded areas reflect areas that are lower than the selected local sea-level and / or coastal flood projection; however, there is a caveat. The "bathtub" approach used by Climate Central, Inc.'s model does not account for areas whose elevation falls below the selected water level where ridges or other features protect them from inundation at that level. It also does not account for coastal defenses, such as levees. Water inundation from the Kennebecasis River at Drury Cove would only occur if water levels within the River were at ≥ 10 m. Also, water

<sup>2</sup>[https://coastal.climatecentral.org/map/14/-66.0149/45.3211/?theme=sea\\_level\\_rise&map\\_type=coastal\\_dem\\_comparison&elevation\\_model=coastal\\_dem&fbclid=IwAR3zAZglzh7IRIJEGDAkB1o39mOFq6cA8NIKjXAWgTcnlvfcu0QKcgHv\\_l&forecast\\_year=2070&pathway=rcp45&percentile=p50&return\\_level=return\\_level\\_1&slr\\_model=kopp\\_2014](https://coastal.climatecentral.org/map/14/-66.0149/45.3211/?theme=sea_level_rise&map_type=coastal_dem_comparison&elevation_model=coastal_dem&fbclid=IwAR3zAZglzh7IRIJEGDAkB1o39mOFq6cA8NIKjXAWgTcnlvfcu0QKcgHv_l&forecast_year=2070&pathway=rcp45&percentile=p50&return_level=return_level_1&slr_model=kopp_2014)

inundation from Courtenay Bay would have to exceed 6 m. As noted above, if water levels at Courtenay Bay were to rise to a point where downstream infrastructure was affected (*i.e.*, Courtenay Bay Causeway), it is likely that work would be done to halt the inland advancement of the Bay.

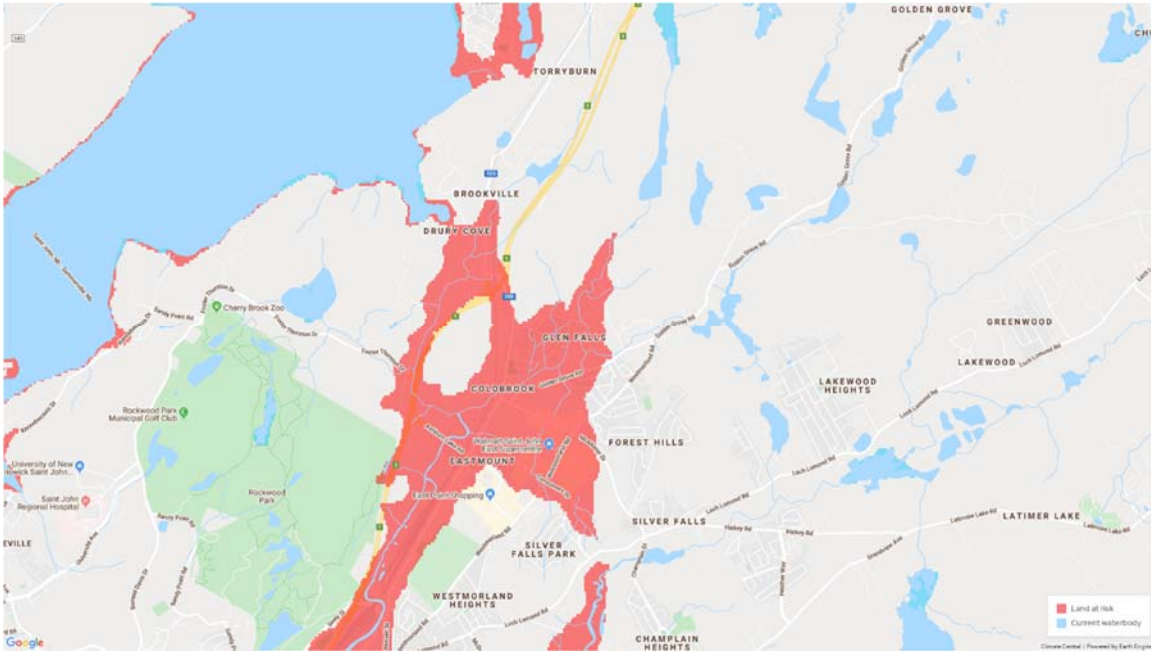


Figure 67. Land in east Saint John, New Brunswick at the location proposed for *The Crossing* that are projected to be below the 2030 annual flood level (*i.e.*, areas shaded red).

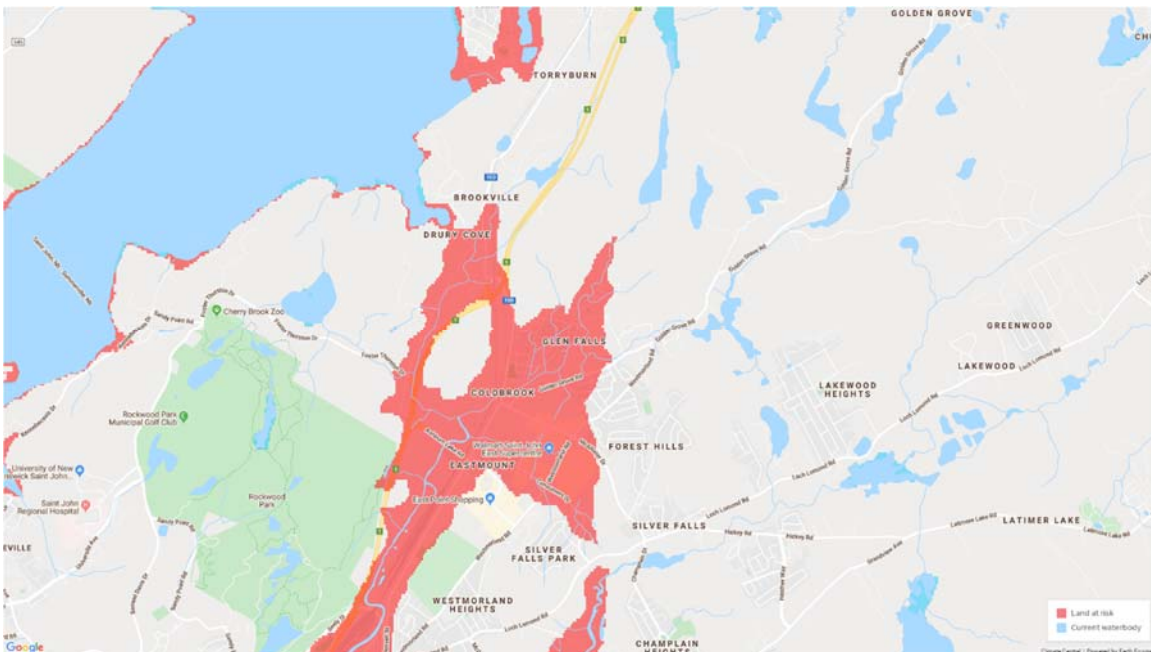


Figure 68. Land in east Saint John, New Brunswick at the location proposed for *The Crossing* that are projected to be below the 2050 annual flood level (*i.e.*, areas shaded red).

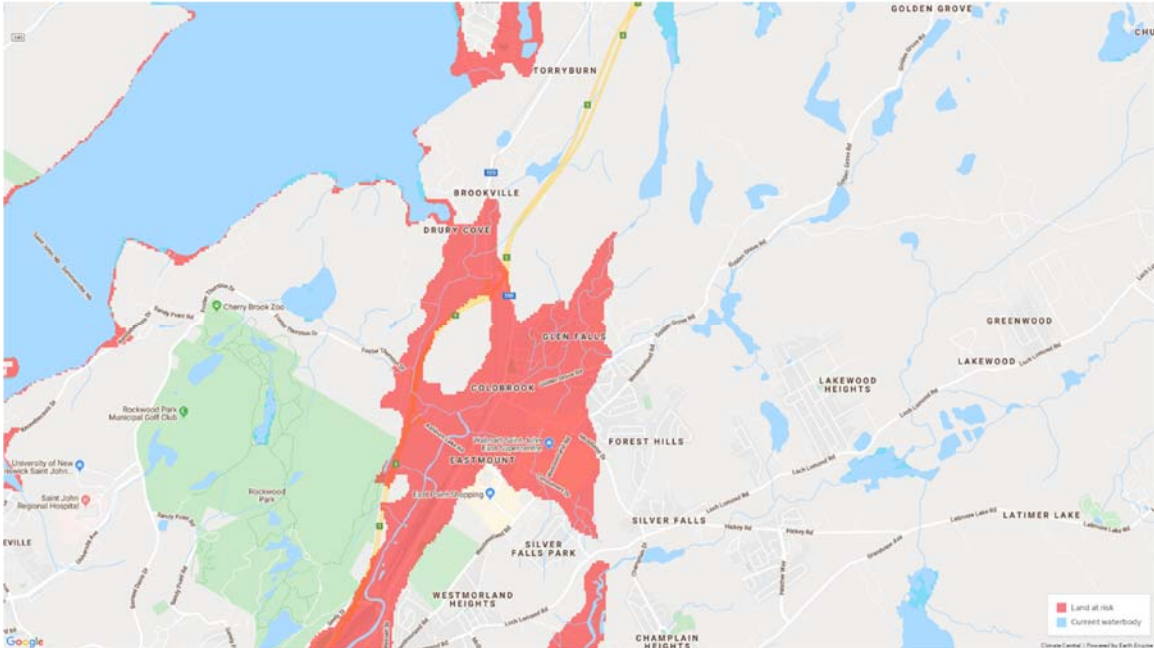


Figure 69. Land in east Saint John, New Brunswick at the location proposed for *The Crossing* that are projected to be below the 2070 annual flood level (*i.e.*, areas shaded red).

#### 4.4.9 Summary

Horizon Management will ensure design of the Project is in accordance to strict standards and codes. Through application of those criteria and implementation of the mitigation measures noted, the Project should withstand all impacts of the environment on it, even under a changing climate. Detailed mitigation strategies for potential impacts of the environment on the Project should be further discussed in the Project-specific EPP. In particular, the Project-specific EPP should ensure that there is:

- no long-term interruption in construction activities;
- no long-term interruption in scheduling of the Project;
- no long-term interruption in operation of the Project;
- no damage to infrastructure such that public health and safety are put at risk; and
- no change to infrastructure that would not be economically feasible to repair.

#### 4.5 PROJECT-SPECIFIC ENVIRONMENTAL PROTECTION PLAN

A Project-specific environmental protection plan was previously developed by Horizon Management (*i.e.*, refer to Appendix XII). The EPP is an important component to the overall Project because it will dictate the importance of Best-Management Practices (BMPs) that shall be undertaken by all those associated with the Project to ensure environmental protection. The EPP provides a practical means for conveying BMPs to Horizon Management for ensuring the implementation of the outlined standards and regulations throughout the entire Project. It will be a dynamic document to be used by

Project personnel in the field and at the corporate level for ensuring commitments made in the EIA are implemented and monitored.

More specifically, the purpose of the EPP is to:

- outline Horizon Management's commitments to minimize potential Project environmental impacts, including commitments made during the regulatory review process of the EIA;
- comply with conditions and requirements of an "EIA Approval", if and when issued;
- comply with the conditions of any authorization(s), license(s), and / or permit(s) issued to complete the project;
- provide a reference document for Horizon Management and all contractor personnel to use when planning and / or conducting specific Project activities; and
- provide a summary of environmental issues and protection measures to be implemented during the Project.

The EPP was developed in accordance with applicable federal and provincial environmental protection legislation and regulations. Horizon Management will continue to take a proactive approach toward creating a safe and secure work environment and maintain a system to manage environmental effects of the Project. They will identify health, safety, environmental, and security issues as part of the execution planning and manage the environmental effects of the Project and work in ways that are environmentally, economically, and socially justified and legally compliant. Specific health, environmental, safety, and security issues will be addressed in the execution plans and procedures for the Project.

Horizon Management understands that the EPP must be reviewed and approved by the NBDELG prior to commencing the Project.

## 5.0 FIRST NATION AND PUBLIC INVOLVEMENT

The NBDELG has a prescriptive process for undertaking First Nation and public involvement with respect to EIAs. This section describes the work that has been and will be done to involve First Nations, the public, and stakeholders in the EIA process. It identifies the meetings that have been held and who was consulted.

First Nation and public involvement is an important component of the Project. Horizon Management's goal is to notify and inform the public and stakeholders about the Project. As such, the public involvement plan is designed to inform and engage all rights-holders and all stakeholder groups about the Project in order to encourage participation and gather feedback from all interested parties, including questions and concerns about the Project. The overall goal is to ensure that those potentially affected by the Project are aware of the Project, able to obtain additional information and able to express any concerns they may have. The goal of the process is to gather input, identify potential issues, and ensure understanding of the Project among rights-holders and stakeholder groups.

*The Crossing* was registered for EIA review on 25 November 2016 (*i.e.*, EIA File 4561-3-1450). On-going First Nations, public, and stakeholder involvement have been occurring throughout the regulatory review process to collect feedback and enhance the Project's development.

### 5.1 PARTIES INCLUDED

#### 5.1.1 First Nations

The Project site is located within the traditional Maliseet territory of the Wolastoqiyik (*i.e.*, Figure 40). Section 35 of the *Constitution Act, 1982* [UK, 1982, c 11] "recognizes and affirms" the "existing" Aboriginal and treaty rights in Canada and the duty to consult. In New Brunswick, First Nations communities are rights-holders as opposed to stakeholders. As such, they require engagement.

Engagement with New Brunswick's First Nations communities must be done both early and often to ensure a true partnership or accession from them. Horizon Management discussed the Duty to Consult responsibilities with representatives from the New Brunswick Aboriginal Affairs Secretariat (AAS) (*i.e.*, Kimberley Allen and Fiona Deschenes). It was determined through those discussions that the Duty Consult would best be done through the EIA review process. In the 22 December 2016 TRC Letter (*i.e.*, refer to TRC1-4 of Appendix IX), representatives with the AAS offered the initial view that there will be no obligation regarding the Crown's Duty to Consult as there is no apparent adverse impact to Aboriginal or treaty rights. It was also noted in that letter that the St. Mary's First Nation has rights in this area.

The provincial government will consult with First Nations communities during the EIA review Process. To that end, a meeting was held with representatives of the AAS (*i.e.*, Patrick Francis and John Adams) on 4 August 2016. At that time, it was indicated that there are no apparent adverse impacts to Aboriginal or treaty rights; however, the Proponent understands that there is an obligation to further consult First Nations when obtaining Project permits, such as a Fisheries Authorization.



### 5.1.2 Local People, NGOs, and Community Groups

Fundy Engineering and Horizon Management will again reach out to local residents, Non-Government Organizations (NGOs) (*i.e.*, The Chamber, Enterprise Saint John, Uptown Saint John, and the Saint John Construction Association), and community groups (*i.e.*, ACAP Saint John, Conservation Council of New Brunswick, and Saint John Citizens' Coalition for Clean Air). These groups are generally direct conduits to the community. Related Project information will include:

- who is involved;
- what is the purpose of the proposed Project;
- where the proposed Project will occur;
- when the proposed Project will occur;
- why the proposed Project is being considered; and
- how the proposed Project will be undertaken.

ACAP Saint John, which has invested considerable time, effort, and funding into the restoration of Marsh Creek, is fully aware of the proposed Project. As part of the site characterization work, Horizon Management engaged ACAP Saint John in 2018 to conduct a watercourse assessment, which included fish surveys, of Little Marsh Creek.

### 5.1.3 Regulatory Agencies

The NBDELG, through the EIA regulation [87-83] of the *Clean Environment Act* [R.S.N.B. 1973, c. C-6] has regulatory jurisdiction over this Project.

## 5.2 PRE-REGISTRATION CONSULTATION

### 5.2.1 New Brunswick Department of the Environment and Local Government

Prior to registering a project, the NBDELG recommends discussing it with representatives of the Project Assessment Branch in order to:

- obtain advice and guidance on the submission of the EIA registration document and the review process;
- obtain information with respect to the possible timing and duration of the review for the EIA document; and
- provide the NBDELG personnel with advance notice of the anticipated timing for preparation and submission of the EIA document.

On 18 July 2016, a pre-registration consultation meeting was held between representatives of the NBDELG and Horizon Management (Table 49). That meeting was held at the NBDELG's head office (*i.e.*, in Fredericton, New Brunswick).

Table 49. Attendees of the pre-registration consultation meeting on 18 July 2016 regarding *The Crossing* proposed for east Saint John, New Brunswick.

Name	Affiliation
Bill Borland	Consultant
John Wheatley	Consultant
Shawn Hamilton, <i>P.Eng.</i>	Environmental Assessment Branch Project Manager, NBDELG
Paul Vanderlaan	Environmental Assessment Branch Director, NBDELG

### 5.3 PROJECT REGISTRATION CONSULTATION

It is the Proponent's responsibility to demonstrate that the potentially affected public and other stakeholders are given the opportunity to actively participate in the EIA review process. Fundy Engineering has developed an organized information dissemination program, whereby relevant, sufficient, and credible information is presented.

The public consultation plan for this Project was developed in accordance with the process described in Appendix C of *A Guide to Environmental Impact Assessment in New Brunswick* [NBDELG, 2018]. The step-wise process proposed for the public consultation plan for this EIA is described in detail below. Our process satisfies the component of the NBDELG EIA Determination Review Summary highlighted in Figure 70.

The public will continue to be informed of this project and the EIA registration document will be made available for review. Comments regarding the document will be collected and addressed as part of this process (*i.e.*, there is a two way flow of information between the proponent and the public with opportunities for the public to express their views).

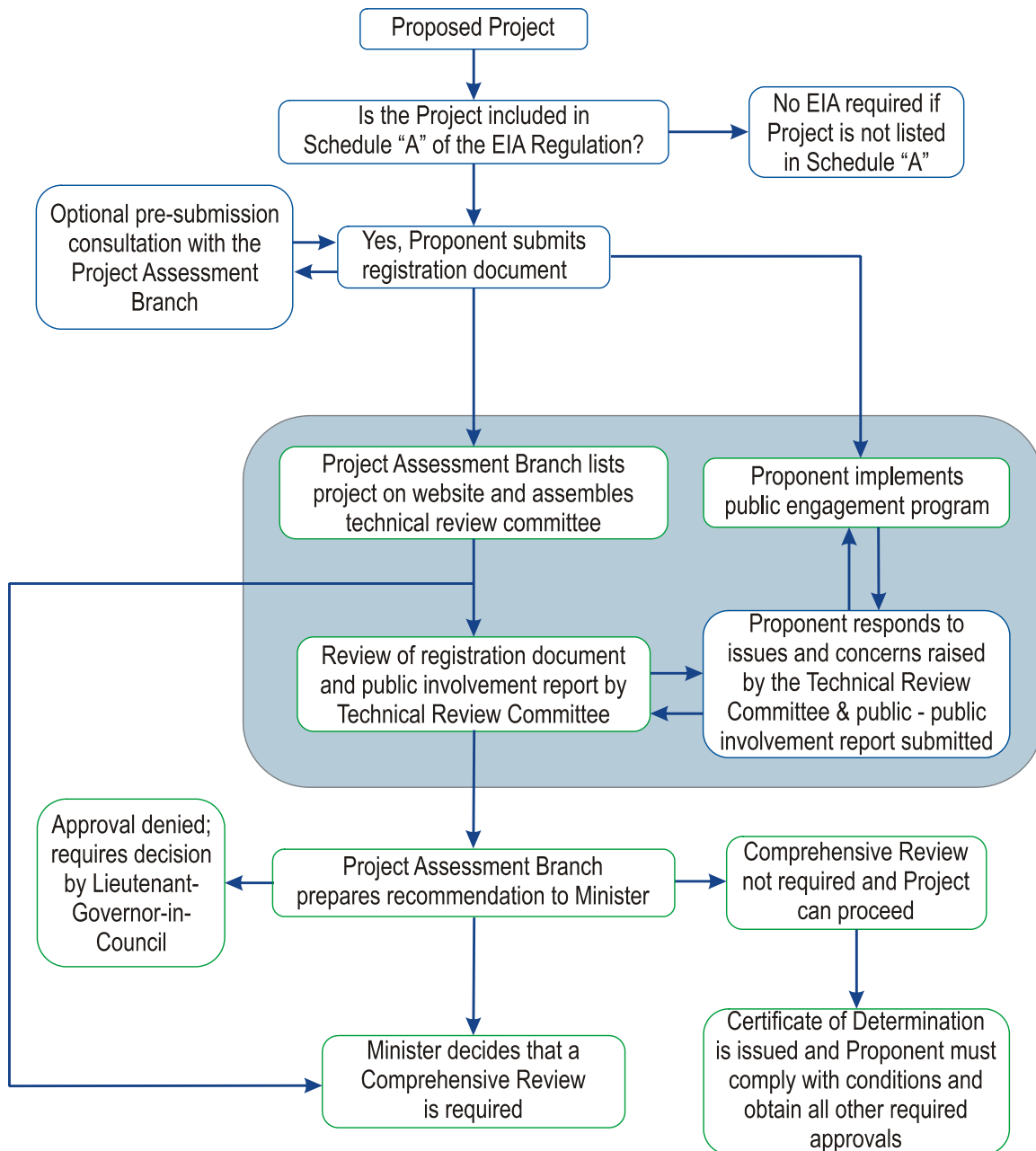


Figure 70. The NBDELG EIA Determination Review process highlighting the public consultation component of the process (i.e., the blue box).

### 5.3.1 NBDELG Consultation Meetings

Several meetings were held with NBDELG representatives after the EIA was registered on 25 November 2016. A brief summary of those meetings is provided in the sections below.

#### 5.3.1.1 22 March 2017

Horizon Management's original EIA consultant, Bill Borland, met with Christie Ward and Shelia Goucher, the newly appointed Project Manager, regarding the Project. The meeting was held in Fredericton at NBDELG's head office.

#### 5.3.1.2 25 October 2017

A meeting was convened at NBDELG's head office in Fredericton between TRC representatives and Proponent representatives from exp Services Ltd. and Dillon Consulting. The meeting was designed to address information related to the TRC's first round of questions. Regulatory authorities represented at the meeting included the NBDELG, DFO, ECCC, the Canadian Environmental Assessment Agency, NBTHC, AAS, City of Saint John, and NBDTI.

#### 5.3.1.3 1 June 2018

Bill Borland and John Wheatley met with Susan Dean, the newly appointed NBDELG Project Manager, in Fredericton at NBDELG's head office. The meeting was held to discuss the Project's overall status, the application review process, and next steps.

#### 5.3.1.4 12 September 2018

Bill Borland and John Wheatley met with Susan Dean in Fredericton regarding a revised EIA application and the modified layout proposal to avoid on-site regulated wetlands (*i.e.*, refer to Section 2.6.2.2).

#### 5.3.1.5 21 February 2019

Bill Borland and John Wheatley had a teleconference with Susan Dean to review the wetland trigger for the EIA review process. The Proponent wanted to understand the trigger's applicability since on-site wetlands were being avoided through the modified layout proposal.

#### 5.3.1.6 31 May 2019

Bill Borland and John Wheatley met with Susan Dean and David Maguire, Manager of the NBDELG's Environmental Impact Assessment Branch, in Fredericton to discuss the need to continue with the EIA process.

### 5.3.2 *Step 1: Direct Communication with Elected Officials, Local Service Districts, Community Groups, Environmental Groups, Key Stakeholders, and First Nations*

Formal notification of the Project registration document (*i.e.*, in the form of an information letter) was sent to elected officials (*i.e.*, local MLAs, Saint John Mayor, and City Councilors), local environmental groups (*i.e.*, ACAP Saint John and the Saint John Citizens' Coalition for Clean Air), and other key stakeholder groups (*i.e.*, the West Side Business Coalition, The Chamber (*i.e.*, the Saint John Region Chamber of Commerce). Direct communication enables those individuals and groups to become more familiar with the Project, ask questions, and / or raise any and all concerns.

### 5.3.3 Step 2: Direct Written Communication with First Nations, Area Residents, and Landowners

On 21 April 2017, Horizon Management mailed out a letter to 27 nearby residents describing the proposed development. A copy of that letter is included in Appendix XXIII. In response to the letter, 83 comments were received from eight individuals. All of the respondents were contacted with an offer for a face-to-face meeting to further discuss the Project and perhaps alleviate their concerns. Three respondents agreed to the offer and those meetings occurred between 15 and 27 June 2017. On 19 September 2017, the Proponent responded in writing to all of the public comments. A complete list of the public questions, responses, and updated responses is also included in Appendix XXIII.

Following submission of this updated EIA document, an additional limited mail out comprising a project information sheet will be mailed to nearby residents. They will be directed to where they can view the updated EIA document and asked for their feedback.

### 5.3.4 Step 3: Notifications on the NBDELG Website and at the Head Office

The NBDELG placed notice of the EIA registration on its website (*i.e.*, [https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental\\_impactassessment/registrations/2016.html](https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental_impactassessment/registrations/2016.html)) shortly following registration of the original EIA document on 25 November 2016. The Proponent also had hardcopies of the EIA document for public viewing delivered to the Project Assessment Branch head office located on the second floor of 20 McGloin Street in Fredericton, New Brunswick. It is expected that after this updated EIA document is submitted to the NBDELG that it will be placed on the website. The Proponent will also deliver updated EIA documents to the head office for public viewing.

### 5.3.5 Step 4: Documentation Availability with Stakeholder and NBDELG Offices

Copies of the original EIA Project registration document were made available to the public at the Saint John NBDELG regional office at 8 Castle Street. A copy of this updated EIA document will also be made available to the public at that NBDELG office.

### 5.3.6 Step 5: Public Notice Announcement

As required, a public notice was placed in at least one local newspaper that has general circulation in Saint John County and / or at least one provincial daily newspaper after the original EIA document was registered. Horizon Management placed an advertisement in the *Telegraph Journal* on 22 April 2017 and a copy of the advertisement is presented in Figure 71.



Figure 71. Environmental impact assessment public notice announcement that was placed by the Proponent in the Telegraph Journal on 22 April 2017.

### 5.3.7 Step 6: Local Area Availability of the Registered Document

Copies of the updated Project registration document, and any subsequent submissions made in response to issues raised by the TRC, will be made available in at least two locations local to the Project. Locations proposed for viewing the document locally include the Regional NBDELG Office (*i.e.*, 8 Castle Street) and Fundy Engineering's Saint John office (*i.e.*, 27 Wellington Row). A copy of the Project registration document and any subsequent information will be made available to any member of the public, stakeholder, and / or First Nations group upon request.

### 5.3.8 Step 7: Open House and / or Public Meeting

There is no requirement, under a Determination Review, to host an open house and / or public meeting.

Prior to registering the original EIA document for review, Horizon Management held a pair of Open Houses to announce the Project to the Greater Saint John community. On 7 and 8 March 2016, Open Houses were held at East Point's Media Room located off of Retail Drive in east Saint John. The sessions ran from 4 PM to 7 PM. Large-scale drawings on easels were set up so people could see the proposed development and ask questions to those staffing the sessions. It is estimated that about 100 people attended at least one of the Open Houses. Some of the general observations / comments received during the Open Houses were:

- over 90 % of attendees favoured the Project and believe it is a great Project that should start immediately because the City needs an economic boost;
- the developer has a great track record with the East Point development;
- unsure why other retail developments are complaining about this development;
- where exactly is the Project located;
- how will flood risk or impact will be managed in the area;
- how will existing traffic be impacted;
- why is another commercial node in the City needed;
- turn off the sky tracker lights at the East Point development; and
- why is housing being included when housing infill locations are already available in other areas of the City, such as Uptown.

First Nations were not specifically notified of the Open House. A Public Notice was sent out through local media (*i.e.*, radio, television, and print). Any impacts resulting from the Project would not extend to Aboriginal fisheries in the Bay of Fundy and / or surrounding areas.

#### 5.3.9 Step 8: *Documentation of Public Consultation Activities*

The NBDELG Minister (*i.e.*, the Honourable Jeff Carr) will only provide an EIA determination once sufficient information has been received. This includes documentation of First Nations, public, and stakeholder concerns and Proponent responses. On 19 September 2017, Horizon Management submitted a public involvement summary to the NBDELG regarding the original EIA registration document (*i.e.*, refer to Appendix XXIII for a copy of the public involvement summary). The report:

- describes the public consultation activities including copies of newspaper notices, and letters distributed;
- identifies the key public and private stakeholders including First Nations that were directly contacted during the public consultation process;
- included copies of any and all correspondence received from and sent to stakeholders and the general public;
- described any issues or concerns received during the public consultation program, which included the names and affiliations of the person(s) providing the comments;
- indicated how those issues and concerns were, or will be, considered and / or addressed; and
- described any proposed future public consultation with respect to the Project.

Horizon Management will adhere to the report requirements listed above regarding the updated EIA document.

## 6.0 PROJECT APPROVAL

Much of the information contained in this EIA document is in the conceptual design phase. Horizon Management recognizes that the EIA is the first step in the regulatory approval process (*i.e.*, it gives approval to prepare and submit permits for further regulatory approval). Once EIA approval is granted, Horizon Management will undertake detailed design engineering for Phase 1 of the Project. Once that detailed design is completed, the Proponent will apply for further regulatory permits to allow construction and operation. The regulatory permits / authorizations believed to be necessary for the Project are provided below; however, additional permits / authorizations may be required depending on final engineering design and / or legislative changes.

### 6.1 MUNICIPAL APPROVAL

#### 6.1.1 Re-Zoning

As per Part 3, Division C of the New Brunswick *Community Planning Act* [**S.N.B. 2017, c.19**], the City of Saint John, upon the adoption of a municipal plan, shall enact a Zoning By-Law. On 15 December 2014, ZoneSJ (*i.e.*, the Zoning By-Law of the City of Saint John) was enacted. The Zoning By-Law [**C.P. 111**] prescribes the use, placement, erection, and / or alteration of land, buildings, or structures within specific zones within the City. A zoning by-law amendment (*i.e.*, re-zoning) is required when a proposed use does not conform to the stipulated zoning. Re-zoning applications are administered through the *City of Saint John One-Stop Development Shop*.

A copy of the New Brunswick *Community Planning Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>;

a copy of the City of Saint John Zoning By-Law can be found at:

[https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20\(Office%20Consolidation%20October%202016\).pdf](https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20(Office%20Consolidation%20October%202016).pdf); and

a copy of the City of Saint John Zoning By-Law Amendment Form can be found at:

<https://www.saintjohn.ca/site/media/SaintJohn/Planning%20Development%20Application%20Form%202015.pdf>.

Contact information for the *City of Saint John One-Stop Development Shop* is as follows:

Growth & Community Development Services  
 One Stop Development Shop  
 10<sup>th</sup> Floor, City Hall  
 15 Market Square  
 PO Box 1971  
 Saint John, NB  
 E2L 4L1

📞 506.658.2911

🌐 <http://www.saintjohn.ca/en/home/cityhall/developmentgrowth/default.aspx>

✉ [onestop@saintjohn.ca](mailto:onestop@saintjohn.ca)



Based on the zoning of the Project's properties (*i.e.*, Table 1), the existing conditional zoning (*i.e.*, CC and RM) appears to align with the proposed use; however, there may be some instances where zoning will have to change to accommodate the proposed use. Table 50 summarizes the permitted uses within some of Saint John's zones. The zones listed are likely those that will be required to meet the contemplated uses.

Table 50. Permitted uses based on zoning in the City of Saint John, New Brunswick.

Zone	Permitted Uses*
Business Park Commercial (CBP)	Accommodations; Bar, lounge, nightclub; Business office; Business support service; Commercial group; Communication facility; Daycare centre; Distribution facility; Dwelling unit; Financial service; Health and fitness facility; Health services laboratory; Industrial use; Medical clinic; Personal service; Recreation facility; Research and development facility; Restaurant; Retail convenience; Technical or vocational school; and Warehouse facility
Corridor Commercial (CC)	Accommodations; Animal shelter; Auction house; Bakery; Banquet hall; Bar, lounge, or nightclub; Business office; Business support service; Car wash; Catering service; Commercial entertainment; Commercial group; Communication facility; Household contractor services; Daycare centre; Distribution facility; Emergency services facility; Light equipment sales and rental; Financial service; Fleet service; Funeral service; Grocery store; Health and fitness facility; Health services laboratory; Kennel; Landscape material supply; Medical clinic; Moving services; Personal service; Pet grooming; Private club; Large and small recreational vehicle sales and service; Recycling bins; Redemption centre; Restaurant; General retail; Model home sales centre; Self-storage facility; Household service and repair; Service station; Technical or vocational school; Transit terminal; Vehicle body and paint shop; Vehicle rental; Vehicle repair garage; Vehicle sales and leasing; Veterinary clinic; and Warehouse facility
Light Industrial (IL)	Animal shelter; Business support service; Car wash; Household contractor service; Distribution facility; Heavy equipment sales and rental; Fleet service; Kennel; Landscape material supply; Light industrial use; Large and small recreational vehicle sales and service; Redemption centre; Research and development facility; Model home sales centre; Self-storage facility; Special industrial use; Vehicle body and paint shop; Vehicle repair shop, Incidental vehicle sales; and Warehouse facility
Mid-Rise Residential (RM)	Bed and breakfast; Daycare (home and neighbourhood); Group dwelling; Cluster townhouse; Multiple dwelling; One-unit dwelling; Semi-detached dwelling; Townhouse; Two-unit dwelling; Garden suite; Home occupation; Rooming house; Supportive facility; and Supportive housing
Park (P)	Agricultural use; Bed and breakfast; Cemetery; Community centre; Daycare centre; Existing dwelling; Equestrian facility; Farmers market; Home occupation; Interpretive centre; Recreation facility; Restaurant without a lounge; Supportive housing; and Zoo

Notes:

From The City of Saint John Zoning By-law 2014, Office Consolidation 31 October 2016

### 6.1.2 Excavation Permit

As per the New Brunswick *Community Planning Act* [S.N.B. 2017, c.19] and the Zoning By-Law of the City of Saint John [C.P. 111], an excavation permit is required to excavate land within the municipality. The permit is administered through the *City of Saint John One-Stop Development Shop*.

A copy of the New Brunswick *Community Planning Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>>;

a copy of the City of Saint John Zoning By-Law can be found at:

[https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20\(Office%20Consolidation%20October%2031,%202016\).pdf](https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20(Office%20Consolidation%20October%2031,%202016).pdf); and

a City of Saint John Excavation Permit application form can be found at:

<https://www.saintjohn.ca/site/media/SaintJohn/Fillable%20APPLICATION%20FOR%20PERMIT%20TO%20EXCAVATE%20LAND.pdf>.

Contact information for the *City of Saint John One-Stop Development Shop* is provided in Section 6.1.1.

Excavations required for access road construction, foundations, and bedrock removal may require the Proponent to obtain an excavation permit from the City of Saint John; however, consultations with City representatives will have to be done to confirm this.

### 6.1.3 Flood Risk Area Development Permit

As per Part 4, Division E of the New Brunswick *Community Planning Act* [S.N.B. 2017, c.19] and the Flood Risk Area By-Law of the City of Saint John [CP-11], a permit is required when building within a flood risk area of the City of Saint John (*i.e.*, Kelly Lake, Glen Falls, Lower Marsh Creek, and Indiantown; Figure 72). The permit is administered through the *City of Saint John One-Stop Development Shop*.

A copy of the New Brunswick *Community Planning Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>;

a copy of the City of Saint John Flood Risk Area By-Law can be found at:

<http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&dbid=0&repo=CityofSaintJohn>; and

a City of Saint John Flood Risk Area Development Permit application form can be found at:

[https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20\(English\).pdf](https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf).

Contact information for the *City of Saint John One-Stop Development Shop* is provided in Section 6.1.1.

The Project area is located within the Glen Falls and Lower Marsh Creek Flood Risk Areas of Saint John. Building within those areas requires analysis of flood risk and volume and purchase of compensatory storage. Horizon Management is proposing to develop buildings within the Glen Falls Flood Risk Area and provide compensatory storage within the Glen Falls and the Lower Marsh Creek Flood Risk Areas. It is understood that the By-Law requires that compensatory storage be provided at the same time as development occurs within either Flood Risk Area.



Figure 72. Aerial photograph, circa 2004, showing blue boxes that denote flood risk areas of Saint John, New Brunswick.

#### 6.1.4 *Blasting Approval*

Part 2 of the New Brunswick *Local Governance Act* [**S.N.B. 2017, c.18**], rock blasting activities require approval within a municipality. Blasting activities are controlled under the Blasting Code Approval Regulation [**89-108**] of the *Act*. The Zoning By-Law [**C.P. 111**] of the City of Saint John prescribes information that blasting activities must adhere to. Representatives with Saint John's Approval is administered through the *City of Saint John One-Stop Development Shop*.

A copy of the New Brunswick *Local Governance Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.18.pdf>;

a copy of the Blasting Code Approval Regulation be found at:

<http://laws.gnb.ca/en/ShowPdf/cr/89-108.pdf>;

a copy of the City of Saint John Zoning By-Law can be found at:

[https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20\(Office%20Consolidation%20October%2031,%202016\).pdf](https://www.saintjohn.ca/site/media/SaintJohn/The%20City%20of%20Saint%20John%20Zoning%20By-law%20(Office%20Consolidation%20October%2031,%202016).pdf); and

Contact information for the *City of Saint John One-Stop Development Shop* is provided in Section 6.1.1.

#### 6.1.5 *Building Permit*

Pursuant to Part 4, Division B of the New Brunswick *Community Planning Act* [**S.N.B. 2017, c.19**], a building permit must be obtained prior to the construction, relocation, demolition, and / or altering of any structures on land within a municipality. Building Permits in Saint John are administered through the *City of Saint John One-Stop Development Shop*.

A copy of the New Brunswick *Community Planning Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>; and

an application for a building permit can be found at:

[https://www.saintjohn.ca/site/media/SaintJohn/One-Stop%20General%20Application%20\(English\).pdf](https://www.saintjohn.ca/site/media/SaintJohn/One-Stop%20General%20Application%20(English).pdf).

Contact information for the *City of Saint John One-Stop Development Shop* is provided in Section 6.1.1.

A building permit will be required to build any structures (e.g., buildings, substations, etc.) associated with the Project within Saint John's municipal boundaries.

## 6.2 PROVINCIAL APPROVAL

### 6.2.1 *Environmental Impact Assessment Approval*

As per Schedule A, item v) (*i.e.*, all enterprises, activities, projects, structures, works, or programs affecting two hectares or more of bog, marsh, swamp, or other wetland...) of the Environmental Impact Assessment Regulation [87-83] of the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6], this Project triggers an EIA review. As previously noted, the purpose of an EIA is to identify and evaluate the potential impacts that the proposed Project will have on the environment. The EIA also identifies and presents measures to mitigate those potential environmental impacts.

A copy of the New Brunswick *Clean Environment Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/C-6.pdf>; and

a copy of the EIA Regulation can be found at:

<http://laws.gnb.ca/en/ShowPdf/cr/87-83.pdf>.

Contact information for the NBDELG's Environmental Assessment Section of the Sustainable Development and Impact Evaluation Branch is as follows:

NBDELG  
 Environmental Assessment  
 Sustainable Development and Impact Evaluation  
 PO Box 6000  
 Fredericton, NB  
 E3B 5H1

☎ 506.444.5382  
 📠 506.453.2627  
 🌐 [www.gnb.ca/environment](http://www.gnb.ca/environment)  
 ✉ [eia-eie@gnb.ca](mailto:eia-eie@gnb.ca)

### 6.2.2 *Environmental Protection Plan*

Refer to Section 4.5 for a summary of the Environmental Protection Plan and Appendix XII for a copy of Horizon Management's EPP document.

### 6.2.3 *Provincial Species At Risk Act Permit*

As per the New Brunswick *Species At Risk Act* [S.N.B. 2012, c.6], it is illegal to kill, harm, harass, take, possess, buy, sell, or trade a species listed under the *Act* as extirpated, endangered, or threatened. Several species are ranked under the List of Species at Risk Regulation [2013-38] of the provincial *Species At Risk Act* (pSARA). Should impacts be required to a species listed as extirpated, endangered, or threatened and / or designated habitat, it must first be authorized through a pSARA Permit. The NBDNRED administers the pSARA.

A copy of the New Brunswick *Species at Risk Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/2012-c.6.pdf>>;

a copy of the List of Species at Risk Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/2013-38.pdf>>; and

the public registry can be found at:

<<https://www1.gnb.ca/0078/SpeciesAtRisk/search-e.asp>>.

Contact information for the Habitat, Species at Risk, and Protected Natural Areas Section is as follows:

Habitat, Species at Risk,  
and Protected Natural Areas Section  
Fish and Wildlife Branch  
Hugh John Flemming Forestry Centre  
PO Box 6000  
Fredericton, New Brunswick  
E3B 5H1

☎ 506.453.3826

☎ 506.453.6699

🌐 [http://fetenbday.gnb.ca/content/gnb/en/departments/erd/natural\\_resources/content/wildlife/content/SpeciesAtRisk.html](http://fetenbday.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/wildlife/content/SpeciesAtRisk.html)

✉ [dnr\\_mrnweb@gnb.ca](mailto:dnr_mrnweb@gnb.ca)

As listed in Table 18, there are several species listed as being of special concern, endangered, or threatened under the pSARA that may be present at the Project site. If a listed species is identified as being present during construction activities and it may be impacted, then a pSARA Permit would be required.

#### 6.2.4 *Watercourse and Wetland Alteration Permit*

New Brunswick's watercourses and wetlands are afforded protection under the WAWA Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1]. Any proposed alterations within watercourses and / or wetlands, or within their 30 m regulated buffer, require permitting through the NBDELG's WAWA program.

A copy of the New Brunswick *Clean Water Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/C-6.1.pdf>>;

a copy of the WAWA Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf>>;

the WAWA application portal can be found at:

<<https://www.elqegl.gnb.ca/WAWAG/en/Home/Site>>; and

a copy of the WAWA technical guidelines can be found at:

<<https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/WatercourseWetlandAlterationTechnicalGuidelines.pdf>>.

Contact information for the NBDELG WAWA program is as follows:

NBDELG  
Surface Water Protection  
Sustainable Development and Impact Evaluation  
Marysville Place  
PO Box 6000  
Fredericton, NB  
E3B 5H1

📞 506.457.4850

📠 506.453.6862

🌐 <http://www2.gnb.ca/content/gnb/en/departments/elg/environment.html>

✉ [elg/egl-info@gnb.ca](mailto:elg/egl-info@gnb.ca)

Little Marsh Creek and its contiguous wetland are prominent features on portions of the properties proposed for development. Those features and their 30 m regulated buffers will be partially impacted as a result of this Project. For example, there will be at least two crossings of Little Marsh Creek to access *The Crossing* from Ashburn Road. Therefore, a WAWA permit will be required before any impact can occur to those features and / or their 30 m regulated buffers. It is likely that this will be a condition of EIA approval.

### 6.2.5 Highway Usage Permit

As per the Highway Usage Regulation [2010-55] of the New Brunswick *Highway Act* [R.S.N.B. 1973, c. H-5], a highway usage permit is required when carrying out any development, construction, repair, or maintenance within the limits of a roadway under NBDTI jurisdiction. Any work that occurs within the right-of-way of a provincial road must conform to the guidelines prescribed in the Work Area Traffic Control Manual (WATCM).

A copy of the New Brunswick *Highway Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/H-5.pdf>>;

a copy of the Highway Usage Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/2010-55.pdf>>; and

a copy of the WATCM can be found at:

<[https://www2.gnb.ca/content/dam/gnb/Departments/trans/pdf/en/RoadsHighways/WATCM/WATCM2015\\_Revised\\_Manual\\_EN.pdf](https://www2.gnb.ca/content/dam/gnb/Departments/trans/pdf/en/RoadsHighways/WATCM/WATCM2015_Revised_Manual_EN.pdf)>.

The Highway Usage Regulation provides information on what information is required to apply for a Highway Usage Permit. The permit can be made through the NBDTI Saint John district office.

Contact information for the NBDTI Saint John district office is as follows:

NBDTI  
 % Mr. Peter McDonald  
 Manager Highway Corridor Management  
 Kings Place  
 PO Box 6000  
 Fredericton, NB  
 E3B 5H1

📞 506.453.3939  
 📠 506.444.5653  
 🌐 [https://www2.gnb.ca/content/gnb/en/departments/dti/district\\_offices.html](https://www2.gnb.ca/content/gnb/en/departments/dti/district_offices.html)  
 ✉️ [Peter.McDonald@gnb.ca](mailto:Peter.McDonald@gnb.ca)

### 6.2.6 Access Road Permit / Certificate of Setback

As per the Provincial Set-Back Regulation [84-292] of the New Brunswick *Community Planning Act* [S.N.B. 2017, c.19], an access road permit or certificate of setback is required when constructing a new access road, using an existing access road, or building a structure near roadways under NBDTI jurisdiction. Permits / certificates are administered by NBDTI district offices.

A copy of the New Brunswick *Community Planning Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>>; and

a copy of the Provincial Set-Back regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/84-292.pdf>>.

Contact information for the NBDTI Saint John district office is as follows:

NBDTI  
 District 4, Saint John Office  
 % Mr. Alan Kerr  
 Special Projects  
 50 Crown Street, Suite 105  
 Saint John, NB  
 E2L 2X6

📞 506.643.7463  
 📠 506.643.7464  
 🌐 [https://www2.gnb.ca/content/gnb/en/departments/dti/district\\_offices.html](https://www2.gnb.ca/content/gnb/en/departments/dti/district_offices.html)  
 ✉️ [alan.kerr@gnb.ca](mailto:alan.kerr@gnb.ca)

### 6.2.7 Heritage Site Alteration Permit

Historic places in New Brunswick are protected under the *Heritage Conservation Act* [O.C. 2010-453]. Unauthorized alteration of any archaeological, paleontological, buried heritage objects, and / or Provincial Heritage Places in New Brunswick is strictly prohibited under



the *Act*. The Project lands located along Rothesay Avenue, as noted in the AFW [2018] report (*i.e.*, refer to Section 3.3.2), are an area of elevated archaeological potential. Should there be plans for development of the Project lands located along Rothesay Avenue, then there may be need for obtaining Heritage Site Alteration Permit (HSAP).

A copy of the *Heritage Conservation Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/H-4.05.pdf>>.

Information on the conservation of heritage sites and heritage objects can be found at:

<[https://www2.gnb.ca/content/gnb/en/departments/thc/heritage/content/heritage\\_conservationact/conservation.html](https://www2.gnb.ca/content/gnb/en/departments/thc/heritage/content/heritage_conservationact/conservation.html)>.

Contact information for the New Brunswick Heritage Branch of the NBDTHC is as follows:

Department of Tourism, Heritage, and Culture  
Centennial Building  
PO Box 6000  
Fredericton, NB  
E3B 5H1

📞 506.453.3115

📠 506.457.4984

🌐 <https://www2.gnb.ca/content/gnb/en/departments/thc.html>

✉ [thctpcinfo@gnb.ca](mailto:thctpcinfo@gnb.ca)

### 6.2.8 Food Premises License

As per the Food Premises Regulation [2009-138] of the *Public Health Act* [S.N.B. 1998, c. P-22.4], food service establishments in New Brunswick require approval and licensing before serving food to the public. Depending on the types of food prepared and sold and the ways foods are handled, food premises licenses are divided into three classes: Class 3; Class 4; and Class 5. Any food establishments that are part of *The Crossing* will require approval and licensing.

A copy of the *Public Health Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/P-22.4.pdf>>;

a copy of the Food Premises Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/2009-138.pdf>>;

a guide to the food premises licensing can be found at:

<<https://www.pxw1.snb.ca/snb7001/e/1000/CSS-FOL-35-1762E.pdf>>; and

an application for a Food Premises License can be found at:

<<https://www.pxw1.snb.ca/snb7001/b/1000/CSS-FOL-35-1762B.pdf>>.

Contact information for Saint John Regional office of the New Brunswick Department of Health is as follows:

Department of Health  
 Saint John Regional Office  
 PO Box 93  
 Saint John, NB  
 E2L 3X1

📞 506.658.3022  
 📠 506.643.7894  
 🌐 [https://www2.gnb.ca/content/gnb/en/contacts/dept\\_renderer.141.2281.202479.2282.200507.2378.html](https://www2.gnb.ca/content/gnb/en/contacts/dept_renderer.141.2281.202479.2282.200507.2378.html)  
 ✉️ <http://www.gnb.ca/0051/mail-e.asp>

### 6.2.9 *Vehicle Dimensions and Mass and Special Permit Fees*

The sizing of vehicles and their loadings on roadways in the Province is controlled under the Vehicle Dimensions and Mass Regulation [**2001-67**] of the *Motor Vehicle Act* [**R.S.N.B. 1973, c. M-17**]. All trucks used for the Project must adhere to the legal load weights limits at all times, including spring weight restrictions. If a truck exceeds dimensions and / or mass for a roadway, then there is a requirement to obtain permission under the Special Permit Fees Regulation [**89-65**] of the *Act*.

A copy of the *Motor Vehicle Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/M-17.pdf>>;

a copy of the Vehicle Dimensions and Mass Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/2001-67.pdf>>;

a copy of the Special Permit Fees Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/89-65.pdf>>; and

an application for a Special Permit can be found at:

<<https://www.pxw1.snb.ca/snb9000/product.aspx?ProductID=A001PTI023a>>.

Contact information for the NBDTI Saint John district office is as follows:

NBDTI  
 Saint John District Office  
 50 Crown Street, Suite 105  
 Saint John, NB  
 E2L 2X6

📞 506.643.7463  
 📠 506.643.7464  
 🌐 [https://www2.gnb.ca/content/gnb/en/departments/dti/district\\_offices.html](https://www2.gnb.ca/content/gnb/en/departments/dti/district_offices.html)  
 ✉️ [transportation.web@gnb.ca](mailto:transportation.web@gnb.ca)

## 6.3 FEDERAL APPROVAL

### 6.3.1 Fisheries Authorization

Changes were introduced to the *Fisheries Act* [R.S.C., 1985, c. F-14] in 2015, which came into force in August 2019. Although the changes reduce the regulatory requirements for undertaking works in fish-bearing waters, they increase the focus on managing threats to the sustainability and ongoing productivity of fisheries. The *Fisheries Act* requires that projects avoid causing serious harm to fish unless authorized by the Minister. Section 35 prohibits causing serious harm to fish that are part of or that support a commercial, recreational, or Aboriginal fishery.

A copy of the federal *Fisheries Act* can be found at:

<https://laws.justice.gc.ca/PDF/F-14.pdf>.

Any potential impact to fish-bearing waters requires approval through a Fisheries Authorization. An applicant's guide to submitting a Fisheries Authorization application can be found at:

[http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/Applicant\\_Guide-Guide\\_autorisation-eng.pdf](http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/Applicant_Guide-Guide_autorisation-eng.pdf); and

an application for a Fisheries Authorization can be found at:

[http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/Authorizations-Form-eng\\_2015-01-23.pdf](http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/Authorizations-Form-eng_2015-01-23.pdf).

Contact information for the DFO is as follows:

Fisheries Protection Program  
Fisheries and Oceans Canada  
343 University Avenue  
Moncton, New Brunswick  
E1C 9B6

① 506.851.2824

☎ 506.851.6579

🌐 <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/index-eng.htm>

✉ [gulfhabitatgolfe@dfo-mpo.gc.ca](mailto:gulfhabitatgolfe@dfo-mpo.gc.ca)

Little Marsh Creek is a 4.22 km long tributary to Marsh Creek. Both watercourses are known to support fish and fish habitat. During development, Little Marsh Creek or some of the drainage courses that flow into it and / or their 30 m regulated buffers will be impacted. For example, there will be at least two crossings of Little Marsh Creek to access *The Crossing* from Ashburn Road. A Fisheries Authorization will be required before any work can be done within 30 m of any watercourse within the development lands. It is likely that this will be a condition of EIA approval.

It is understood that First Nations consultation is a component of the work required to obtain a Fisheries Authorization; however, it is recognized that representatives with the Department of Fisheries and Oceans serve as the coordinator for consultations.

### 6.3.2 Federal Species At Risk Act Permit

As per the federal *Species At Risk Act* [S.C. 2002, c. 29], it is illegal to kill, harm, harass, possess, capture, or take a species listed under the *Act* as extirpated, endangered, or threatened. Also, it is illegal to damage or destroy a residence or any part of critical habitat for a species listed as extirpated, endangered, or threatened under the federal *Species At Risk Act* (fSARA). Should impacts be required to a species listed as extirpated, endangered, or threatened and / or its habitat, it must first be authorized through an fSARA Permit as per the Permits Authorizing an Activity Affecting Listed Wildlife Species Regulations [SOR/2013-140]. Because of the broad range of species that fall under the fSARA, there are several regulatory authorities, including, DFO, and Parks Canada. The fSARA public registry provides information related to SARA listed species.

A copy of the federal *Species At Risk Act* can be found at:

<https://laws.justice.gc.ca/PDF/S-15.3.pdf>;

a copy of the Permits Authorizing an Activity Affecting Listed Wildlife Species Regulations can be found at:

<https://laws-lois.justice.gc.ca/PDF/SOR-2013-140.pdf>; and

the fSARA public registry can be found at:

<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>.

Contact information for the Public Registry Office is as follows:

Species at Risk Public Registry Office  
351 St. Joseph Boulevard, 21<sup>st</sup> Floor  
Gatineau, Quebec  
K1A 0H3

☎ 800.668.6767

☎ 819.953.2225

🌐 <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

✉ [ec.registrellep-sararegistry.ec@canada.ca](mailto:ec.registrellep-sararegistry.ec@canada.ca)

As listed in Table 17, there are several species listed as being of special concern, endangered, or threatened under the fSARA that may be present at the Project site. If a listed species is identified as being present during construction activities and it may be impacted, then an fSARA Permit would be required.

## 7.0 FUNDING

The entire capital cost for this Project will be funded by the Proponent. It is anticipated that the total capital expenditure will be in the tens of millions of dollars with the exact amount being dependent on the overall tenant mix. No provincial or federal monies are being used for this Project.

Horizon Management will be discussing roadway and municipal services (*i.e.*, water and sanitary sewer) cost-sharing with the City of Saint John.

The highway interchange at Ashburn Lake Road that is described in the *exp Services Inc.* [2017a] Traffic Impact Study (*i.e.*, refer to Appendix X), will be funded by the Province.

## 8.0 SIGNATURES

This Project Environmental Impact Assessment was prepared in accordance with the Environmental Impact Assessment Regulation [87-83] under the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6] and on the advice of and in consultation with the various Regulators. Fundy Engineering & Consulting Ltd. prepared the document on behalf of Horizon Management Ltd. The Proponent has reviewed the document and understands the information contained within. Horizon Management Ltd. commits to undertaking all environmental mitigation measures described within this Environmental Impact Assessment document and those mitigation measures.

Respectfully submitted,

*Proponent Signature:*

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**Mr. John Wheatley**  
**Business Development**  
**Horizon Management Ltd.**

*Environmental Consultant Signature:*



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**Dr. Matt Alexander, P.Geo., EP**  
**Environmental Scientist**  
**Fundy Engineering & Consulting Ltd.**

**17 December 2019**

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## 10.0 GLOSSARY

**Aboriginal Peoples:** are the indigenous peoples recognized in the *Canadian Constitution Act*, 1982.

**airshed:** a geographical area that shares the same air mass due to topography, meteorology, and / or climate and as a result, it behaves in a coherent way with respect to the dispersion of emissions.

**anadromous:** fish that hatch and rear in freshwater, migrate to the ocean to grow and mature, and then migrate back to freshwater to spawn and reproduce.

**anthropogenic:** caused by human activity.

**aquifer:** a saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic conditions.

**archaeological and cultural features:** all evidence of human occupation that comes out of the ground or underwater or on the ground, including shell middens, fishing stations, large First Nation villages, sugar-bush camps, shipbuilding yards, trading posts, shipwrecks, cemeteries, military forts, and a variety of other locations where humans, both long ago and more recently.

**avian:** a bird.

**baseline:** background or pre-activity data that can be used for comparison when conducting further analyses.

**bedrock:** solid rock encountered below the soil or any other unconsolidated cover that occurs on the Earth's surface.

**Best Management Practices (BMPs):** techniques used to guide design and construction of an Undertaking to minimize adverse environmental impacts.

**brownfield:** abandoned or underused industrial and commercial sites that may be or perceived to be contaminated and / or need extensive redevelopment.

**bylaw:** a law made by municipal government.

**carbon dioxide (CO<sub>2</sub>):** an atmospheric gas, composed of carbon and oxygen, that is a major component of the carbon cycle and the predominant gas contributing to the greenhouse effect and is therefore known as a contributor to climate change. It is produced through natural processes, but is also released through anthropogenic activities, such as the combustion of fossil fuels to produce electricity.

**carbon monoxide (CO):** a colourless, odourless, and highly toxic gas that is a byproduct of combustion.

**circa (ca):** makes reference to an approximate date when the actual date is unknown.

**Clean Water Act:** a provincial *Act* administered by the New Brunswick Department of the Environment, which deals with protecting the overall water environment for all New Brunswickers to enjoy.

**Clean Environment Act:** a provincial *Act* administered by the New Brunswick Department of the Environment, which deals with protecting the overall environment for all New Brunswickers to enjoy.

**climate:** a description of aggregate weather conditions or the sum of all statistical weather information that is used to describe a place or region.

**combustion emissions:** air pollutants released solely as a result of burning material.

**Committee On the Status of Endangered Wildlife In Canada (COSEWIC):** a committee of experts that assesses and designated which wild species are in some danger of disappearing from Canada.

**contamination:** the presence of a substance of concern, or a condition, in concentrations above appropriate pre-established criteria in soil, sediment, surface water, groundwater, air, and / or structures.

**cultural resources:** archaeological and historic resources that are eligible for or listed by the government including buildings, sites, districts, structures, or objects having historical, architectural, archaeological cultural, or scientific importance.

**emission:** a form of pollution discharged into a receiving body from smokestacks, pipes, vents, surface areas of commercial or industrial facilities, from motor vehicles, locomotives, aircrafts, *etc.*

**endangered:** a species that is facing imminent extirpation.

**Environmental Impact Assessment (EIA):** a study undertaken to assess the effect on a specified environment of the introduction of any new factor that may upset the current ecological balance and includes the social and physical environment of the surrounding area.

**Environmental Protection Plan (EPP):** a description of what will be done to minimize the environmental effects pre-, during, and post-construction of the Undertaking. The plan also includes mitigation measures.

**Environmentally Significant Area (ESA):** spaces that are provided special protection because they represent a habitat that is integral to the overall ecological health of the region.

**erosion:** the wearing away of land surface by wind or water, which naturally occurs from weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, timber cutting, *etc.*

**excavate:** the process of making a hole in something or removing a part of something by scooping or digging it out.

**First Nations:** a collective group of Aboriginals that are living on a reserve.

**Fisheries Act:** a federal *Act* administered by the Department of Fisheries and Oceans with respect to fish and fisheries in Canadian Waters.

**floodplain:** the part of the ground surface inundated with water on a recurring basis, usually associated with the one percent recurrence interval (100-year) flow.

**flora:** the collective plant life occurring in an area or time period, especially the naturally occurring indigenous plant life.

**Fundy Coast Ecoregion:** the southern area of New Brunswick along the Bay of Fundy that is characterized by a distinctive climate, reflected in recurring patterns of vegetation on comparable landforms and soils that are different from the six other New Brunswick Ecoregions.

**geology:** the science that studies Earth by looking at its composition and the processes past and present that shaped it, both on the surface and within.

**glacial:** pertaining to an interval of geologic time that was marked by an equatorward advance of ice during an ice age.

**glaciomarine:** deposits consisting of sediments that were transported by glacial ice and marine water.

**greenfield:** a previously undeveloped open space, such as agricultural fields or forests, that has not been used for commercial or industrial activities and is presumed to be free of contamination.

**ground truth:** the process of verifying the correctness of remote sensing information by use of ancillary information, such as field studies.

**groundwater:** subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

**hazardous materials:** a solid, liquid, or gaseous material that, upon exposure, constitutes an identifiable risk to human health or the natural environment. Hazardous material criteria are established with regard to appropriate regulatory requirements.

**herptile:** reptile or amphibian.

**hibernaculum:** an over-wintering area used to hibernate and survive the winter; bats typically seek out caves to hibernate.

**hydrocarbons:** a broad family of organic compounds that are comprised predominantly of carbon and hydrogen in various combinations; crude oil, natural gas, petroleum products, *etc.* are all various forms of hydrocarbons.

**hydrogeology:** the scientific study of groundwater geology and the geological environments that control the occurrence, movement, production, and characteristics of groundwater.

**hydrology:** an earth science that encompasses the occurrence, distribution, movement, and properties of water.

**impermeable:** not allowing water to pass through.

**Important Bird Area (IBA):** an area recognized as being globally important for the conservation of bird populations. There are about 10 000 sites globally.

**land parcel:** an area of land for which rights or ownership can be purchased.

**land use:** the way that land is developed and used in terms of the kinds of activities allowed (*e.g.*, agriculture, residences, industries, *etc.*).

**lithology:** a description of the physical character of a rock as determined by eye or with a low-power magnifier, and based on colour, structures, mineralogic components, and grain size.

**long-term impacts:** those that are experienced for a prolonged period, such as during the entire duration (*i.e.*, operation) of the Undertaking.

**lubricants:** a substance used to reduce the friction between surfaces or as process materials either incorporated into other materials used as processing aids in the manufacturing of other products, or as carriers for other materials.

**micro-climate:** an area influenced by natural or human-made features that alter the climatic conditions from the general regional climate.

**migratory birds:** land birds that migrate very long distances to breed or escape temperatures outside their normal optimum temperature range.

**morainal sediments:** glacial drift materials deposited mainly by direct glacial action and possessing initial constructional form independent of the material beneath it.

**n:** see sample size.

**outcrop:** exposed stratum or body of ore at the surface of the Earth.

**Parcel / Property IDentification (PID) number:** a unique number given to a land parcel for tracking information, such as deed holders, size, environmental issues, *etc.*

**Parcel Information:** Service New Brunswick (SNB) maintains a network of registries across the province where legal plans and documents related to the ownership of real property can be registered and made available for public scrutiny. The records in the Registries provide land ownership information dating back to the issuance of the original crown grants. Instruments registered or filed in the registry include deeds, mortgages, wills, subdivision plans, *etc.*

**permanent impacts:** those that cause irreversible change to the environment.

**petroleum hydrocarbons:** a family of naturally occurring liquid organic compounds,

**physiographic region:** an area having a pattern of relief features or landforms that differ significantly from that of adjacent areas.

**precipitation:** any kind of water that falls from the sky (*i.e.*, snow, rain, freezing rain, sleet, hail, virga, *etc.*) as part of the weather at a specified place within a specified period of time.

**primary treatment:** the first stage of wastewater treatment, which typically involves the removal of floating debris and solids by screening and / or settling processes.

**receptor:** a sensitive component of the ecosystem that reacts to or is influenced by environmental stressors.

**Saint John Census Metropolitan Area:** an area used for collecting census data, which is comprised of the city of Saint John, the suburbs of Rothesay, Quispamsis, Grand Bay-Westfield, and rural areas of Hampton and St. Martins.

**Saint John Station A:** the weather station at the Saint John airport where various weather parameters are monitored and recorded for determining the climate of the area.

**sanitary waste:** liquid or solid waste originating solely from humans and human activities, such as wastes collected from toilets, showers, wash basins, sinks used for cleaning domestic areas, sinks used for food preparation, clothes washing operations, and sinks or washing machines where food and beverage serving dishes, glasses, and utensils are cleaned, but does not include hazardous or radioactive materials.



**short-term impacts:** those that are only experienced for a brief period or during a portion of the Undertaking (*i.e.*, during the pre-construction, construction, or commissioning).

**solid waste:** non-liquid or gaseous waste that can be accepted for disposal in a landfill or incinerator and includes food waste, paper and cardboard, yard waste, metals, plastics, *etc.*, but does not typically include industrial waste, medical waste, or hazardous waste.

**special concern:** a species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

**Species At Risk Act (SARA):** a federal *Act* administered by Environment Canada with the goal of protecting Canada's wildlife.

**surface water:** all water that flows in watercourses and wetlands or is held in reservoirs above the Earth's surface.

**surficial sediments:** unconsolidated alluvial (*i.e.*, formed by running water), residual, or glacial deposits overlying bedrock or occurring on or near the surface of the earth.

**terrestrial:** relating to or inhabiting the land (*e.g.*, terrestrial plants live on the land as opposed to in the water).

**threatened:** a species that is likely to become endangered if nothing is done to the factors leading to its extirpation or extinction.

**till:** unsorted and unstratified drift consisting of a heterogeneous (*i.e.*, non-uniform) mixture of clay, sand, gravel, and boulders that is deposited by and underneath a glacier.

**topography:** the physical features of a geographical area including relative elevations and the position of natural and anthropogenic features.

**Total Suspended Solids (TSS):** a measure of the amount of particles that are dispersed in a liquid due to turbulent mixing, which can create turbid and cloudy conditions; includes a wide variety of materials, such as silt, organics, industrial wastes, and sewage.

**varmint:** small nuisance animals, such as raccoons, foxes, and coyotes.

**wastewater:** liquid or waterborne wastes polluted or fouled from household, commercial, or industrial applications along with any surface water, stormwater, or groundwater infiltration.

**watershed:** an area of land that drains to a single outlet and is separated from other watersheds by a divide.

**Watercourse and Wetland Alteration (WAWA) permit:** in New Brunswick, watercourses and wetlands are afforded protection under the *Clean Water Act* (Regulation 90-80) with respect to a temporary or permanent change made at, near, or to a watercourse or wetland or to the water flow in a watercourse or wetland. The permits are administered by the New Brunswick Department of the Environment.

**watercourse:** the full width and length, including the bed, banks, sides and shoreline, or any part of a river, creek, stream, spring, brook, lake, pond, reservoir, canal, ditch, or other natural or artificial channel open to the atmosphere, the primary function of which is the conveyance or containment of water whether the flow be continuous or not.

**weather:** the state of the atmosphere at any given time.

**wetland:** land that either periodically or permanently, has a water table at, near, or above the land's surface or that is saturated with water and sustains aquatic processes as indicated by the presence of hydric soils, hydrophytic vegetation, and biological activities adapted to wet conditions.

## 11.0 REPORT DISCLAIMERS AND DISCLOSURES

The sole purpose of this report and the associated services performed by Fundy Engineering & Consulting Ltd. is to complete an Environmental Impact Assessment document for *The Crossing*, a proposed mixed commercial and residential development with a 10 to 20 year build-out located along Ashburn Road in east Saint John adjacent to the Saint John Throughway / McKay Highway (*i.e.*, NB Route 1). The scope of services was defined by the New Brunswick Department of the Environment and Local Government's guidelines to Environmental Impact Assessment in New Brunswick [NBDELG, 2018].

This report was prepared on behalf of and for the exclusive use of Horizon Management Ltd. The report expresses the professional opinion of Fundy Engineering experts and is based on their technical / scientific knowledge. Fundy Engineering & Consulting Ltd. accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report or data by any third-party. Fundy Engineering makes no guarantee that the Client will be successful in the regulatory approval process.

## PLEASE NOTE:

Due to the length of the Appendices (*i.e.*, ~ 1 600 pages), they have been eliminated from this version of the document, but can be made available upon request. Alternatively, they can be viewed online at the NBDELG's Projects Under Review website:

[https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental\\_impactassessment/registrations.html](https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental_impactassessment/registrations.html)

The Final Appendix, XXV, has been included because it addresses the 201 TRC questions and concerns previously made.

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**Appendix I:**

Service New Brunswick Property Information

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**Appendix II:**

Original EIA Registration Document for *The Crossing*

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**Appendix III:**

Fundy Engineering Geotechnical Investigation Letter Report

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**Appendix IV:**

TAP Environmental Resources Inc. Preliminary Watercourse and Wetland Assessment

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**Appendix V:**

Terrain Group Inc. Hydraulics and Hydrology Report



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**Appendix VI:**

JC Williams Group Retail Advisory Report

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**Appendix VII:**

Re-Zoning PAC Memo and Approval Conditions

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**Appendix VIII:**

WSP Rare Plant Survey

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**Appendix IX:**

TRC Questions on Original EIA Registration Document for *The Crossing*

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**Appendix X:**

exp Services Inc. Traffic Impact Study

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**Appendix XI:**

Dillon Consulting Wetland Delineation and Functional Assessment

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**Appendix XII:**

Horizon Management Environmental Protection Plan

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**Appendix XIII:**

exp Services Inc. Conceptual Design Report for Water and Sanitary Servicing



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**Appendix XIV:**

exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and  
Hydrology Conceptual Design Report

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**Appendix XV:**

Horizon Management Response to First Round of TRC Questions

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**Appendix XVI:**

**Amec Foster Wheeler Archaeological Impact Assessment**

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**Appendix XVII:**

ACAP Saint John Little Marsh Creek Watercourse Assessment

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**Appendix XVIII:**

Stantec Breeding Bird and Wildlife Field Studies

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**Appendix XIX:**

NBDELG OWLS Query for 2 km Radius Around *The Crossing Site*

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**Appendix XX:**

ACCDC Data Report for Little Marsh Creek

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**Appendix XXI:**

**eBird Canada and NatureCounts Data**



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**Appendix XXII:**

ACAP Saint John Sport Electrofishing Data

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**Appendix XXIII:**

**Public Consultation Information Completed To Date and Media Coverage**

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**Appendix XXIV:**

exp Services Inc. Route 1 Corridor Study

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**Appendix XXV:**

Disposition Table of TRC Comments

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
<b>22 DECEMBER 2016 LETTER</b>					
TRC1-1	The proponent will be required to submit the following studies to the undersigned for review by the Technical Review Committee: <ul style="list-style-type: none"> <li>➤ Traffic Impact Study,</li> <li>➤ Site Servicing Study and</li> <li>➤ Stormwater Management Study.</li> </ul>	The subject studies are attached as Appendices 1, 2 and 3.	A Traffic Impact Study completed by exp Services Inc. in 2017 is included as Appendix X. A water and sanitary servicing study completed by exp Services Inc. in 2017 is included as Appendix XVIII. A stormwater management study completed by exp Services Inc. in 2017 is included as Appendix XIV.	exp Services Inc. Traffic Impact Study – Appendix X exp Services Inc. Conceptual Design Report for Water and Sanitary Servicing – Appendix XIII exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report – Appendix XIV	General
TRC1-2	The proponent mentions that an Open House was held in March of 2016. In addition, the proponent will be required to complete all the minimum public involvement requirements specified in Appendix C of the <i>Guide to Environmental Impact Assessment in New Brunswick</i> ( <a href="http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/GuideEnvironmentalImpactAssessment.pdf">http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/GuideEnvironmentalImpactAssessment.pdf</a> ). Upon completion of this requirement, the Proponent must submit a Public Involvement Summary Report to the undersigned for review and approval. This summary report should include the results of the March 2016 Open House events.	The Public Involvement Summary Report has been submitted as Appendix 4.	Horizon is aware that it will be required to complete all the minimum public involvement requirements specified in Appendix C of the Guide to Environmental Impact Assessment in New Brunswick. A Public Involvement Summary Report was previously submitted to the NBDELG for review and approval ( <i>i.e.</i> , refer to Appendix XXIII).	Section 5.0 – First Nation and Public Involvement Public Consultation Information Completed to Date and Media Coverage – Appendix XXIV	Public Involvement
TRC1-3	The proponent must contact the Atlantic Coastal Action Program (ACAP) Saint John (contact information below) as part of public consultation. The community group has invested time and funding into restoration efforts for Marsh Creek over the last several years and will likely be interested in the project.  Atlantic Coastal Action Program – Saint John Graeme Stewart--Robertson, Executive Director Mailing address: 139 Prince Edward Street, Suite 323 Saint John, New Brunswick E2L 3S3 Tel/Tél: (506) 652---2227 Fax/Télé: (506) 801---3810 Email/Courriel: <a href="mailto:office@acapsj.org">office@acapsj.org</a>	ACAP Saint John has been actively consulted on this project through the development and will continue to be through design & construction.	ACAP Saint John, which has invested considerable time, effort, and funding into the restoration of Marsh Creek, is fully aware of the proposed Project. As part of the site characterization work, Horizon engaged ACAP Saint John in 2018 to conduct a watercourse assessment, which included fish surveys, of Little Marsh Creek ( <i>i.e.</i> , refer to Appendix XVII).	Section 5.1.2 – Local People, NGOs, and Community Groups	Public Involvement
TRC1-4	Based on the information provided, the Aboriginal Affairs Secretariat (AAS) offers the initial view that there will be no obligation regarding the Crown's Duty to Consult as there is no apparent adverse impact to Aboriginal or treaty rights as a result of this project however; should additional information on potential impacts to Aboriginal or treaty rights be brought forward, AAS requires notification. AAS also requests the proponent to respond to the following questions: <ol style="list-style-type: none"> <li>Were any First Nations notified of the Open House?</li> </ol>	Contact has been made with Kimberley Allen and Fiona Deschenes at the Aboriginal Affairs Secretariat as part of the Public Involvement process. This connection will be maintained through the remainder of this process. <ol style="list-style-type: none"> <li>Public Notice of the Open House was sent out through local media. Individual organizations were not specifically notified.</li> <li>There is no reason to believe that impacts from the proposed project would extend to Aboriginal fishing area in the Bay of Fundy.</li> </ol>	<u>Section 5.1.1</u> Engagement with New Brunswick's First Nations communities must be done both early and often to ensure a true partnership or accession from them. Horizon Management Ltd. discussed the Duty to Consult responsibilities with representatives from the New Brunswick Aboriginal Affairs Secretariat ( <i>i.e.</i> , Kimberley Allen and Fiona Deschenes). It was determined through those discussions that the Duty Consult would be best done through the EIA review process. In the 22 December 2016 TRC Letter ( <i>i.e.</i> , refer to TRC1-4 of Appendix XV), representatives with the AAS offered the initial view that there will be no obligation regarding the Crown's Duty to Consult as there is no apparent adverse impact to Aboriginal or treaty rights.	Section 5.1.1 – First Nations Section 5.3.8 – Step 7: Open House and / or Public Meeting	Public Involvement

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	b. Is there potential for this project to impact Aboriginal fisheries in the Bay of Fundy and surrounding areas?		<u>Section 5.3.8</u> First Nations were not specifically notified of the Open House. A Public Notice was sent out through local media ( <i>i.e.</i> , radio, television, and print). Any impacts resulting from the Project would not extend to Aboriginal fisheries in the Bay of Fundy and / or surrounding areas.		
TRC1-5	Although there is no apparent adverse impact to Aboriginal or treaty rights, the proponent may provide project information to First Nation communities. For more information, please contact AAS at (506) 462-5177.	Contact has been made with Kimberley Allen and Fiona Deschenes at the Aboriginal Affairs Secretariat as part of the Public Involvement process. This connection will be maintained through the remainder of this process.	Notice of any future Open House will be sent to First Nation's communities. Representatives with the AAS would also be contacted regarding which communities should be contacted.	Section 5.3.8 – Step 7: Open House and / or Public Meeting	Public Involvement
TRC1-6	The proponent should be made aware that migratory birds, their eggs, nests, and young are protected under the <u>Migratory Birds Convention Act</u> (MBCA). Migratory birds protected by the MBCA generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most land birds (birds with principally terrestrial life cycles). The list of species protected by the MBCA can be found at: <a href="https://www.ec.gc.ca/nature/default.asp?lang=En&amp;n=496E2702-1">https://www.ec.gc.ca/nature/default.asp?lang=En&amp;n=496E2702-1</a> . Bird species not listed may be protected under other legislation.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment # 25 and Appendix #5.	Horizon Management understands that migratory birds, their eggs, nests, and young are protected under the <i>Migratory Birds Convention Act</i> , 1994 [S.C. 1994, c. 22] and includes all seabirds, with the exception of cormorants and pelicans, all waterfowl, all shorebirds, and most land birds. It is also understood that bird species not listed under the <i>Act</i> may be protected under other provincial and/or federal legislation.	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-7	Please note that under Section 6 of the Migratory Birds Regulations (MBR), it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the migratory Birds Convention Act. Reference TRC Comment #25 and Appendix #5.	As per the <i>Act</i> , it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird or to be in possession of a live migratory bird, or its carcass, skin, nest, or egg, except under authority of a permit and no permits are issued by the regulator for the incidental take of migratory birds caused by development projects or other economic activities.	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-8	Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds: a. "5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. b. (2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds."	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix #5.	➤ No Project personnel should deposit or permit to be deposited oil, oil wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-9	It is the responsibility of the proponent to ensure that activities are managed so as to ensure compliance with the MBCA and associated regulations.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection	➤ Horizon Management will ensure that Project activities are managed so as to ensure compliance with the <i>Migratory</i>	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
		Plan was been prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix #5.	<i>Birds Convention Act, 1994</i> [S.C. 1994, c. 22] and associated regulations.		
TRC1-10	The proponent should be aware of the potential applicability of the <u>Canadian Environmental Protection Act</u> (CEPA). CEPA enables protection of the environment, and human life and health, through the establishment of environmental quality objectives, guidelines and codes of practice and the regulation of toxic substances, nutrients, emissions and discharges from federal facilities, and disposal at sea.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was been prepared for this project with specific reference to the Canadian Environmental Protection Act. Reference TRC Comment #25 and Appendix #5.	Based on our understanding of the Project as currently defined, the <i>Canadian Environmental Protection Act</i> is not applicable.	Section 6.3 – Federal Approval	Canadian Environmental Protection Act
TRC1-11	It is not possible to adequately evaluate the potential effects of the project on migratory birds, species at risk, and species of conservation concern, based on the limited information provided. The proponent has undertaken the first step in obtaining information on species at risk (SAR) and species of conservation concern potentially occurring in the area by obtaining information from the Atlantic Canada Conservation Data Centre (ACDC). The proponent should additionally contact provincial wildlife biologists, as well as local naturalists. The proponent should also obtain data from Nature Counts (Website: <a href="http://www.birdscanada.org/birdmon/default/searchquery.jsp">http://www.birdscanada.org/birdmon/default/searchquery.jsp</a> ) which provides location data for certain migratory bird species at risk and colonial nesters, which was collected during field work for the 2 <sup>nd</sup> Maritimes Breeding Bird Atlas (MBBA): <a href="http://www.mba-aom.ca">http://www.mba-aom.ca</a> ). It should be noted that this more specific data is not directly available on the website of the MBBA, and that not all MBBA SAR data is yet available from the ACDC, so must be ordered from Nature Counts. By contacting Nature Counts, the proponent may therefore be able to obtain data that is much more site-specific than the more general information in the MBBA square if data was collected from their project area during the field work of the MBBA.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was been prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix # 5. An ACCDC Report was received, and is included in the Rare plant Survey and the Wetland Delineation and Functional Assessment, Appendix # 7. As well as data from Nature Counts was obtained, Appendix #10 and fauna observations were made during the Wetland Delineation and Functional Assessment (see Appendix 7).	The baseline biological environment was characterized using available desktop information and by completing several field assessments specific to the Project site. Desktop data included sources, such as: <ul style="list-style-type: none"> <li>➤ the federal species at risk registry;</li> <li>➤ the Committee On Status of Endangered Wildlife In Canada (COSEWIC) database;</li> <li>➤ the provincial species at risk registry;</li> <li>➤ the Atlantic Canada Conservation Data Centre (ACDC) databases; and</li> <li>➤ eBird Canada and NatureCounts databases.</li> </ul> The sections below describe results of the desktop and field assessments related to the biological environment for the Project site.	Section 3.2 – Biological Environment	Migratory Birds and Species at Risk
TRC1-12	Desktop information should then be supplemented by field surveys by professional biologists (with expertise at conducting the types of surveys required) at the appropriate time of year in habitats potentially harbouring species at risk and species of conservation concern. The fact that a species has not been confirmed in an area does not necessarily mean that it does not occur there, especially if habitat appropriate for that species is available. The results of the surveys, as well as detailed mitigation measures with special emphasis on avoidance of impacts, should be provided to the appropriate regulatory agencies for review.	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was been prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix # 5. An ACCDC Report was received, and is included in the Rare plant Survey and the Wetland Delineation and Functional Assessment, Appendix # 7. As well as data from Nature Counts was obtained, Appendix #10 and fauna observations were made during the Wetland Delineation and Functional Assessment (see Appendix 7).	<u>Section 3.2.5.1</u> Only one sensitive plant ( <i>i.e.</i> , Boreal Aster) was observed at three locations at <i>The Crossing</i> site on 9 September 2016 ( <i>i.e.</i> , 45.325869°, 66.034649°; 45.32553°, 66.034873°; 45.32.5435°, 66.035072°) by a rare plant botanical specialist with WSP (refer to Appendix VIII). <u>Section 3.2.5.2.2</u> During July 2019, no native aquatic turtles ( <i>i.e.</i> , <i>Glyptemys insculpta</i> , <i>Chrysemys picta</i> , and <i>Chelydra serpentina</i> ) were observed [ <i>Stantec</i> , 2019] ( <i>i.e.</i> , refer to Appendix XVIII). Although some areas of the Project site have the potential to provide some feeding and overwintering habitat for eastern painted turtles and common snapping turtles and possibly some habitat for wood turtles, the overall habitat for native aquatic turtle species was considered to be relatively low. Notably missing from the Project site was an abundance of prominent	Appendix VIII – WSP Rare Plant Survey Appendix XVIII – Stantec Breeding Bird and Wildlife Field Studies Section 3.2.5.1 – Flora Section 3.2.5.2.2 – Herpetiles Section 3.2.5.2.3 – Birds	Migratory Birds and Species At Risk

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			<p>basking areas and extensive thick aquatic vegetation preferred by eastern painted turtles and common snapping turtles, and the lack of faster moving water and sandy / gravelly substrate preferred by wood turtles.</p> <p><u>Section 3.2.5.2.3</u></p> <p>During breeding bird surveys, 47 species of birds were observed at the Project site [Stantec, 2019] (i.e., refer to Appendix XVIII). Those species are listed in the table. None of the birds observed are listed under the pSARA, fSARA, or by the COSWEIC and all are ranked provincially as being secure. The absence of species during the surveys does not mean that it is not possible for that species to occur there. In some instances, habitat appropriate for that bird may be available, but is not being utilized for some reason (e.g., preference for another nearby area where similar habitat is available, etc.).</p>		
TRC1-13	It is recommended that a detailed description of wildlife use of the project area be provided, along with the results of the desktop review, field survey methodology, and field survey results. These can then be used to evaluate the potential effects, including potential cumulative effects of the proposed project on birds, and to develop mitigation measures.	<p>Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix # 5.</p> <p>An ACCDC Report was received, and is included in the Rare plant Survey and the Wetland Delineation and Functional Assessment, Appendix # 7. As well as data from Nature Counts was obtained, Appendix #10 and fauna observations were made during the Wetland Delineation and Functional Assessment (see Appendix 7).</p>		Appendix VIII – WSP Rare Plant Survey Appendix XVIII – Stantec Breeding Bird and Wildlife Field Studies Section 3.2 – Biological Environment	Migratory Birds and Species At Risk
TRC1-14	Clearing vegetation may cause disturbance to migratory birds, and may inadvertently cause the destruction of their nests and eggs. Many species use trees, as well as brush, deadfalls and other low-lying vegetation for nesting, feeding, shelter and cover. This would apply to songbirds throughout the region, as well as waterfowl in wetland areas. Disturbance of this nature would be most critical during the breeding period. The breeding season for most birds within the project area occurs between April 5 <sup>th</sup> and August 31 <sup>st</sup> in this region, however some species protected under the MBCA do nest outside of this time period. Please see the webpage "General Nesting Periods of Migratory Birds in Canada" (Website: <a href="http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=4F39A78F-1">http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=4F39A78F-1</a> ) for more specific information concerning the breeding times of migratory birds. This project area falls within or near zones "C3" and "C4".	<p>Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Migratory Birds Convention Act. Reference TRC Comment #25 and Appendix # 5.</p> <p>An ACCDC Report was received, and is included in the Rare plant Survey and the Wetland Delineation and Functional Assessment, Appendix # 7. As well as data from Nature Counts was obtained, Appendix #10 and fauna observations were made during the Wetland Delineation and Functional Assessment (see Appendix 7).</p>	<ul style="list-style-type: none"> <li>➤ Any tree clearing activity should be undertaken outside of the migration and breeding season for migratory birds in the greater Saint John region, which generally occurs between 5 April and 31 August, in order to protect nesting areas.</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-15	<p>Environment and Climate Change Canada provides the following recommendations:</p> <ol style="list-style-type: none"> <li>a. To avoid the risk of nest destruction, the proponent should avoid vegetation clearing and field burning during the most critical period of the migratory bird breeding season (see above).</li> </ol>	<p>Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Canadian Environmental Protection Act. Reference TRC Comment #25 and Appendix #5.</p>	<ul style="list-style-type: none"> <li>➤ Horizon Management will ensure that Project activities are managed so as to ensure compliance with the <i>Migratory Birds Convention Act, 1994</i> [S.C. 1994, c. 22] and associated regulations.</li> <li>➤ Any tree clearing activity should be undertaken outside of the annual migration and breeding season for migratory birds in the greater Saint John region, which generally</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds



ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<p>b. To develop and implement an environmental management plan that includes appropriate preventive measures to minimize the risk of impacts on migratory birds (See "Planning ahead to reduce risks to migratory bird nests", PDF: <a href="http://www.ec.gc.ca/Publications/default.asp?lang=En&amp;xml=50C4FE11-801E-4FE3-8019-B2D8537D76CF">http://www.ec.gc.ca/Publications/default.asp?lang=En&amp;xml=50C4FE11-801E-4FE3-8019-B2D8537D76CF</a>). It is the responsibility of the individual or company undertaking the activities to determine these measures. For guidance on how to avoid the incidental take of migratory birds nests and eggs, please refer to the <i>Avoidance Guidelines</i> (Website: <a href="http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=AB36A082-1">http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=AB36A082-1</a>). The management plan should include processes to follow should an active nest be found at any time of the year.</p>		<p>occurs between 5 April and 31 August, in order to protect nesting areas.</p> <ul style="list-style-type: none"> <li>➤ If tree clearing is required within the annual migration and breeding season for migratory birds in the greater Saint John region (<i>i.e.</i>, between 5 April and 31 August), then additional measures should be implemented, such as having a qualified biologist and / or experienced birder conduct a survey of the area prior to clearing to ensure no active nests are present and only after approval from the New Brunswick Department of the Environment and Local Government.</li> <li>➤ If an active nest, den, <i>etc.</i> is encountered, a no-disturbance buffer zone of 30 m+ should be established around the area (<i>n.b.</i>, flagging tape should not be used to mark the feature as it increases the change of predation and representatives with the Canadian Wildlife Service should be contacted to determine the appropriate buffer size) until a qualified biologist determines if the buffer zone shall remain, if the size should be increased, or if the buffer zone can be eliminated (<i>i.e.</i>, the animal has abandoned the feature).</li> </ul>		
TRC1-16	<p>A variety of species of plants native to the general project area should be used in revegetation efforts. Should seed mixes for herbaceous native species for the area not be available, it should be ensured that plants used in revegetation efforts are not known to be invasive.</p>	Noted.	<p>The overall concept for the Project envisions an abundance of green spaces with lots of trees, shrubs, and plants to provide a more natural environment, to capture surface water runoff, and to help offset the effects of greenhouse gas emissions. Exposed areas adjacent to the development will be hydroseeded to promote revegetation. The seed mix used will comprise a variety of native herbaceous species and be free of invasive species. Revegetation of areas adjacent to Little Marsh Creek and on-site wetlands will be seeded using the following prescription:</p> <ul style="list-style-type: none"> <li>➤ 60 % blue joint reed-grass (<i>Calamagrostis canadensis</i>);</li> <li>➤ 15 % American manna grass (<i>Glyceria grandis</i>);</li> <li>➤ 10 % wool grass (<i>Scirpus cyperinus</i>);</li> <li>➤ 10 % soft rush (<i>Juncus effuses</i>);</li> <li>➤ 3 % boneset (<i>Eupatorium perfoliatum</i>); and</li> <li>➤ 2 % blue vervain (<i>Verbena hastate</i>).</li> </ul>	Section 2.7.5 - Landscaping	Revegetation
TRC1-17	<p>Certain species of migratory birds (e.g. Bank Swallows) may nest in large piles of soil left unattended/unvegetated during the most critical period of breeding season (April 5<sup>th</sup> through August 31<sup>st</sup>). To discourage this, the proponent should consider measures to cover or to deter birds from these large piles of unattended soil during the breeding season. If migratory birds take up occupancy of these piles, any industrial activities (including hydroseeding) will cause disturbance to these migratory birds and inadvertently cause the destruction of nests and eggs. Alternate measures will then need to be taken to reduce potential for erosion, and to ensure that nests are protected until chicks have fledged and left the area. For a species such as the Bank Swallow, the period when the nests would be considered active would include not only the</p>	Noted.	<ul style="list-style-type: none"> <li>➤ Large piles of soil should not be left uncovered / unvegetated during the annual migration and breeding season for migratory birds in the greater Saint John region (<i>i.e.</i>, between 5 April and 31 August) in order to discourage the use by certain species (<i>i.e.</i>, bank swallows) for nesting and roosting unless slopes are reduced to &lt; 70 °.</li> </ul>	4.3.3.1.2 – Proposed Mitigation	Migratory Birds

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	time when birds are incubating eggs or taking care of flightless chicks, but also a period of time after chicks have learned to fly, because Bank Swallows return to their colony to roost.				
TRC1-18	See also the attached guidance concerning beneficial management practices that should be considered for implementation when designing mitigation measures for Bank Swallows.	Noted.	Please refer to the Response to TRC1-17 provided above.		Migratory Birds
TRC1-19	Measures to diminish the risk of introducing invasive species should be developed and implemented during all project phases. These measures could include: <ul style="list-style-type: none"> <li>a. Cleaning and inspecting construction equipment prior to transport from elsewhere to ensure that no vegetative matter is attached to the machinery (e.g., use of pressure water hose to clean vehicles prior to transport).</li> <li>b. Regularly inspecting equipment prior to, during and immediately following construction in areas found to support Purple Loosestrife to ensure that vegetative matter is not transported from one construction area to another.</li> </ul>	Noted. It is the Proponent's intention to adhere to all relevant Federal, Provincial and Municipal regulatory requirements. An Environmental Management Manual / Environmental Protection Plan was prepared for this project with specific reference to the Canadian Environmental Protection Act. Reference TRC Comment #25 and Appendix #5.	<ul style="list-style-type: none"> <li>➤ Equipment should arrive at the Project site in a clean condition free of invasive and noxious weeds.</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Equipment maintenance
TRC1-20	Attraction to lights at night or in poor visibility conditions during the day may result in collision with lit structures or their support structures, or with other migratory birds. Disoriented migratory birds are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of depredation.	Noted.	<ul style="list-style-type: none"> <li>➤ Luminaries should be selected to minimize glare and uplighting, which can disorient migrating birds at night (<i>i.e.</i>, they are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of depredation).</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-21	To reduce risk of incidental take of migratory birds related to human-induced light, ECCC-CWS recommends implementation of the following beneficial management practices: <ul style="list-style-type: none"> <li>a. The minimum amount of pilot warning and obstruction avoidance lighting should be used on tall structures. Warning lights should flash, and should completely turn off between flashes.</li> <li>b. The fewest number of site-illuminating lights possible should be used in the project area. Only strobe lights should be used at night, at the lowest intensity and smallest number of flashes per minute allowable by Transport Canada.</li> <li>c. Lighting for the safety of the employees should be shielded to shine down and only to where it is needed.</li> <li>d. LED lights should be used instead of other types of lights where possible. LED light fixtures are less prone to light trespass (<i>i.e.</i> are better at directing light where it needs to be, and do not bleed light into the surrounding area), and this properly reduces the incidence of migratory bird attraction.</li> </ul>	Noted.	<p>In the past, parking lot lighting was dominated by high-pressure sodium, metal halide, and fluorescent luminaries. Light-Emitting Diode (LED) technology is now a significant environmentally energy efficient option (<i>i.e.</i>, considerably reducing energy costs and greenhouse gas emissions) that provides targeted safe lighting levels (<i>i.e.</i>, the light is focused where needed, which reduces light trespass) and reduces the incidence of migratory bird attraction.</p> <p>The tallest Project structures, the multi-residential buildings and / or hotel(s), will only be five to six storeys. It is not believed that pilot warning and obstruction avoidance lighting will be required on those buildings considering they will be lower than the surrounding hills; however, this will be confirmed during detailed engineering design. If required, pilot warning and obstruction avoidance lighting will be kept to a minimum. The lights should flash and completely extinguish between flashes. Furthermore, lights used at night should be strobes that are the lowest intensity with the least number of flashes per minute allowable by Transport Canada.</p>	Section 2.7.3.2 – Lighting	Migratory Birds

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC1-22	The following species at risk (as listed on Schedule 1 of the <u>Species at Risk Act</u> ) may occur within the project area: Canada Warbler (Threatened), Olive-Sided Flycatcher (Threatened) and Common Nighthawk (Threatened). Though unlikely to be found within the project footprint, these species may occur within the project area and we request that sightings be reported to ECCC-CWS.	Noted.	<ul style="list-style-type: none"> <li>➤ If species listed under the federal <i>Species At Risk Act</i> are observed on the Project site, then their sightings will be reported to Environment and Climate Change Canada's Canadian Wildlife Service branch.</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds and Species At Risk
TRC1-23	There have been sightings of SARA-listed Wood Turtle (Threatened) in the area. Wood Turtle Critical Habitat is in the Project Watershed. Wood turtle are unlikely to be in the project area if the project is to proceed in Fall/Winter. If operations proceed in the Spring, Wood Turtle are more likely to be in the project area and further mitigation may be required.	Noted.	During July 2019, no native aquatic turtles ( <i>i.e.</i> , <i>Glyptemys insculpta</i> , <i>Chrysemys picta</i> , and <i>Chelydra serpentina</i> ) were observed [ <i>Stantec</i> , 2019] ( <i>i.e.</i> , refer to Appendix XVIII). Although some areas of the Project site have the potential to provide some feeding and overwintering habitat for eastern painted turtles and common snapping turtles and possibly some habitat for wood turtles, the overall habitat for native aquatic turtle species was considered to be relatively low. Notably missing from the Project site was an abundance of prominent basking areas and extensive thick aquatic vegetation preferred by eastern painted turtles and common snapping turtles, and the lack of faster moving water and sandy / gravelly substrate preferred by wood turtles.	Section 3.2.5.2.2 – Herpetiles Appendix XVIII – Stantec Breeding Bird and Wildlife Field Studies	Wood Turtles and Species At Risk
TRC1-24	ECCC-CWS recommends that the Province of New Brunswick be consulted with respect to specific Wood Turtle mitigations and beneficial management practices.	Noted.	<ul style="list-style-type: none"> <li>➤ If species listed under the federal <i>Species At Risk Act</i> are observed on the Project site, then their sightings will be reported to Environment and Climate Change Canada's Canadian Wildlife Service branch.</li> <li>➤ If a species listed under the provincial <i>Species At Risk Act</i> are observed on the Project site, then their sightings will be reported to the New Brunswick Department of Natural Resources and Energy Development.</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Wood Turtles and Species At Risk
TRC1-25	Prior to commencing the project, the proponent will be required to prepare and submit an Environmental Protection Plan (EPP) to the Project Manager, Environmental Assessment (EA) Section, Department of Environment and Local Government (DELG) for review and approval.	An Environmental Management Plan / Environmental Protection Plan has been prepared (attached, Appendix #5) for review and approval of the Project Manager, Environmental Assessment (EA) Section, Department of Environment and Local Government (DELG).	A Project-specific environmental protection plan was previously developed by Horizon Management ( <i>i.e.</i> , refer to Appendix XII).	Section 4.5 – Project-Specific Environmental Protection Plan Appendix XII – Horizon Management Environmental Protection Plan	EPP
TRC1-26	The EPP should include a Contingency Plan that ensures all precautions will be taken by the proponent and contractors to prevent fuel leaks from equipment and oil spills. Furthermore, the proponent should ensure that contractors are aware that under the MBR, "no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds." Biodegradable alternatives to petroleum-based chainsaw bar oil and hydraulic fluid for heavy machinery are commonly available from major manufacturers. Such biodegradable fluids should be considered for use in place of petroleum products whenever possible, as standard for best practices. Fueling and servicing of equipment should not take place within 30 meters of environmentally sensitive areas, including shorelines and wetlands.	Noted. See Appendix #5.	Horizon Management understands that migratory birds, their eggs, nests, and young are protected under the <i>Migratory Birds Convention Act, 1994</i> [S.C. 1994, c. 22] and includes all seabirds, with the exception of cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds. It is also understood that bird species not listed under the <i>Act</i> may be protected under other provincial and / or federal legislation. As per the <i>Act</i> , no person shall deposit or permit to be deposited oil, oily wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds. <ul style="list-style-type: none"> <li>➤ Refuelling and maintenance of equipment should occur in designated areas, on level terrain, a minimum of 30 m from any watercourse and / or wetland.</li> <li>➤ Heavy equipment working within or within 30 m of watercourses and / or wetlands should use eco-friendly biodegradable and non-toxic hydraulic fluids as opposed to petroleum-based hydraulic fluids.</li> </ul>	Section 4.3.3.2.2 – Proposed Mitigation	Equipment fuelling

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC1-27	Provisions for wildlife response activities should be identified in the Oil Spill Prevention and Response Plan to ensure that pollution incidents affecting Wildlife are effectively and consistently mitigated. The document " <i>Birds and Oil - CWS Response Plan Guidance</i> " is attached and is provided to offer guidance on the development of wildlife response activities.	Noted. See Appendix #5.	<p><u>Section 4.3.2.3.2 and Section 4.3.2.4.2</u></p> <ul style="list-style-type: none"> <li>➤ Fuel storage and fueling / lubricating activities should only be performed in designated safe areas that are located such that minimum effects would be felt from a spill and harmful substances would in no circumstances enter groundwater systems.</li> <li>➤ Fuel storage and fueling / lubricating activities should only be performed in designated safe areas that are located &gt; 30 m from a watercourse and / or wetland.</li> <li>➤ All potential contaminants and contaminated materials should be stored in a contained area where they cannot become mobilized or access the ground surface (<i>i.e.</i>, be placed atop and within spill containment pads).</li> <li>➤ Regular maintenance and inspection of equipment on site should be performed to minimize the risk of spills of oil based fluids that pose a threat to groundwater systems.</li> <li>➤ Appropriate spill response equipment (<i>i.e.</i>, spill kits) should be kept in designated areas, close to designated fueling stations and all appropriate personnel on site should be trained in the use of such equipment.</li> <li>➤ All spills of hazardous materials should be reported immediately to the appropriate Regulator(s).</li> </ul> <p><u>Section 4.3.3.1.2</u></p> <ul style="list-style-type: none"> <li>➤ No Project personnel should deposit or permit to be deposited oil, oil wastes, or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.</li> </ul>	<p>4.3.2.3.2 – Proposed Mitigation</p> <p>4.3.2.4.2 – Proposed Mitigation</p> <p>4.3.3.1.2 – Proposed Mitigation</p>	Equipment Fuelling
TRC1-28	The following information should be included in any Oil Spill Prevention and Response Plan: <ul style="list-style-type: none"> <li>a. Mitigation measures to deter migratory birds from coming into contact with the oil.</li> <li>b. Mitigation measures to be undertaken if migratory birds and/or sensitive habitat become contaminated with the oil.</li> <li>c. The type and extent of monitoring that would be conducted in relation to various spill events.</li> </ul>	Noted. See Appendix #5.	<ul style="list-style-type: none"> <li>➤ An oil spill prevention and response plan should be developed as part of the Project-specific environmental protection plan.</li> </ul>	Section 4.3.3.1.2 – Proposed Mitigation	Equipment fuelling
TRC1-29	In addition to Section 5.1 of the MBCA, ECCC administers and enforces the pollution prevention provisions of the <u>Fisheries Act</u> . Subsection 36(3) of the <u>Fisheries Act</u> prohibits "anyone from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter such water".	Noted.	Horizon Management recognizes that fish and fish habitat are protected under Section 35 of the <i>Fisheries Act</i> [R.S.C. 1985, c. F-14] and includes all activity that results in the harmful alteration, disruption, or destruction of fish habitat. The <i>Act</i> prohibits anyone from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where such deleterious substance or any other deleterious substance that results from the deposit of such deleterious substances may enter such water.	Section 4.3.3.2.2 – Proposed Mitigation	Equipment fuelling and maintenance
TRC1-30	It is the responsibility of the proponent to ensure that all reasonable measures are conducted to prevent the release of substances deleterious to fish from their proposed activities. In general, compliance is determined at the last point of control of the substance	Noted.	Please refer to the Response to TRC1-29 provided above.		Equipment fuelling and maintenance

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	before it enters waters frequented by fish, or, in any place under any conditions where a substance may enter such waters.				
TRC1-31	Provisions for the management of hazardous materials (e.g. fuels, lubricants) and wastes (e.g. contaminated soil, sediments, waste oil) should be identified and implemented in order to ensure compliance with Section 36 (3) of the <u>Fisheries Act</u> , and with the <u>Canadian Environmental Protection Act</u> and the <u>Migratory Birds Convention Act</u> and their Regulations. Hazardous materials and wastes should be managed so as to minimize the risk of chronic and/or accidental releases. For example, refuelling and maintenance activities should be conducted on level terrain, at a suitable distance from environmentally sensitive areas including watercourses and wetlands, and on a prepared impermeable surface with a collection system.	Noted. See Appendix #5.	Please refer to the Responses to TRC1-27, TRC1-28, and TRC1-29 provided above.		Equipment fuelling and maintenance
TRC1-32	The proponent is encouraged to prepare Contingency Plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, <i>Emergency Preparedness and Response, CAN/CSA-Z731-03</i> , is a useful reference.	Noted.	➤ Emergency response and contingency plans should be designed to prevent any sustained environmental damage during any mishaps, errors, and / or unforeseen events.	Section 4.3.3.1.2 – Proposed Mitigation Section 4.3.3.2.2 – Proposed Mitigation	Equipment fuelling and maintenance
TRC1-33	All spills or leaks, such as those from machinery, should be promptly contained and cleaned up (sorbents should be available for quick containment and recovery), and reported to the 24-hour environmental emergencies reporting system (Maritime Provinces (1-800-565-1633)).	Noted. See Appendix #5.	➤ An oil spill prevention and response plan should be developed as part of the Project-specific environmental protection plan.	Section 4.3.3.1.2 – Proposed Mitigation	Equipment fuelling and maintenance
TRC1-34	The proponent should note that Courtney Bay Environmentally Significant Area (ESA) is located downstream of the project area. How will the proponent prevent sedimentation runoff and other substances such as hydrocarbons from entering the watercourse within the project site that drains into Courtney Bay during construction and once the proposed development is in operation?	Noted.	<u>Section 3.2.6</u> Two other ESAs, which aren't within 5 km of the Project site, but are connected to the Marsh Creek watershed are the Courtney Forebay ESA and the Courtney Bay ESA. The Courtenay Forebay ESA is a significant area for waterfowl in Saint John. Bald eagles have also been observed preying on waterfowl within the Forebay. It is a unique 43 ha urban wetland that is frequented by birders. ACAP Saint John has been a strong advocate for cleanup efforts related to the Forebay and Marsh Creek, which flows into the wetland. Courtenay Bay is the tidal marsh and estuary of the Marsh Creek watershed. The Bay has a diversity and abundance of aquatic and brackish habitats. Because the area is also an important urban-centric breeding area for ducks and geese, it is designated as an ESA. Marsh Creek and Courtenay Bay, which Marsh Creek discharges to, has also been the focus of ACAP Saint John. The group has become known for partnering and working with the community, including industry, to help improve the environmental health of these two diverse ecosystems. <u>Section 4.3.2.3.2</u> ➤ An erosion and sediment control plan should be developed and implemented prior to initiating construction for any part of the various Project Phases in order to limit and control	Section 3.2.6 – Environmentally Significant and Managed Areas Section 4.3.2.3.2 – Proposed Mitigation	Environmentally Significant Areas

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			erosion and sedimentation. Erosion control measures should be used to minimize and / or prevent erosion and may include the following: topsoil; mulching; hydro-seeding; jute mats; riprap; sod; trees and shrubs; polyethylene film; gravel; and gabions ( <i>n.b.</i> , each measure has benefits and challenges that must be reviewed prior to using). Sedimentation control measures should be used to minimize and / or prevent the transportation and deposition of sediment as a result of erosion and may include the following: sediment control fences; sediment ponds; erosion control structures; and flumes ( <i>i.e.</i> , slope drains).		
TRC1-35	Archaeological Services has completed its review of EIA Registration 4561-3-1450. The proponent should note that any area within 80 meters of a watercourse (or former watercourse) contains elevated archaeological potential and therefore requires an Archaeological Impact Assessment (AIA) conducted by a professional archaeologist before any ground disturbing activities are permitted in the area. In addition, there is a known archaeological site (BhDm-4) located at N45 19' 53.89 W66 1' 59.69" which has a 100m buffer zone around it where ground disturbing activities would not be permitted without an <i>Archaeological Site Alteration Permit</i> (SAP). From the plans provided, Archaeological Services was unable to determine whether the proposed development would encroach on this archaeological site or its buffer zone. Could the proponent provide a shape file of the proposed development's footprint?	An Archaeological Assessment has been completed (see Appendix #6)	The nearest documented site is located along the shoreline of Drury Cove. BhDm-24 is an historic (circa 1870) surficial artifact scatter site [AFW, 2018]. Up until 1970-80, an historic structure still stood at that site. Even with a 100 m buffer zone around this known archaeological site, it does not impact use of the Project site ( <i>i.e.</i> , the 100 m buffer does not quite extend to the intersection of Old Drury Cove Road and Stagecoach Drive). A preliminary archaeological impact assessment of the Project site was completed by Amec Foster Wheeler (AFW) in June 2017 under Archaeological Field Research Permit 2017NB53. AFW submitted a final archaeological impact assessment report in April 2018. Copies of both reports are included in Appendix XVI. No significant archaeological finds were made during reviews of the site.	Section 3.3.2 – Archaeological and Cultural Features Appendix XVI – Amec Foster Wheeler Archaeological Impact Assessment	Archaeology
TRC1-36	The proponent should be aware that as part of its commitment to wetlands conservation, the Federal Government has adopted <i>The Federal Policy on Wetland Conservation</i> (FPWC) with its objective to "promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future." In support of this objective, the Federal Government strives for the goal of No Net Loss of wetland function on federal lands or when federal funding is provided. Though this project does not take place on federal lands, ECCC-CWS recommends that the goals of the policy be considered in wetland areas as a beneficial management practice. A copy of the FPWC can be found at: <a href="http://publications.gc.ca/pub?id=9.686114&amp;sl=0">http://publications.gc.ca/pub?id=9.686114&amp;sl=0</a>	Noted.	Wetlands provide many ecological and socio-economic functions and New Brunswick has adopted a <i>no-net-loss</i> approach to wetlands consistent with the Federal government. Under that approach, wetland avoidance is preferred and is achieved by choosing an alternate project, alternative project design, or alternate development. Minimization and compensation, respectively, follow avoidance. Horizon Management has avoided direct impacts as a result of this Project to regulated wetlands by changing its conceptual design to be outside of the wetland contiguous with Little Marsh Creek ( <i>n.b.</i> , some portions of the regulated buffer may be impacted).	Section 4.3.2.3.1 – Potential Impacts	Wetlands
TRC1-37	ECCC-CWS recommends using a 30 meter buffer from the high water mark of any water body (1:100 year Flood Zone) in order to maintain movement corridors for migratory birds. Please see <a href="https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=8D910CAC-1#_03_1_1">https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=8D910CAC-1#_03_1_1</a> for further information concerning buffer zones.	Noted.	➤ Tree clearing within 30 m from the highwater mark of any water body should be minimized in order to maintain movement for migratory birds and if any tree clearing is required within 30 m then it will only be done through regulatory approval, such as under the Watercourse and Wetland Alteration Regulation [90-80] of the New Brunswick <i>Clean Water Act</i> [S.N.B. 1989, c. C-6.1].	Section 4.3.3.1.2 – Proposed Mitigation	Migratory Birds
TRC1-38	In order to promote wetland conservation EC-CWS recommends the following:	Noted.	Section 4.3.2.3.2	Please refer to the Response to TRC1-36 provided above.	Wetlands

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<ul style="list-style-type: none"> <li>a. Developments in wetlands should be avoided.</li> <li>b. Where development does occur in the vicinity of wetlands, a minimum vegetation buffer zone of 30 m should be maintained around existing wetland areas.</li> <li>c. Hydrologic function of the wetland should be maintained.</li> <li>d. Runoff from the development should be directed away from wetlands.</li> </ul>		<ul style="list-style-type: none"> <li>➤ Horizon Management will ensure Project activities are managed so as to ensure conformity with the New Brunswick <i>Clean Water Act</i> [S.N.B. 1989, c. C-6.1] and associated regulations, which includes any work within 30 m of a watercourse and / or wetland.</li> <li>➤ Off takes, ditches, and dykes should be used to divert runoff flow into vegetated areas away from watercourses and / or wetlands.</li> </ul>	Section 4.3.2.3.2 – Proposed Mitigation	
TRC1-39	Is avoidance of the wetlands or portions of any regulated and unmapped wetlands possible with this development?	The preparation of the site layout will take into consideration the regulated wetlands.	The site plans submitted with the original EIA application of 25 November 2016 and the modified EIA application of 14 February 2019 have been further modified to reduce the Project's impacts on the watercourse, wetlands, and to minimize the volume requirement for floodplain compensation. The current proposal for <i>The Crossing</i> , which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched.	Section 2.6.2.3 – Current Proposal	Wetlands
TRC1-40	<p>Under the Description of the Existing Environment, Physical and Natural Features, Section 3.0 i, (Page 14), the <i>Preliminary Watercourse and Wetland Assessment Report</i> was based on field work completed in excess of ten years ago. Please be advised that a more recent assessment of the wetland boundaries and the functions of the wetlands will be required. The typical time frame for a wetland assessment is June – September. Should the proponent wish to complete a wetland assessment outside of this time frame please contact the Provincial Wetland Biologist at (506) 453-2480 to discuss potential additional requirements.</p> <ul style="list-style-type: none"> <li>a. The wetland assessment will need to include the boundaries of the mapped wetlands on the property and the location/extent of unmapped wetlands.</li> <li>b. Information regarding the functions/benefits that these mapped and unmapped wetlands provide.</li> <li>c. The total proposed impact area within the regulated wetland and unmapped wetlands?</li> </ul>	A Wetland Delineation and Functional Assessment has been completed. (see Appendix #7)	<p>There are several wetlands and regulated wetlands contiguous with the Little Marsh Creek and its tributaries. Wetlands are transitional areas between terrestrial and aquatic systems where the water table is at or near the surface and the land is covered by shallow water at some time during the growing season. Permits are required to impact regulated wetlands and / or their 30 m regulated buffer.</p> <p>When TAP [2005] conducted their preliminary watercourse and wetland assessment they noted that wetlands on the Project site would need to be delineated in order to determine their extent (<i>i.e.</i>, refer to Appendix IV). Dillon Consulting (Dillon) completed a wetland delineation and functional assessment for the entire Project site and lands along Rothesay Avenue (<i>i.e.</i>, formerly referred to as the Eco-Park site) during May and June 2017 [Dillon, 2017] (<i>i.e.</i>, refer to Appendix IX). A total of 42.9 ha and 8.4 ha of wetland were delineated at the Project and Eco-Park sites, respectively. Regulated wetlands (<i>i.e.</i>, those that appear on the GeoNB Map Viewer) at the two sites are 10.5 ha and 0 ha, respectively, for the Project site and the lands along Rothesay Avenue.</p> <p>Dillon [2017] used the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC), a standardized methodology for rapidly assessing some important natural functions of non-tidal wetlands in Atlantic Canada [Adamus, 2016]. A summary of the functional assessment results is provided in the table and a copy of the Dillon [2017] assessment is included in Appendix IX. Results indicate that the Little Marsh Creek wetlands provide ecological value, specifically related to the maintenance of water quality and aquatic habitat for the Marsh Creek Watershed. Furthermore, the wetlands are at risk based on ecological sensitivity and surrounding stressors (<i>i.e.</i>, denoted by the "Higher" benefit rating for wetland risk in the table).</p>	Section 3.1.5.2 - Wetlands	Wetlands

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC1-41	<p>Please provide additional information regarding the following statements:</p> <ol style="list-style-type: none"> <li>It is stated that the banks of the Little Marsh Creek will be expanded to create an urban wetland throughout the commercial site. What is the construction methodology for this process? Has it been successful in the past?</li> <li>It is stated that "Efforts to enhance amphibian and reptile habitat in the Urban Wetland will also be explored". What efforts will be explored?</li> <li>In Figure 3 from the "<i>Preliminary Watercourse and Wetland Assessment of the Ashburn Lake Road Site</i>", it states that the 38 acres to the north end of Ashburn Lake road exhibits wetland characteristics. It also states in the borehole analysis that there is peat within the soils. What measures will be done to offset potential flooding from the loss of wetland habitat and hydric soils which are currently retaining water?</li> <li>It is stated that run-off waters will be directed further down marsh creek. This area is currently being used for several existing commercial developments in which there have been flooding issues in the past. There are recorded flooding problems immediately downstream and in nearby tributaries of Marsh Creek (see <a href="http://www.elgegl.qnb.ca/0001/en/Flood/Search">http://www.elgegl.qnb.ca/0001/en/Flood/Search</a>). Increased volume (i.e. from paved areas) would likely aggravate the problem. This is particularly true during high tides, when drainage through the Courtenay Bay Causeway is an issue. Is the proponent aware of the present flooding issues?</li> <li>While they are older, the provinces flood hazard maps of the area do show the site to be located in a flood zone, which should be addressed by the proponent.</li> <li>Given the history of flooding in the surrounding area what is being proposed to mitigate any further flooding issues or any loss of wetland function as a result of this project? Please include additional information regarding the proposed summary of wetland mitigation (i.e. diagram, maps, proposed projects with DUC, etc.).</li> </ol>	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)	Considerable information regarding these comments are found in sections of the EIA document identified.	Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Concept Report Section 2.8.2.10 – Storm Water Management Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater runoff and wetlands
TRC1-42	With regards to Appendix 1, the <i>2005 Watercourse and Wetland Assessment Report</i> , TAP Environmental Resources conducted electrofishing and there were minimal species identified (three). It is important to note that the City of Saint John completed a major harbor clean-up in 2014. In other words, raw sewage is no longer being released in the Marsh Creek watershed where "The Crossing" is being proposed. Thus, with the improvement in water quality, it is possible that there	A new wetland delineation and functional assessment was completed in 2017 (see Appendix # 7) Electrofishing data from a 2013 study by ACAP Saint John has been used (see Appendix #8).	Section 3.1.5 ... As such, several assessments have been completed for the on-site watercourses and wetlands as described in the sections that follow. Copies of those previous assessments are included in Appendices IV, V, VII, XI, XIV, XVII, and XVIII.	Section 3.1.5 – Hydrology Appendix IV – TAP Environmental Resources Inc. Preliminary Watercourse and Wetland Assessment Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report Appendix VII – Re-Zoning PAC Memo and Approval Conditions	Watercourses, wetlands, and fish



ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	are more fish species present in this watershed. Since this report is over a decade old, a new watercourse and wetland assessment should be completed.			Appendix XI – Dillon Consulting Wetland Delineation and Functional Assessment Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment Appendix XVIII – Stantec Breeding Bird and Wildlife Field Studies	
TRC1-43	There was no scale provided in any of the report's figures. For Figure 1, please provide a scale, location of current watercourses (it appears as the rerouted watercourse), wetlands, names of roads / streets as well as a legend and the phases of development. For Figure 3, please provide a revised map of the proposed green space site in relation to the proposed development site and include the property boundaries and PIDs as well as a scale, location of current watercourses, wetlands, names of roads as well as a legend.	Attached is a revised Figure 1 (see Appendix 9). With respect to Figure 3, see Figures 1& 2 in the Wetland Delineation and Functional Assessment Report, Appendix 7.	New figures have been developed for the new EIA document. Those figures include more details, such as scale bars.	Updated figures are found throughout the EIA document.	Report maps
TRC1-44	Under the Summary of the Environmental Impacts, Section 4.0 (Page 15), the Hydraulics and Hydrology Report was produced in 2008. Marsh creek has been subject to a lot of attention and remediation efforts since then. The hydraulics report should be reassessed/updated, or new study initiated based on current conditions and current climate data.	An updated Stormwater and Hydrology Study was completed in 2017. (see Appendix #3)	Considerable information regarding these comments are found in sections of the EIA document identified.	Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC1-45	What is the length of channel to be cut off and the number of square meters this equates to with regard to the straightening of the "loop" in Marsh Creek between Ashburn Road and HWY 1?	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)	...the flow path of Little Marsh Creek is expected to remain as it presently exists on the Project site.	Section 2.8.2.9 – Watercourse Realignment and Piping	Watercourses
TRC1-46	What is the linear length and square meters of the tributary to be realigned as part of the development project?	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)	To facilitate Project development, tributaries of Little Marsh Creek will require alteration. The potential impacts to on-site watercourses will be as follows: <ul style="list-style-type: none"> <li>➤ an unnamed tributary between Fulton Lane and Ashburn Road, ~ 178 m long and 1 m to 2 m wide (<i>i.e.</i>, ~ 270 m<sup>2</sup>) will be piped;</li> <li>➤ an unnamed tributary near Rothesay Road / Rothesay Avenue intersection, ~ 165 m long and 2 m to 4 m wide (<i>i.e.</i>, ~ 500 m<sup>2</sup>) will be realigned within an open channel;</li> <li>➤ an unnamed tributary near Jones Drive / Ashburn Road intersection, ~ 220 m and 0.5 m to 1 m wide (<i>i.e.</i>, ~ 170 m<sup>2</sup>) may be realigned within an open channel / pipe; and</li> <li>➤ an unnamed tributary near Foster Thurston / Ashburn Road intersection, ~ 40 m long and 1 m to 1.5 m wide (<i>i.e.</i>, ~ 50 m<sup>2</sup>) will be piped.</li> </ul> The overall combined linear length of the proposed alterations is ~ 600 m and the overall combined area of the proposed alterations is ~ 540 m <sup>2</sup> . The actual linear length and area will be	Section 4.3.2.3.1 – Potential Impacts	Watercourses

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			determined during detailed design and during permitting as will the design / sizing of piping and open channels.		
TRC1-47	Can the proponent provide photos depicting the habitat in the reaches of the watercourse to be altered?	See Attachment 2 in the Wetland Delineation and Functional Assessment, Appendix 5	ACAP Saint John conducted an assessment of Little Marsh Creek and its tributaries on the Project site in June and July 2018. The report included in Appendix XVII includes photos of the habitat.	Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment	Watercourses
TRC1-48	Has the proponent determined what species are in the lake/wetland area upstream of the project locations and thus what fish may use this section of the watercourse as a corridor to the upstream environment? This can vary from the species found in the creek during spot check electrofishing.	Electrofishing data from a 2013 study on Ashburn Creek by ACAP Saint John has been used. (see Appendix 8)	Between 19 June and 10 July 2018, ACAP Saint John conducted comprehensive fish population and habitat surveys within Little Marsh Creek and its tributaries upstream of the Project site in order to identify fish species present. A total of 19 species were found.	Section 3.2.5.2.1 – Fishes Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment	Watercourses and fish
TRC1-49	Does the proponent plan on studying existing drainage systems to ensure that they are capable of handling climate change impacts in addition to the impacts of the proposed development (or any others added since the latest studies)?	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)		Please refer to the Response to TRC1-44 provided above.	Stormwater
TRC1-50	If storage techniques for floodwater are to be used, design has to be adequate to ensure that flooding is not induced or aggravated downstream or upstream of the site.	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)	<p><u>Section 2.8.2.10</u> Compensatory storage options considered in the assessment include:</p> <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>e.g.</i>, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, <i>etc.</i>); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas on the Rothesay Avenue lands to provide compensatory storage capacity).</li> </ul> <p><u>Section 4.3.2.3.2</u></p> <ul style="list-style-type: none"> <li>➤ Horizon Management will ensure that flood storage lost as a result of the Project is compensated for within either the Glen Falls Flood Risk area or the Lower Marsh Creek Flood Risk area to ensure compliance with the Flood Risk Area By-Law of the City of Saint John [CP-11].</li> </ul>	Section 2.8.2.10 – Storm Water Management Section 4.3.2.3.2 – Proposed Mitigation	Stormwater
TRC1-51	The 2008 modeling study by Terrain may have been adequate at the time however; the size of the proposed development has increased significantly since Terrain completed its draft report in 2008. According to the EIA document, the proposed development will span 49 hectares and will be comprised of business, commercial as well as residential. Terrain's report states that "The Crossing" would consist of a 46,500 square meters (4.65hectares) of commercial/business development (no residential) on 41 hectares of land. Furthermore, in Terrain's report, there is no indication that Little Marsh Creek is being realigned. This proposed realignment could change flow dynamics which in turn, would impact the accuracy of the model used in 2008. Therefore, further study will be needed to determine if the conclusion on page 18 of Terrain's report "The results	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)		Please refer to the Response to TRC1-44 provided above.	Stormwater

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<i>obtained from the stormwater models indicate that development of The Crossing will not have a negative effect on flooding in the Marsh Creek watershed</i> would still apply to the updated project scope.				
TRC1-52	The use of a 24-hour flood storm example may not accurately represent the potential for flooding to occur on the project site. This is a small, flat watershed with poor drainage capacity. It maybe more prone to flash flooding from a brief, intense rain event. Does the proponent plan on studying this type of flooding event?	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)		Please refer to the Response to TRC1-44 provided above.	Stormwater
TRC1-53	On preparation of a Storm Water Management Plan, it is recommended that the proponent consider examples from across Canada to determine the best storm water management techniques using such approaches as naturalized storm water basins, rain gardens, landscape designs, and other modifications or installations used to reduce surface water flow rates, and increase retention, infiltration, and sediment catchment.	A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)	<p>Compensatory storage options considered in the assessment include:</p> <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>i.e.</i>, detention and retention); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas to provide compensatory storage capacity).</li> </ul> <p>Surface water runoff attenuation options provided in the assessment to yield a net zero increase in post-development storm water discharge for the 100 year + 20 % return period for storms include:</p> <ul style="list-style-type: none"> <li>➤ parking lot ponding;</li> <li>➤ landscaped dry detention ponds; and</li> <li>➤ roof rainwater infiltration galleries.</li> </ul>	Section 2.8.2.10 – Stormwater Management	Stormwater
TRC1-54	ELG recommends the proponent review the most recent AR5 New Brunswick climate change projections data and maps of 29 climate variables on the following site: <a href="http://acasav2.azurewebsites.net/">http://acasav2.azurewebsites.net/</a> in order to consider any projected climate change impacts on the design and build of infrastructure associated with the project. Please note that data is available for the climate meteorological station Saint John in the Excel tables.	Noted.	<ul style="list-style-type: none"> <li>➤ Input to the model included existing 100 year rainfall (<i>i.e.</i>, Environment Canada Meteorological Station Data with AR5 New Brunswick climate change predictions), predicted 100 year rainfall for 2050 (<i>i.e.</i>, University of Western Ontario climate change model, Scenario RCP 2.6 for Saint John), existing 100 year tidal curves with storm surge, and predicted 100 year tidal curves with storm surge for 2050.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater and climate change
TRC1-55	The proponent is advised to apply the IDF Climate Change curves that reflect future trends of extreme rainfall patterns, referencing future climate scenarios to all infrastructure design specifications. Tools available for these calculations include the IDF Climate Change Tool produced by the University of Western Ontario. <a href="http://www.idf-cc-uwo.ca/">http://www.idf-cc-uwo.ca/</a> . Use of the UWO IDF tool is an acceptable approach for IDF development under future climates.	Noted.		Please refer to the Response to TRC1-54 provided above.	Stormwater and climate change
TRC1-56	In order to reduce risk, liability, and responsibility, the developer is advised that all infrastructure be installed at a minimum elevation that mitigates any and all possibility of flooding, contamination, and safety risks in the future. Design and installation specifications should ensure that infrastructure and other items are located completely above projected future flood elevations so that:	The Proponent has engaged a nationally recognized Consulting firm with experience in this area. All design will adhere to relevant regulatory requirements and current standards and practices.	Design engineers and architects generally follow specific guidelines with respect to design criteria. Those design criteria consider the environmental effects of climate change and the potential cumulative effects on the structures ( <i>e.g.</i> , increased streamflow through a culvert, increased snow loads on a roof, <i>etc.</i> ). Engineers will account for impacts of climate change on the proposed Project in their design. Mitigation of potential effects of the environment on the proposed Project are also	Section 4.4.1 – Notes on Climate Change	Stormwater and climate change

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<p>a. Septic systems/municipal wastewater infrastructure remains functional at all times, and does not create any discharges into the immediate environment.</p> <p>b. Potable water wells are not inundated and at risk of contamination.</p> <p>c. Storm water basins do not discharge any accumulated sediments.</p> <p>d. Habitable spaces are not impacted by water infiltrating via surface runoff, ground saturation, or septic back up, and</p> <p>e. Electrical and plumbing systems are unaffected by projected water levels.</p>		<p>inherent in the planning (<i>i.e.</i>, the EIA document), construction (<i>e.g.</i>, environmental protection / management plans), and planned operation of the Project (<i>e.g.</i>, capture and handling of surface water runoff).</p> <p>Many planning, designing, and construction strategies are available to minimize the potential effects of the environment on the Project so that risk of serious damage to infrastructure, human health, or interruption of service can be reduced to acceptable levels. The National Codes of Canada, which will be strictly adhered to for this Project, identify many codes and standards that address environmental considerations during all aspects of a project.</p>		
TRC1-57	<p>ELG recommends the proponent review the sea level rise information for Zone 12, Saint John County in the Updated Sea-Level Rise and Flooding Estimates for New Brunswick Coastal Sections – Based on the <i>IPCC 5<sup>th</sup> Assessment Report 2014</i> by Réal Daigle (R. J. DaigleEnviro)</p> <p><a href="http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/SeaLevelRiseAndFloodingEstimates.pdf">http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/SeaLevelRiseAndFloodingEstimates.pdf</a>.</p>	<p>A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)</p>	<p>Sea level rise estimates for Saint John County, based on information from the IPCC, are provided in <i>Daigle</i> [2017]. Total predicted changes are as follows:</p> <ul style="list-style-type: none"> <li>➤ 0.17 m ± 0.07 m between 2010 and 2030;</li> <li>➤ 0.31 m ± 0.14 m between 2010 and 2050;</li> <li>➤ 0.86 m ± 0.38 m between 2010 and 2100; and</li> <li>➤ 1.51 m + 0.38 m between 2010 and 2100 with 0.65 m increase related to potential rise due to the melting of the Antarctic Ice Sheet.</li> </ul> <p>The Project site is inland from Courtenay Bay. Significant flooding of other sites downstream would have to occur before The Crossing is affected from sea level rise. If water levels at Courtenay Bay were to rise to a point where downstream infrastructure was affected (<i>i.e.</i>, Courtenay Bay Causeway), it is likely that work would be done to halt the inland advancement of the Bay.</p>	Section 4.4.8 – Sea Level Rise	Sea level rise and climate change
TRC1-58	<p>The proponent is advised to review the recently published '<i>Implementation Framework for Climate Change Adaptation Planning at a Watershed Scale</i>'. The Framework lists seven steps through which a group of individuals can come together to assess and manage vulnerabilities and risks stemming from climate change at a watershed level.</p> <p><a href="http://www.ccme.ca/files/Resources/climate_change/Climate%20Change%20Adaptation%20Framework%201_0_e%20PN%201529.pdf">http://www.ccme.ca/files/Resources/climate_change/Climate%20Change%20Adaptation%20Framework%201_0_e%20PN%201529.pdf</a>.</p>	<p>A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)</p>	<p>The document was reviewed when preparing the updated EIA document.</p>		Stormwater and climate change
TRC1-59	<p>Please identify the intended types of climate change adaptation strategies and actions that will help to manage and reduce risks/vulnerabilities associated with inland flooding to the built infrastructure associated with the project.</p>	<p>A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)</p>		<p>Please refer to the Response to TRC1-56 provided above.</p>	Stormwater and climate change
TRC1-60	<p>While it is understood that the proponent may not be the sole developer, the proponent is uniquely positioned to enable a low-carbon development (through covalence, contracts and marketing, or other such means) for all businesses and residential buildings in "The Crossing" development.</p>	<p>Noted.</p>	<p>Although Horizon Management will not be the sole developer of <i>The Crossing</i>, they are uniquely positioned to enable a low-carbon development. Project buildings will be designed to include taking into consideration environmentally-friendly features, such as highly-efficient low-emissivity glass, canopies over windows to reduce cooling requirements, the use of natural</p>	Section 2.7.4 – Low-Carbon Development and Energy Efficient Design	Climate change

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TRC1-61	<p>In November 2016, the Government of New Brunswick released its new <i>Climate Change Action Plan "Transitioning to a Low-Carbon Economy"</i>. The Plan is ambitious and designed to respond to greenhouse gas (GHG) emissions and climate change adaptation while taking advantage of opportunities for potential long-term job creation and stimulating investment in innovation and business development. Land-use planning and development has an important role to play in New Brunswick's transition to a low-carbon economy by reducing GHG emissions in communities through smart growth-oriented (which includes mixed-use) development patterns. Urban form and spatial planning measures can also cause transportation emission reductions and can facilitate improvements in low-carbon building construction/operation and compact design. It is well documented that the cost of inaction (i.e. not incorporating climate change into decisions); is greater than the cost of progressive action, and will be greater when a price on carbon emissions is in place in 2018. This development has the opportunity to be progressive in areas such as conservation design, energy efficiency, renewable energy and alternative transportation and that this could be a significant life-cycle cost saving and selling feature for The Crossing development. That being said, the proponent is requested to consider all beneficial greenhouse gas reduction measures and incorporate such features into the development. In cases where this is not possible, the proponent should justify the exclusion.</p> <ol style="list-style-type: none"> <li>The proponent should reduce greenhouse gas emissions during construction with measures such as limiting vehicle idling.</li> <li>The proponent should strive for no net loss of carbon sinks in the development area. This could be achieved through measures such as: planting tree species which sequester relatively higher quantities of carbon; increasing use of structural and appearance wood products, and incorporating green roofs.</li> <li>The proponent should take steps to incorporate alternative transportation in the design of the development to allow for, and encourage, use of public transit, biking, walking, electric vehicles, etc.</li> <li>Provinces and territories have established a goal of adopting "net-zero energy ready" model building code by 2030. We strongly encourage all new development to strive for this goal in advance of codes, or at least improve energy performance by incorporating features which</li> </ol>	Noted.	<p>gas by all tenants, and computer controls on building heating, ventilation, and air-conditioning systems.</p> <p>Aligning with New Brunswick's Climate Change Action Plan for transitioning to a low-carbon economy [PNB, 2016], Horizon will strive to implement into the overall design of <i>The Crossing</i>:</p> <ul style="list-style-type: none"> <li>➤ energy conservation;</li> <li>➤ energy efficiency;</li> <li>➤ renewable energy sources; and</li> <li>➤ alternative transportation.</li> </ul> <p>The Proponent will also consider beneficial GreenHouse Gas (GHG) reduction measures and incorporate practical and feasible measures into the development. Those measures will include:</p> <ul style="list-style-type: none"> <li>➤ reducing vehicle idling;</li> <li>➤ striving for a no net loss of carbon sinks; and</li> <li>➤ improving energy performance.</li> </ul>	Section 2.7.4 – Low-Carbon Development and Energy Efficient Design	Greenhouse gas emissions and climate change

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	would 1) improve energy efficiency and 2) source renewable energy. e. To assist the proponent, the following suggestions are provided (although not exhaustive): achieve more ambitious R-values (i.e. increased insulation, triple-pane windows); use heating sources which achieve the highest level of efficiency that is economically achievable (i.e. high efficiency heat pumps); build with passive solar heating and orient structures to take advantage of the sun's energy (which in turn reduces heating demand); incorporate renewable or reduced-emission energy sources such as geothermal, solar, biomass, wood pellets, or natural gas.				
TRC1-62	Has the proponent considered snowmelt, frozen ground or ice effects in any of the modeling or designs?	Yes, the Proponent has engaged a nationally recognized Consulting firm with experience in this area. All design will adhere to relevant regulatory requirements and current standards and practices.	➤ exp Services Inc. were contacted regarding the modelling and indicated that winter runoff scenarios do not control storm water storage management for this site. Peak winter storm runoff scenarios were greatly reduced under post-development conditions with the proposed attenuation when compared to pre-development scenarios.	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
<b>20 JANUARY 2017 LETTER</b>					
TRC1-63	In 2016, the proponent made an application to the City of Saint John (CoSJ) to amend the Municipal Plan designation of the subject site, and to rezone the subject site to allow for the proposed development to proceed. On April 18, 2016, Common Council gave third reading to the Municipal Plan Amendment and rezoning, and imposed a number of conditions on the rezoning of the subject lands. a. Please note that should a <i>Certificate of Determination</i> be issued following the EIA review of this project; the proponent will be required to satisfy the conditions imposed by the CoSJ Common Council and successfully obtain any required rezoning designation prior to commencing the project.	Noted. The proponent understands that the Section 39 requirements will need to be met before commencing the project.	It is expected that the 10 conditions made by the City of Saint John's Common Council, as per the Proponent's Section 39 (59) application, will be conditions of the EIA Certificate of Determination.	Section 2.8.1.1 – Existing Approvals	
<b>STORMWATER MANAGEMENT COMMENTS</b>					
TRC1-64	The EIA Registration Document contains a <i>Hydraulics and Hydrology Report</i> prepared by Terrain Group, dated March 6, 2008. This document relates to the hydrotechnical and stormwater management impacts of the development, which were identified as important considerations by CoSJ "City Staff" in the planning approvals process. Upon reviewing this document, City Staff note the following: a. This document is dated 2008, was stamped "draft" and is not sealed by a Professional Engineer. The document must therefore be updated to reflect current conditions. For example the site plan for the proposed "The Crossing" development contained in the 2008	Stormwater and Hydrology Study was completed in 2017. (see Appendix #3) The Proponent has engaged a nationally recognized Consulting firm with experience in this area. All design will adhere to relevant regulatory requirements and current standards and practices.	Considerable information regarding these comments are found in sections of the EIA document identified.	Section 2.8.2.10 – Storm Water Management Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater

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	<p>report is different from the current proposal contained in the main EIA Registration Document and submitted as part of the 2016 planning approvals process. In addition to the differences pointed out in question 51 from the December 22, 2016 TRC letter, the following major differences are noted between the two site plans:</p> <ul style="list-style-type: none"> <li>i. The recent layout contains a residential component on the north side of Ashburn Road which is not shown in the 2008 site plan.</li> <li>ii. The stream alignment / realignment shown on the 2016/2017 concept is different than that shown on the 2008 document.</li> <li>iii. The 2016/2017 development concept appears to have more impervious area (roofs and paved parking) as compared to the 2008 development concept.</li> <li>iv. Additional information is required relating to the Terrain Report to allow for City Staff to fully understand the stormwater modelling that was done as part of this exercise. This would include: assumptions made for the modelling; additional details regarding the scenarios modelled; results at different locations and different times of the year (winter vs. summer – frozen ground impacts) and for different tidal conditions. It is noted that supporting information on the sub-watersheds that were analyzed with the model are not provided with the report. In addition, the assumptions relating to land use and the corresponding runoff coefficients made by the consultants may no longer be valid given the change in future land use outlined in new <i>Municipal Plan</i> and <i>Zoning By-law</i> that have been enacted by the City since 2012.</li> <li>v. No detailed discussion was provided regarding the calibration of the model, specifically how the modelled water elevations compare with data observed from field monitoring and how the modelled water levels compare with the Procter and Redfern mapping.</li> <li>vi. Responsibility for maintenance of any stormwater retention/detention ponds needs to be understood. In particular one of the scenarios modelled includes use of a City-owned parcel of land for additional water storage capacity: is there compensation for this use of City lands? Are there implications for adjacent properties?</li> <li>vii. How will a phased approach be taken with respect to stormwater management as the development proceeds in order to manage the stormwater requirements of the current site,</li> </ul>				

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	phased development and adjacent impacts both upstream and downstream?				
TRC1-65	<p>The phasing of the site preparation (mentioned on Page 10 of the Registration Document) should be better understood, as well as the implications on water levels downstream.</p> <p>a. For example, what are the stormwater management impacts for if the entire site is grubbed and trees removed but no further development occurs?</p>	<p>A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)</p> <p>Issues like this will be addressed in the conditions stated in the Certificate of Determination and in subsequent Watercourse and Wetland Alterations Permits.</p>	<p>➤ Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.</p>	Section 4.3.2.3.2 – Proposed Mitigation	Stormwater
<b>CITY OF SJ FLOOD RISK BY-LAW COMMENTS</b>					
TRC1-66	<p>Portions of the proposed development site are within areas that are subject to regulation through the CoSJ's <i>Flood Risk Area By-law</i> which seeks to regulate development in the Marsh Creek Watershed in order to prevent flooding. This by-law requires that additional flood storage be developed to offset flood storage that is lost as development occurs within the Flood Risk Area. The EIA Registration Document indicates that the proposed work plan is to start in the spring of 2017 (section 2(vii) of Registration Document) by realigning the stream through straightening the loop in the watercourse on PID 00432203. It is also stated that initial development of the project will take place with this parcel of land being the hub of the development and that the infilling of lands with local aggregate to form an "aggregate mattress" will be undertaken on several parcels of land that are subject to the City of Saint John Flood Risk Areas By-law.</p> <p>a. The City of Saint John notes that this work cannot occur until the studies required by the Section 39 conditions have been completed by the developer and reviewed and approved by City staff, the City's Planning Advisory Committee and Common Council through an amendment to the conditions attached to the rezoning.</p> <p>b. As the placement of the aggregate materials constitutes a "development", permits for this work (including filling, excavating, relocating, altering land levels, etc.) such as Flood Risk Area permits cannot be issued until the required studies including the traffic impact study, servicing study, and stormwater management study are completed, a <i>Certificate of Determination</i> is issued by the Province relating to the EIA, and all other required Section 39 conditions are fulfilled through an amendment to the Section 39 conditions.</p>	<p>A Stormwater and Floodplain Study was completed in 2017. (see Appendix #3)</p> <p>The Proponent will adhere to the City of Saint John Flood Plain Area By-Law requirements.</p>		Please refer to the Response to TRC1-44 provided above.	Stormwater
TRC1-67	How will existing compensatory storage provided by ponds across from Jones Road be affected by the development?	<p>A Stormwater and Hydrology Study was completed in 2017. (see Appendix #3)</p> <p>These ponds will be taken into consideration during site design and layout</p>	<p><u>Section 2.8.2.9</u></p> <p>The existing compensatory storage provided by ponds contiguous with Little Marsh Creek on the Project lands across</p>	<p>Section 2.8.2.9 – Watercourse Realignment and Piping</p> <p>Section 2.8.2.10 – Storm Water Management</p>	Stormwater



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			<p>from Jones Road will remain. There are no plans, at this time to increase the size of those ponds.</p> <p><u>Section 2.8.2.10</u></p> <p>Compensatory storage options considered in the assessment include:</p> <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>e.g.</i>, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, <i>etc.</i>); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas to provide compensatory storage capacity).</li> </ul>		
TRC1-68	<p>The <i>Flood Risk Area By-Law</i> requires compensatory flood storage for projects that occur within the Flood Risk Area. The report prepared by Terrain Group and attached to the Registration Document indicates there are a few ways of providing compensatory storage for this development, however; the proposal does not indicate that compensatory storage creation will initially take place and it seems that the requirements of the by-law will not be immediately addressed.</p> <p>a. Based on the information provided in the Terrain report (Section 5), it appears that compensatory storage may possibly be addressed through the eventual development of an urban wetland and a naturalized storm water pond, however, this section also indicates that it will be some time before this work will be undertaken and it seems to be connected to developing in the regulated wetland area. The <i>Flood Risk Areas By-law</i> is not based upon development of Provincially Designated Wetlands and any compensatory storage required for the flood risk area is separate from compensation required through Provincial Legislation for impacts in Provincially Designated Wetlands. The <i>Flood Risk Area By-law</i> requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Areas and any such development is subject to a <i>Flood Risk Area Permit</i>.</p> <p>b. The Terrain Report presents 4 different scenarios that were assessed with a hydraulic model. Scenario 3 involves the lower Marsh Creek parcel of land to be excavated (it is assumed that this is the parcel designated as the Eco-Park in the planning application, PID 55189385, however; it is not confirmed in the report). The scenario indicates that the proposal is to remove and dispose of 356,000 m<sup>3</sup> of soil to create about 400,000 m<sup>3</sup> of compensatory storage. The report does not favor this option due to the cost of</p>	<p>A Stormwater and Hydrology Study was completed in 2017 and covers the issues stated. (see Appendix #3)</p>	<p><u>Section 4.3.2.3.2</u></p> <p>The Proponent appreciates that the Project site is located within the Glen Falls Flood Risk Area of Saint John and building within Flood Risk Areas of the City is guarded under the Flood Risk Area By-Law of the City of Saint John [CP-11]. Any loss of flood storage within a flood risk area requires that compensatory storage be provided in time to ensure that there is at no time any reduction in the flood water storage capacity of the area as a result of the development. Water storage maintenance measures can include on-site storage on roof and parking lots, temporary detention ponds, and retention ponds.</p> <p><u>Section 6.1.3</u></p> <p>The Project area is located within the Glen Falls and Lower Marsh Creek Flood Risk Areas of Saint John. Building within those areas requires analysis of flood risk and volume and purchase of compensatory storage. Horizon Management Ltd. is proposing to develop buildings within the Glen Falls Flood Risk Area and provide compensatory storage within the Lower Marsh Creek Flood Risk Area. It is understood that the By-Law requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Area.</p>	<p>Section 4.3.2.3.2 – Proposed Mitigation Section 6.1.3 – Flood Risk Area Development Permit</p>	<p>Stormwater</p>

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	<p>excavation and disposal of soil. Another scenario, Scenario #2, involves developing "The Crossing" project but no creation of compensatory storage (the report indicates that about 17,000 m3 of storage is required) and the last scenario, Scenario #4, seems to indicate that City-owned land (PID 55024921) could also be used to provide compensatory storage. Please be advised that Scenario #2 does not meet the requirements of the <i>Flood Risk Area By-Law</i> as no compensatory storage is provided to offset that lost by the development. Scenario 4 would also not be considered at this time as it would require a decision of Common Council to provide compensatory storage on City-owned land in lieu of the proponent providing it on their land.</p> <p>c. The Terrain report does not contain a recommended approach, based on a thorough assessment, to provide for the 17,000 cubic metres of compensatory flood storage that will be lost with completion of the development. The City requires this assessment in order to understand the impacts of the development on upstream and downstream areas of the Marsh Creek watershed and its flood storage capacity.</p> <p>d. The <i>Flood Risk Area By-Law</i> must be reviewed thoroughly by the developer's consultants and Flood Risk Areas permits must be obtained, following the required Section 39 Amendment, prior to the commencement of any development on project lands within the flood risk area. The requirements for the permit application are clearly outlined, as are the need for plans showing draining patterns in the City's <i>Flood Risk Area By-Law</i>. The applicant is required to provide the City with a proposed approach to provide the required compensatory storage. Upon receipt of this, it will be evaluated by City Staff to determine its compliance with the by-law and form part of the necessary information, in addition to the required stormwater modelling and other supporting studies, for the required amendment to the Section 39 conditions.</p>				
<b>GENERAL COMMENTS</b>					
TRC1-69	A number of the studies attached to the EIA Registration Document (dated November 23, 2016) are either draft reports and/or between 8 and 11 years old. Updated and finalized professional reports must be prepared by the developer/applicant and provided to the undersigned for TRC review and comment.	An updated Stormwater and Hydrology Study was completed in 2017. (see Appendix #3)	The studies, as requested, have been updated and copies are appended to the EIA document.	Appendices	Appendices
TRC1-70	Page 5 of the Registration Document mentions the economic benefits to the CoSJ. These should be	The Proponent will work with the City of Saint John through the Section 39 process.	<i>The Crossing</i> will have a very significant positive impact on the Greater Saint John region through project construction	Section 2.7.2 – Economic Generation	Economic benefits

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	evaluated in more detail once the implications for City infrastructure are better understood, and modelled for various levels of build-out.		<p>spending, the direct and indirect creation of employment, and the increase in tax revenues. Some additional points regarding economic generation are provided below.</p> <ul style="list-style-type: none"> <li>➤ Development of the site and the construction of buildings will result in millions of dollars being spent on labour and materials in the local economy.</li> <li>➤ Considerable local and regional employment opportunities will be generated during the construction phases and full-time retail service, management, and maintenance positions will be created over the long-term. The International Council of Shopping Centres estimates one permanent job is created for every 37.2 m<sup>2</sup> of retail development (<i>i.e.</i>, ~ 1 060 jobs for 44 000 m<sup>2</sup> of retail space).</li> <li>➤ <i>The Crossing</i> will be a gateway to the City of Saint John, attracting both locals and visitors from the highway to increase local spending; thus benefiting both new and existing businesses in the City.</li> <li>➤ The construction of new buildings will result in a very significant increase in the property tax base for the City of Saint John.</li> <li>➤ The creation of new employment and local spending will increase income taxes, HST revenue, and increase the provincial GDP.</li> <li>➤ The gateway nature of the Project will help to transform the City of Saint John from a "drive by" to a "drive in" destination.</li> <li>➤ The highway services component of the development combined with the international architectural design of the site will make <i>The Crossing</i> a destination for the Greater Saint John region.</li> <li>➤ The development of the Project site will provide a wider range of new and enhanced services to the Greater Saint John region.</li> <li>➤ <i>The Crossing</i> will be a very visible and architecturally unique development that will help create a greater sense of pride for the City.</li> </ul>		
TRC1-71	Page 10 of the Registration Document mentions construction of the main access road to the development. This intersection is already a concern and it should be anticipated that there will be significant, expensive upgrades required to accommodate the additional traffic. Responsibility for construction and ongoing maintenance costs should be understood in advance of this project proceeding. The completion of a Traffic Impact Study that would address the vehicle, transit, pedestrian and active transportation impacts of the development, and on-site circulation is a requirement of the Section 39 conditions and must be completed and approved by the City prior to any development occurring on the site.	Traffic Impact Study was completed in 2017. (see Appendix #1) Discussions with the City and the Province are on-going with respect to cost sharing.	<p>On 15 March 2015, the City of Saint John's Planning Advisory Committee dealt with a Municipal Plan Amendment and Rezoning application for 459, 617-885, and 540-900 Ashburn Road and a parcel of land northeast of the One Mile Interchange. A copy of the Section 39 information is included in Appendix TBD. Pursuant to Section 39 of the New Brunswick <i>Community Planning Act</i> [R.S.N.B. 1973, c. C-12], the proposed Project is subject to the 10 conditions the proposed Project is subject to the 10 conditions noted below (<i>n.b.</i>, the <i>Community Planning Act</i> was repealed and replaced with the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19] where rezoning is covered under Section 59).</p> <p>1. <b>Traffic Impact Study</b> - No portion of the site shall be developed prior to the completion of a Transportation Impact Study prepared by the developer and subject to the approval of Common Council, as a statutory amendment to</p>	Section 2.8.1.1 – Existing Approvals	Traffic

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			<p><i>these conditions. The scope of work for the transportation impact study will be established in cooperation with the City, NBDTI and the developer.</i></p> <p>2. <b>Site Servicing Study</b> - No portion of the site shall be developed prior to the preparation of a servicing study reviewing the impacts on the City's water supply and sanitary sewer collection systems prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p>3. <b>Stormwater Management Study</b> - No portion of the site shall be developed prior to the preparation of a stormwater management study that details the approach for stormwater management on the development site and reviews the impacts of the development on upstream and downstream areas of the Marsh Creek watershed prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p>4. <b>Environmental Impact Assessment Approval</b> - No portion of the site shall be developed prior to the proponent registering the project with the Provincial Environmental Impact Assessment Process and a Certificate of Determination being issued by the Province.</p> <p>5. <b>Detailed Development Plans</b> - No portion of the site shall be developed except in accordance with detailed plans including, but not limited to, a context plan, a site plan, typical building floor plans, building elevations, and a landscape plan all of which are to be prepared by the proponent and subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p>6. <b>Market Study</b> – Should a significant change be proposed in the project concept plan, an addendum is required to the market study that provides additional analysis of the impacts of the proposed development on the regional retail sector as a whole, and is subject to the approval of Common Council, as a statutory amendment to these conditions. This addendum to the market study will be prepared by the developer.</p> <p>7. <b>Municipal Infrastructure Upgrades</b> - Any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's responsibility and cost. However, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, that such cost-sharing agreement be subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p>8. <b>Maximum Building Size</b> - The maximum floor area of a building in the rezoned area is limited to 3000 square metres.</p> <p>9. <b>Additional Studies</b> – The required studies outlined in conditions a) through f) inclusive shall be completed within 5</p>		

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			<p><i>years of the date of the Municipal Plan amendment and rezoning coming into effect. Should this not occur, Common Council reserves the right to take steps to immediately repeal the rezoning agreement and the rezoning pursuant to Sections 39(5) and 39(6) of the Community Planning Act and return the land shall return [sic] to its previous zone which existed prior to this agreement; and, No portion of the site shall be developed prior to the preparation of a detailed phasing plan that graphically outlines the timeline for completion of the site development, prepared by the developer and is subject to the approval of Common Council, as a statutory amendment to these conditions. Common Council reserves the right to impose additional conditions relating to the timeline for completion of the project phases and the repeal of the rezoning agreement and the rezoning pursuant to Section 39(5) and 39(6) of the Community Planning Act and the return of the land to its previous zone which existed prior to this agreement at the time the studies are reviewed as part of the required Section 39 Amendment.</i></p> <p><b>10. Costs</b> – In accordance with Section 39(8) of the Community Planning Act, the applicant shall provide a certified cheque in the amount of one thousand dollars (\$1,000.00) to cover expenses related to the cancellation of the conditional rezoning agreement and/or repeal of the rezoning in the event that the conditions attached to the rezoning cannot be met, as per policy 1-5 in the Municipal Plan. The certified cheque shall be repayable on the substantial completion of the development for which the rezoning is granted. This shall be provided by the Developer to the City within 30 days of Third Reading of the 2016 Municipal Plan Amendment and Rezoning.</p> <p>It is expected that the 10 conditions made by the City of Saint John's Common Council, as per the Proponent's Section 39 (59) application, will be conditions of the EIA Certificate of Determination.</p>		
TRC1-72	<p>The Crossing is a major development application which required an amendment to the Primary Development Area (PDA) boundary. The PDA effectively represents the City's growth and servicing boundary over the horizon of the Municipal Plan and lands within the PDA are intended to accommodate the majority of future growth over the planning period. In reviewing the original Municipal Plan amendment and rezoning application, City staff noted further due diligence is required on behalf of the developer to assess the long term financial risks for the City with respect to future infrastructure requirements. Therefore, Staff recommended a two stage development approvals process for the project. The first stage approval, granted in 2016 provided an "approval in principle" for the land use changes, with the second stage requiring the developer to complete the necessary due diligence to demonstrate the technical and servicing aspects of</p>	<p>All of these Section 39 report requirements have been completed. (see Appendices 1,2 &amp; 3.</p>		<p>Please refer to the Response to TRC1-71 provided above.</p>	<p>Servicing</p>

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<p>the project are able to be satisfied with minimal financial risk to the City. This stage two approval requires that the developer complete the necessary infrastructure and servicing studies through a statutory amendment process to the current application prior to any development being permitted on the site. Specific servicing considerations include:</p> <ul style="list-style-type: none"> <li>a. Water Supply – Water capacity and fire flow requirements for the development must be verified by the developer’s engineering consultant and submitted to the City for review and approval. This includes the expected average and peak water consumption flows (domestic and fire) from this proposed development at full build-out and confirmation that there is enough capacity to support this proposed development. The developer has provided preliminary information that water servicing is available to support the development based on reduced demands from Kennebecasis Park however, this will need to be verified.</li> <li>b. Sanitary Sewer - Peak sanitary flows from the development at full build-out and assessment that existing sanitary sewers and wastewater pumping stations are capable of receiving this flow must be verified by the developer’s engineering consultant and submitted to the City for review and approval. City staff notes the existing sanitary lift station at Drury Cove was designed to accommodate the Drury Cove residential subdivision and would not be able to support this development proposal. A detailed analysis and design is required by the developer’s engineering consultant to determine what upgrades at the station and any associated piping would be necessary. Wastewater infrastructure installed to service the Drury Cove development is also subject to a development charge (lot levy) payable at the time subdivision plans are approved. The proposed development would therefore need to ensure adequate capacity to accommodate the development beyond what is required to support the Drury Cove build-out.</li> <li>c. Stormwater Management - A detailed storm water drainage plan and design report, indicating how storm water will be managed for the full build-out of the development, must be provided by the developer’s engineering consultant. In addition, the Marsh Creek Watershed must be analyzed by the developer’s engineering consultant to determine the impacts this proposed development (phased and full build-out) will have on the existing watershed. City staff notes the proposed Eco-Park provides the</li> </ul>				

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	potential some additional compensatory storage associated with the Flood Risk Area. d. Traffic / Transportation – No information has been provided by the applicant regarding the transportation impacts of the development. City staff notes the proposed development may have significant impact on traffic flow that would add to existing heavy traffic flow between Highway 1 and the Kennebecasis Valley and the UNB/Regional Hospital primary development area. An in depth traffic study must be completed by the developer's traffic engineering consultant to assess impacts and recommend possible solutions if warranted and possible. The development will require upgrading of Ashburn Road to a full suburban standard and probable intersection improvements off-site.				
TRC1-73	City staff notes the recent study completed by the province regarding the function of Route 1 and future access requirements along the corridor between the Kennebecasis Valley and Foster Thurston Drive is expected to provide input into the Traffic Impact Study required from the applicant.	exp, was responsible for the completion of both the Proponent's study and the Province's study. The data from both studies has been coordinated. (see Appendix #1)	➤ <i>exp Services Inc.</i> [2017a] completed the Traffic Impact Study for this Project and for the upgrades to the redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC1-74	The TAP Report notes extensive beaver activity on the property. This is contrary to information provided elsewhere in the EIA Registration Document. In addition, this 2005 report noted beaver dams and associated activity as causing extensive back flooding of the property. Have these conditions been rectified or do these conditions still contribute to back flooding of the property?	A new wetland delineation study conducted in 2017 show no evidence of current beaver activity. (see Appendix 7)	In 2005, there was extensive beaver activity across the property and primarily in the area where compensatory flood storage had been previously constructed. During the 2018 assessment by ACAP, remnants of three beaver dams were observed within Little Marsh Creek on the Project site. Those three dams showed signs of human removal. At this point in time, beaver activity appears to be managed on the property.	Section 3.1.5.1 - Watercourses	Stormwater and beavers
TRC1-75	The site plans from 2008 and 2016/2017 appear to show a 0.39 hectare parcel, PID 55066278, as part of the proposed development, however this parcel is not owned by the proponent nor is it listed as one of the properties to be included in the development. Also, this property was not included in the 2016 planning application. Can the proponent confirm if this parcel is part of the proposed development?	Yes.	PID 55066278 is owned by Canterbury Developments Ltd. and Edifice Development Inc. The property is not part of the development and it is not required for the development to proceed. The Proponent has no intentions of purchasing the property for use as part of the development.	Section 1.5 of the EIA document lists all of the properties that are part of <i>The Crossing</i> .	Property
<b>9 FEBRUARY 2017 LETTER</b>					
TRC1-76	Table 1 below includes a list of typical permits and legislation under the mandate of the New Brunswick Department of Transportation and Infrastructure (NBDTI). Note that Table 1 is not all inclusive, and additional permits and requirements relevant to the project may be required. The proponent is requested to review the table and speak with the appropriate contact regarding the permits/legislation which may be relevant to the project. Access Permit/Certificate of Setback Alan Kerr 506-643-7463 Highway Usage Permit Peter McDonald 506-453-6724 Community Planning Act Norm Cote 506-	Noted.		Please refer to the Responses to TRC1-77, TRC1-78, and TRC1-80 through TRC1-84 provided below.	Permitting

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	457-7559 Highway Act - Transfer of Administration and Control Colleen Brown 506-444-047 Provincial Motor Vehicle Act Permit Office 506-453-2982				
TRC1-77	<i>Special Permits</i> will be required for any transport on NBDTI designated roads that does not comply with Regulation 2001-67 under the NB <u>Motor Vehicle Act</u> . This Regulation includes the dimensions and mass information for legal operation on NBDTI designated roads. The proponent is requested to contact the NBDTI Permit Office as early as possible to discuss the transportation requirements for this project.	Noted.	The sizing of vehicles and their loadings on roadways in the Province is controlled under the Vehicle Dimensions and Mass Regulation [2001-67] of the <i>Motor Vehicle Act</i> [O.C. 2001-438]. All trucks used for the Project must adhere to the legal load weights limits at all times, including spring weight restrictions. If a truck exceeds dimensions and / or mass for a roadway, then there is a requirement to obtain permission under the Special Permit Fees Regulation [89-65] of the <i>Act</i> .	Section 6.2.9 – Vehicle Dimensions and Mass and Special Permit Fees	Permitting
TRC1-78	The proposed project location has been identified as near or within the vicinity of Routes 01, 100 and Ashburn and Jones Road. NBDTI requests the proponent contact Alan Kerr, District Engineer in Saint John well in advance of beginning the project to ensure that all of the department's concerns are addressed.	Noted Discussions have been initiated with NBDTI and the concerns will be addressed.	As per the Provincial Set-Back Regulation [84-292] of the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19], an access road permit or certificate of setback is required when constructing a new access road, using an existing access road, or building a structure near roadways under NBDTI jurisdiction. Permits / certificates are administered by NBDTI district offices.	Section 6.2.6 – Access Road Permit / Certificate of Setback	Permitting
TRC1-79	NBDTI has concerns regarding the increased traffic that will result from this project as well as the potential for future flooding of NBDTI's infrastructure in the area of this proposal. NBDTI will not be responsible for any damage to infrastructure caused by this project, and may have additional questions once it has had the opportunity to review the forthcoming Traffic Impact and Storm Water Management Studies.	Noted.	No additional response required.		Traffic and stormwater
TRC1-80	The <i>Work Area Traffic Control Manual</i> (WATCM) provides a uniform set of traffic control guidelines for all work carried out on New Brunswick provincial roads. Any work that occurs within the right-of-way of a provincial road must conform to the guidelines prescribed by this manual. A PDF version of the manual is available at <a href="http://www.gnb.ca/0113/publications/watcm-e.asp">http://www.gnb.ca/0113/publications/watcm-e.asp</a> .	Noted.	As per the Highway Usage Regulation [2010-55] of the New Brunswick <i>Highway Act</i> [R.S.N.B. 1973, c. H-5], a highway usage permit is required when carrying out any development, construction, repair, or maintenance within the limits of a roadway under NBDTI jurisdiction. Any work that occurs within the right-of-way of a provincial road must conform to the guidelines prescribed in the Work Area Traffic Control Manual (WATCM).	Section 6.2.5 – Highway Usage Permit	Permitting
TRC1-81	Trucks must adhere to legal load weight limits at all times, including spring weight restrictions when applicable. All loads are to be properly secured during transit according to the <u>Motor Vehicle Act</u> .	Noted.	The sizing of vehicles and their loadings on roadways in the Province is controlled under the Vehicle Dimensions and Mass Regulation [2001-67] of the <i>Motor Vehicle Act</i> [O.C. 2001-438]. All trucks used for the Project must adhere to the legal load weights limits at all times, including spring weight restrictions. If a truck exceeds dimensions and / or mass for a roadway, then there is a requirement to obtain permission under the Special Permit Fees Regulation [89-65] of the <i>Act</i> .	Section 6.2.9 – Vehicle Dimensions and Mass and Special Permit Fees	Permitting
TRC1-82	Any spillage of material that occurs during hauling must be kept to a minimum and promptly removed from the highway following appropriate safety procedures.	Noted See Environmental Management Plan, Appendix # 5	➤ Any spillage of material that occurs on provincial roadways during the hauling of material from the Project site should be kept to a minimum and promptly removed from them following appropriate safety procedures.	Section 4.3.4.2.2 – Proposed Mitigation	Permitting
TRC1-83	A <i>Highway Usage Permit</i> is required if the proponent intends to utilize NBDTI right-of-ways.	Noted.	As per the Highway Usage Regulation [2010-55] of the New Brunswick <i>Highway Act</i> [R.S.N.B. 1973, c. H-5], a highway usage permit is required when carrying out any development, construction, repair, or maintenance within the limits of a roadway under NBDTI jurisdiction. Any work that occurs within the right-of-way of a provincial road must conform to the	Section 6.2.5 – Highway Usage Permit	Permitting



ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			guidelines prescribed in the Work Area Traffic Control Manual (WATCM).		
TRC1-84	An <i>Access Road Permit</i> is required prior to the construction of any access roads off NBDTI road(s).	Noted.	As per the Provincial Set-Back Regulation [84-292] of the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19], an access road permit or certificate of setback is required when constructing a new access road, using an existing access road, or building a structure near roadways under NBDTI jurisdiction. Permits / certificates are administered by NBDTI district offices.	Section 6.2.6 – Access Road Permit / Certificate of Setback	Permitting
TRC1-85	The proponent is advised to contact NBDTI as early as possible regarding any permits or approvals required. The process required for approvals can take up to several months to complete.	Noted Such discussions have been initiated		Refer to the Response to TRC1-80, TRC1-81, TRC1-83, and TRC1-84 provided above.	Permitting
TRC1-86	Is the proponent aware of any additional transportation issues?	No.	The Proponent is not aware of any additional transportation issues other than those noted in the EIA document and associated traffic studies.		Traffic
<b>1 NOVEMBER 2017 LETTER</b>					
<b>NBDELG &amp; NBDERD QUESTIONS AND COMMENTS</b>					
TRC2-1	Please note the response for TRC comment #34 in letter dated December 22, 2016 was incomplete. The proponent responded with "Noted", which only referred to the part of #34. Please submit a more detailed response.			Please refer to the Response to TRC1-34 provided above.	Comment TRC 1-34
TRC2-2	Any of the proponent's responses that references "see Appendix 'X'" or "noted" must provide a more detailed reply.				TRC Responses
TRC2-3	Storm Water Management Strategy and Stream Hydraulics and Hydrology Report Section 2.2 – The report states that the project will occur in several phases over a 10 to 15 year period. Please provide more details regarding the proposed phases of the development. For example, is commercial development being completed first, followed by residential? What types of residential units are being proposed?		The overall build-out of the Project is anticipated to occur over a period of 10 to 20 years. The exact timeline, location of buildings, and tenants will be dictated by market conditions; however, it is expected that the Highway Services will be the development's nucleus ( <i>i.e.</i> , PID 00432203) and extend outward from there.  For planning purposes, the Proponent has divided the Project, based on floor space, into three general phases: ➤ Phase 1, ~ 35 000 m <sup>2</sup> with highway services being the proposed anchor; ➤ Phase 2, ~ 35 000 m <sup>2</sup> with a retail / entertainment focus; and ➤ Phase 3, ~ 44 500 m <sup>2</sup> including multi-family residential.	Section 2.7.1.1 – Build-Out	Stormwater
TRC2-4	TRC comment #43 in letter dated December 22, 2016 requested a revised copy of Figure 1 depicting the wetlands, location of current watercourses (it appears as the rerouted watercourse), a legend and the phases of development (e.g. which section of the property will be developed first; type of development). Not all of the requested information was included in the revised map. Please submit another copy of this map providing all of the requested information.		Figures have been updated throughout the EIA document and many new figures were added to better describe the Project and existing environment.	Throughout	Figures in EIA
TRC2-5	Please provide additional information regarding the proposed watercourse realignment of Little Marsh Creek and any other watercourse alteration work associated with the proposed development (e.g. the		To facilitate Project development, tributaries of Little Marsh Creek will require alteration. The potential impacts to on-site watercourses will be as follows:	Section 4.3.2.3.1 – Potential Impacts	Watercourses

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	length of the watercourse to be realigned). A map depicting the current watercourse location and the proposed realignment as well as the property boundaries, PIDs, a scale and a legend must also be included. Also, how much riparian buffer will be maintained between the watercourse and the proposed development?		<ul style="list-style-type: none"> <li>➤ an unnamed tributary between Fulton Lane and Ashburn Road, ~ 178 m long and 1 m to 2 m wide (<i>i.e.</i>, ~ 270 m<sup>2</sup>) will be piped;</li> <li>➤ an unnamed tributary near Rothesay Road / Rothesay Avenue intersection, ~ 165 m long and 2 m to 4 m wide (<i>i.e.</i>, ~ 500 m<sup>2</sup>) will be realigned within an open channel;</li> <li>➤ an unnamed tributary near Jones Drive / Ashburn Road intersection, ~ 220 m and 0.5 m to 1 m wide (<i>i.e.</i>, ~ 170 m<sup>2</sup>) may be realigned within an open channel / pipe; and</li> <li>➤ an unnamed tributary near Foster Thurston / Ashburn Road intersection, ~ 40 m long and 1 m to 1.5 m wide (<i>i.e.</i>, ~ 50 m<sup>2</sup>) will be piped.</li> </ul> <p>The overall combined linear length of the proposed alterations is ~ 600 m and the overall combined area of the proposed alterations is ~ 540 m<sup>2</sup>. The actual linear length and area will be determined during detailed design and during permitting as will the design / sizing of piping and open channels.</p>		
TRC2-6	There is potential for hydrocarbons, sediment, nutrients, etc. to enter Little Marsh Creek which could adversely impact the watercourse. Please provide details regarding stormwater management and if pollutants and sediment can be prevented from entering storm drains and runoff directly into watercourses once development is complete?		<ul style="list-style-type: none"> <li>➤ Any surface water runoff collected from parking lots and roadways within the Project site should be directed to a hydrodynamic separator, or similar product, before being discharged to any watercourse and / or wetland in order to remove hazardous materials, such as grit, fuels, oils, lubricants, and floatables.</li> </ul>	Section 4.3.2.3.2 – Proposed Mitigation	Stormwater
<b>SOURCE AND SURFACE WATER MANAGEMENT BRANCH QUESTIONS AND COMMENTS</b>					
TRC2-7	Was the entire project area evaluated for wetlands or was the on the ground wetland delineation completed only on the portions of the project that had highest potential for wetlands?		When TAP [2005] conducted their preliminary watercourse and wetland assessment they noted that wetlands on the Project site would need to be delineated in order to determine their extent ( <i>i.e.</i> , refer to Appendix IV). Dillon Consulting (Dillon) completed a wetland delineation and functional assessment for the entire Project site and lands along Rothesay Avenue ( <i>i.e.</i> , formerly referred to as the Eco-Park site) during May and June 2017 [Dillon, 2017] ( <i>i.e.</i> , refer to Appendix XI). A total of 42.9 ha and 8.4 ha of wetland were delineated at the Project and Eco-Park sites, respectively. Regulated wetlands ( <i>i.e.</i> , those that appear on the GeoNB Map Viewer) at the two sites are 10.5 ha and 0 ha, respectively, for the Project site and the lands along Rothesay Avenue.	Section 3.1.5.2 – Wetlands Appendix IV – TAP Environmental Resources Inc. Preliminary Watercourse and Wetland Assessment Appendix XI – Dillon Consulting Wetland Delineation and Functional Assessment	Wetlands
TRC2-8	Why was the Ecological Condition (EC) chosen as the only function score to report on from the WESP-AC assessments? The EC score is determined based on the presence of invasives, species of concern, bare ground and the amount of shrub and herbaceous vegetation. WESP-AC describes 17 wetland functions and benefits which are calculated based on all 111 indicator questions. Please describe the “higher” scoring functions of the wetlands AA1 and AA2?		Dillon used the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC), a standardized methodology for rapidly assessing some important natural functions of non-tidal wetlands in Atlantic Canada [Adamus, 2016]. A summary of the functional assessment results is provided in the table and a copy of the Dillon [2017] assessment is included in Appendix XI. Results indicate that the wetlands provide ecological value, specifically related to the maintenance of water quality and aquatic habitat for the Marsh Creek Watershed. Furthermore, the wetlands are at risk based on ecological sensitivity and surrounding stressors ( <i>i.e.</i> , denoted by the “Higher” benefit rating for wetland risk in the table.	Section 3.1.5.2 – Wetlands Appendix XI – Dillon Consulting Wetland Delineation and Functional Assessment	Wetlands

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC2-9	The area of wetland within AA1 and AA2 is described as over 40 hectares in size, please describe mitigation methods for the loss of these wetland functions?		The current proposal for <i>The Crossing</i> , which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched.	Section 2.6.2.3 – Current Proposal	Wetlands
TRC2-10	It is stated that the project will impact more than 10 hectares of regulated wetland. All loss of regulated wetland requires wetland compensation at a 2:1 ratio. Has the exact amount/location of impacted regulated wetland area been determined? If so, please provide detailed drawings and additional details regarding the impact to the wetland and what steps will be taken to compensate for the loss of the regulated wetland area at a 2:1 ratio?		The current proposal for <i>The Crossing</i> , which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched.	Please refer to the Response to TRC2-9 provided above.	Wetlands
TRC2-11	Any required wetland compensation projects required for this project should occur within the City of Saint John.		Wetlands provide many ecological and socio-economic functions and New Brunswick has adopted a <i>no-net-loss</i> approach to wetlands consistent with the Federal government. Under that approach, wetland avoidance is preferred and is achieved by choosing an alternate project, alternative project design, or alternate development. Minimization and compensation, respectively, follow avoidance. Horizon has avoided direct impacts as a result of this Project to regulated wetlands by changing its conceptual design to be outside of the regulated buffer. Should any wetlands be impacted, it will only be done through regulatory approval. It is understood that compensation will be required for the loss of regulated wetland area and that the compensation ratio would likely be 2:1. Furthermore, any required wetland compensation required would be done within the City of Saint John and most likely within the Marsh Creek watershed on lands owned by the Proponent.	Section 4.3.2.3.1 – Potential Impacts	Wetlands
TRC2-12	Has the proponent conducted surveys in order to determine if there are unmapped watercourses which meet the watercourse definition? Any proposed work in or within 30 metres of a regulated wetland or watercourse will require a valid Watercourse and Wetland Alteration (WAWA) permit.		<p><u>Section 3.1.5.1</u> An assessment was conducted by ACAP Saint John [Stewart-Robertson et al., 2018] of Little Marsh Creek and its tributaries in June and July 2018. No unmapped watercourses that meet the watercourse definition were identified on the Project site by ACAP Saint John during their 2018 assessment.</p> <p><u>Section 6.2.4</u> New Brunswick's watercourses and wetlands are afforded protection under the WAWA Regulation [90-80] of the New Brunswick <i>Clean Water Act</i> [S.N.B. 1989, c. C-6.1]. Any proposed alterations within watercourses and / or wetlands, or within their 30 m regulated buffer, require permitting through the NBDELG's WAWA program. A copy of the New Brunswick <i>Clean Water Act</i> can be found at: &lt;<a href="http://laws.gnb.ca/en/ShowPdf/cs/C-6.1.pdf">http://laws.gnb.ca/en/ShowPdf/cs/C-6.1.pdf</a>&gt;; a copy of the WAWA Regulation can be found at: &lt;<a href="http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf">http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf</a>&gt;; the WAWA application portal can be found at: &lt;<a href="https://www.elgegl.gnb.ca/WAWAG/en/Home/Site">https://www.elgegl.gnb.ca/WAWAG/en/Home/Site</a>&gt;; and a copy of the WAWA technical guidelines can be found at:</p>	Section 3.1.5.1 – Watercourses Section 6.2.4 – Watercourse and Wetland Alteration Permit	Wetlands

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			<p><a href="https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/WatercourseWetlandAlterationTechnicalGuidelines.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/WatercourseWetlandAlterationTechnicalGuidelines.pdf</a></p> <p>Contact information for the NBDELG WAWA program is as follows:</p> <p>NBDELG Surface Water Protection Sustainable Development and Impact Evaluation Marysville Place PO Box 6000 Fredericton, NB E3B 5H1 ☎ 506.457.4850 ☎ 506.453.6862 📧 <a href="http://www2.gnb.ca/content/gnb/en/departments/elg/environment.html">http://www2.gnb.ca/content/gnb/en/departments/elg/environment.html</a> 📧 <a href="mailto:elg/eql-info@gnb.ca">elg/eql-info@gnb.ca</a></p> <p>Little Marsh Creek and its contiguous wetland are prominent features on portions of the properties proposed for development. Those features and their 30 m regulated buffers will be partially impacted as a result of this Project. For example, there will be at least two crossings of Little Marsh Creek to access <i>The Crossing</i> from Ashburn Road. Therefore, a WAWA permit will be required before any impact can occur to those features and / or their 30 m regulated buffers. It is likely that this will be a condition of EIA approval.</p>		
TRC2-13	<p>Has the proponent incorporated watercourses into the project plans based on the new watercourse definition? Any work within 30 metres of a watercourse that meets the new watercourse definition will also require a valid WAWA permit. Watercourses in New Brunswick are defined as the following: a feature in which the primary function is the conveyance or containment of water, which includes:</p> <ol style="list-style-type: none"> <li>The bed, banks and sides of any watercourse that is depicted on the New Brunswick Hydrographic Network layer (available on GeoNB Map Viewer);</li> <li>The bed, banks and sides of any incised channel greater than 0.5 metres in width that displays a rock or soil (mineral or organic) bed, that is not depicted on New Brunswick Hydrographic Network layer (available on GeoNB Map Viewer); water/flow does not have to be continuous and may be absent during any time of year; or</li> <li>A natural or man-made basin (i.e. lakes and ponds).</li> </ol>			Please refer to the Response to TRC2-12 provided above.	Watercourses and wetlands
TRC2-14	Will a vegetated buffer be established along the watercourses, and if so, what is the proposed width of buffer zone? Will there be established overflow areas for the watercourses?		It is anticipated that Little Marsh Creek will remain largely untouched, but portions of the regulated 30 m buffer will be impacted to increase channel capacity through the Project site;	Section 4.3.2.3.1 – Potential Impacts	Watercourses

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			however, it is anticipated that the remaining vegetated buffer will be an average of 10 m wide on each side of Little Marsh Creek.		
TRC2-15	Will the flood retention pond discharge directly into the watercourse? Will a vegetated buffer be established around the pond, and if so, how wide will be it?		Compensatory storage options considered in the assessment include: <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>e.g.</i>, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, <i>etc.</i>); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas to provide compensatory storage capacity).</li> </ul>	Section 2.8.2.10 – Storm Water Management	Watercourses
TRC2-16	Will in-situ soils have to be removed for engineered fill for development purposes? If so, what is the proposed plan for dewatering and transporting this material?		Portions of the overall Project site will be prepared as required. When a portion of the site is required, existing trees and shrubs will be removed along with the grubbing. The remainder of the materials, including <i>in-situ</i> soils, will remain on-site. Recommendations to improve soil conditions at the site include: <ul style="list-style-type: none"> <li>➤ surcharging the development area with soil;</li> <li>➤ using light weight fills in all developed areas;</li> <li>➤ using geogrids and / or geotextiles under all developed areas; and / or</li> <li>➤ using geofoam under all developed areas.</li> </ul> There are no plans to remove <i>in-situ</i> soils from the site. Therefore, there is no proposed plan for dewatering and transporting the material.	2.8.2 Stage II – Project Construction	Material removal
TRC2-17	The proponent states that the channel will be straightened by removing bends and oxbow. Bends and oxbows provide capacity and function to slow the velocity of water within the channel. Has the client considered the loss of channel capacity and how this will affect the downstream system? Will an EPP be developed for the channel isolation and re-alignment?		The site plans submitted with the original EIA application of 25 November 2016 and the modified EIA application of 14 February 2019 have been further modified to reduce the Project's impacts on the watercourse, wetlands, and to minimize the volume requirement for floodplain compensation. The current proposal for <i>The Crossing</i> , which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched.	Section 2.6.2.3 – Current Proposal	Watercourses and EPP
<b>DEPARTMENT OF ENERGY AND RESOURCE DEVELOPMENT QUESTIONS AND COMMENTS</b>					
TRC2-18	In regards to question #42 of the TRC letter dated December 22, 2016, this question requests updated information on fish species presence following improvement to the waste water treatment in the Marsh Creek watershed in 2014, however, the proponent still refers to the ACAP 2013 study. The ACAP study also refers to the removal of a barrier to upstream fish passage. A current electrofishing study of the area to be impacted by this development including the section of stream to be relocated should be undertaken.		From the mid-1800s to about 2014, sewage outfalls discharged untreated waste into Marsh Creek, which drains to Saint John Harbour. Discharge from those outfalls was halted when a new wastewater treatment plant in east Saint John, part of Saint John Harbour Cleanup, came online. Since then, Marsh Creek has seen a transformation from a polluted waterway to a more natural system. Horizon Management recently contracted the Saint John Chapter of the Atlantic Coastal Action Program (ACAP Saint John) to undertake a fish and fish habitat assessment on the portion of Little Marsh Creek between Foster Thurston Drive and Rothesay Road. This was done in an effort to determine if additional fish species are inhabiting Little Marsh Creek following the stemming of sewage discharge and the removal of at least one barrier to upstream fish passage.	Section 3.2.5.2.1 – Fishes Appendix IV – TAP Environmental Resources Inc. Preliminary Watercourse and Wetland Assessment Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment Appendix XXII – ACAP Saint John Spot Electrofishing Data	Fish

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			In summary, Little Marsh Creek has an abundance of resident aquatic life and forms a key link between Marsh Creek and the headwaters comprising lakes and wetlands.		
TRC2-19	A site specific EPP for the watercourse relocation portion of this project should be developed.		<ul style="list-style-type: none"> <li>➤ Piping and / or realigning watercourses should be kept to a minimum in order to limit impacts to the natural drainage characteristics of Little Marsh Creek and its tributaries.</li> <li>➤ Site-specific measures should be developed for piping and / or realigning any watercourses and those measures should be submitted for review and approval when applying for regulatory permits / authorizations. If fish passage is interrupted during any piping and / or realigning of watercourses, then that interruption should be kept to a minimum during the summer low-flow period between 1 June and 30 September.</li> </ul>	Section 4.3.2.3.2 – Proposed Mitigation	Environmental protection plan
<b>FISHERIES AND OCEANS CANADA QUESTIONS AND COMMENTS</b>					
TRC2-20	What is the length of channel to be cut off and the number of square meters this equates to with regards to the straightening of the “loop” in Marsh Creek between Ashburn Road and HWY 1.			Please refer to the Response to TRC2-17 provided above.	Watercourses
TRC2-21	What is the linear length and square meters of the tributary to be realigned as part of the development project.			Please refer to the Response to TRC2-5 provided above.	Watercourses
TRC2-22	Can the proponent provide photos depicting the habitat in the reaches of the watercourse to be altered and labeled as such to clearly demonstrate the quality of the habitat to be affected.		ACAP conducted the fish and fish habitat assessment of Little Marsh Creek in June and July 2018. The assessment was completed on the lands proposed for the Project as well as upstream and downstream in order to better characterize the system. The habitat within the project site is fairly uniform and riparian vegetation consists of tall grasses, alder, and willows. Stream cover and shade, with the exception of areas with willow, is sparse. The stream bottom is primarily silty, water depths vary from 30 cm to 110 cm, and the stream width ranges from 4.5 m to 12 m.	Section 3.2.5.2.1 – Fishes Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment	Watercourses
TRC2-23	Has the proponent determined what species are in the lakes / wetlands upstream of the project locations and thus what fish may use this section of the watercourse as a corridor to the upstream environment? This can vary from the species found in the creek during spot check electrofishing and may require separate habitat surveys upstream		As detailed in the attached ACAP report, 19 species of fishes were identified within the project site and the surrounding tributaries. Species observed included brook trout, brown trout, and American eel.	Section 3.2.5.2.1 – Fishes Appendix XVII – ACAP Saint John Little Marsh Creek Watercourse Assessment	Fish
TRC2-24	What is the duration, if applicable, in which fish passage is anticipated to not be provided during the development of this project?			Please refer to the Response to TRC2-19 provided above.	Fish
TRC2-25	What are the desired work windows for watercourse alterations and realignments?		<ul style="list-style-type: none"> <li>➤ In-water work should only be conducted between 1 June and 30 September in order to minimize impact to fish and fish habitat unless otherwise approved by the Regulator(s). Furthermore, the duration of all in-stream work should be kept to a minimum in order to mitigate any potential impacts.</li> </ul>	Section 4.3.3.2.2 – Proposed Mitigation	Watercourses
TRC2-26	What is the total estimated footprint for the habitat alterations and habitat destructions as part of this project?			Please refer to the Response to TRC2-21 provided above.	Watercourses

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TRC2-27	DFO would like the proponent to be aware that a S.35(2) <i>Fisheries Act</i> Authorization may be required based on the current information and that the proponents should consider this when discussing timelines for project completion.		<p>It is understood that a S.35(2) <i>Fisheries Act</i> Authorization will be required to undertake any realignment of Little Marsh Creek and / or complete any in-stream work, such as installing culverts within Little Marsh Creek for access roads on to the site from Ashburn Road.</p> <p>In order to comply with the Fisheries Act, we will adhere to the DFO guidance tools, which we understand can be found at: <a href="http://www.dfo-mpo.gc.ca/pnwpppe/measures-mesures/index-eng.html">http://www.dfo-mpo.gc.ca/pnwpppe/measures-mesures/index-eng.html</a></p> <p>We also understand that it is the proponent's responsibility to meet all other requirements of federal, provincial, and municipal agencies.</p>	Section 6.3.1 – Fisheries Authorization	Watercourses and fish
TRC2-28	If a S.35(2) <i>Fisheries Act</i> Authorization is required, the proponent will be required to conduct First Nations Consultation and this should be included in the project planning and timelines moving forward.		<p><u>Section 5.1.1</u></p> <p>The provincial government will consult with First Nations communities during the EIA review Process. To that end, a meeting was held with representatives of the Aboriginal Affairs Secretariat (<i>i.e.</i>, Patrick Francis and John Adams) on 4 August 2016. At that time, it was indicated that there are no apparent adverse impacts to Aboriginal or treaty rights; however, the Proponent understands that there is an obligation to further consult First Nations when obtaining Project permits, such as a Fisheries Authorization.</p> <p><u>Section 6.3.1</u></p> <p>It is understood that First Nations consultation is a component of the work required to obtain a Fisheries Authorization; however, it is recognized that representatives with the Department of Fisheries and Oceans serve as the coordinator for consultations.</p>	Section 5.1.1 – First Nations Section 6.3.1 – Fisheries Authorization	Watercourses and fish
TRC2-29	The proponent refers to the <i>Endangered Species Act</i> in the EPP, please be advised that the <i>Endangered Species Act</i> has been replaced by the <i>Species At Risk Act</i> , please change the <i>Endangered Species Act</i> to the <i>Species At Risk Act</i> in the EPP		<p>As per the New Brunswick <i>Species At Risk Act</i> [S.N.B. 2012, c.6], it is illegal to kill, harm, harass, take, possess, buy, sell, or trade a species listed under the <i>Act</i> as extirpated, endangered, or threatened. Several species are ranked under the List of Species at Risk Regulation [2013-38] of the provincial <i>Species At Risk Act</i> (pSARA). Should impacts be required to a species listed as extirpated, endangered, or threatened and / or designated habitat, it must first be authorized through a pSARA Permit. The NBDNRED administers the pSARA.</p> <p>A copy of the New Brunswick <i>Species at Risk Act</i> can be found at: &lt;<a href="http://laws.gnb.ca/en/ShowPdf/cs/2012-c.6.pdf">http://laws.gnb.ca/en/ShowPdf/cs/2012-c.6.pdf</a>&gt;;</p> <p>a copy of the List of Species at Risk Regulation can be found at: &lt;<a href="http://laws.gnb.ca/en/ShowPdf/cr/2013-38.pdf">http://laws.gnb.ca/en/ShowPdf/cr/2013-38.pdf</a>&gt;; and</p> <p>the public registry can be found at: &lt;<a href="https://www1.gnb.ca/0078/SpeciesAtRisk/search-e.asp">https://www1.gnb.ca/0078/SpeciesAtRisk/search-e.asp</a>&gt;.</p> <p>Contact information for the Habitat, Species at Risk, and Protected Natural Areas Section is as follows: Habitat, Species at Risk, and Protected Natural Areas Section Fish and Wildlife Branch Hugh John Flemming Forestry Centre PO Box 6000 Fredericton, New Brunswick</p>	Section 6.2.3 – Provincial Species At Risk Permit	Species at risk

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			<p>E3B 5H1</p> <p>☎ 506.453.3826            📠 506.453.6699            📧 <a href="mailto:dnr_mrnweb@gnb.ca">dnr_mrnweb@gnb.ca</a></p> <p><a href="http://fetenbday.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/wildlife/content/SpeciesAtRisk.html">http://fetenbday.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/wildlife/content/SpeciesAtRisk.html</a></p> <p>As listed in the table, there are several species listed as being of special concern, endangered, or threatened under the pSARA that may be present at the Project site. If a listed species is identified as being present during construction activities and it may be impacted, then a pSARA Permit would be required.</p>		
<b>DEPARTMENT OF ENERGY AND RESOURCE DEVELOPMENT QUESTIONS AND CONCERNS</b>					
TRC2-30	There is also reference to NBDNR in the EPP, please note that the New Brunswick Department of Natural Resources (NBDNR) should be changed to the New Brunswick Department of Energy and Resource Development (NBDERD).		New Brunswick Department of Energy and Resource Development (NBDERD) was recently changed to New Brunswick Department of Natural Resources and Energy Development (NBDNRED) and is reflected throughout the document.	Throughout	Department Name
TRC2-31	The proponent also refers to seeding in the EPP, when seeding and area, use native seed mixes if possible. If not possible, ensure that the seed mix does not contain species that could be invasive.		<p>Exposed areas adjacent to the development will be seeded to promote revegetation. The seed mix used will comprise a variety of native herbaceous species and be free of invasive species. Revegetation of areas adjacent to Little Marsh Creek and on-site wetlands will be guided by the following prescription:</p> <ul style="list-style-type: none"> <li>➤ 60 % blue joint reed-grass (<i>Calamagrostis canadensis</i>);</li> <li>➤ 15 % American manna grass (<i>Glyceria grandis</i>);</li> <li>➤ 10 % wool grass (<i>Scirpus cyperinus</i>);</li> <li>➤ 10 % soft rush (<i>Juncus effuses</i>);</li> <li>➤ 3 % boneset (<i>Eupatorium perfoliatum</i>); and</li> <li>➤ 2 % blue vervain (<i>Verbena hastate</i>).</li> </ul>	Section 2.7.5 - Landscaping	Revegetation
TRC2-32	Please be advised that the bird breeding season for the areas is as follows: forest (April 8 to August 28), open (April 21 to August 28), wetland (April 8 to August 16), please refer to this link: <a href="https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html">https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html</a>		<p><u>Section 3.2.5.2.3</u></p> <p>The annual bird breeding season in the Project area (<i>i.e.</i>, Zone C3) is as follows:</p> <ul style="list-style-type: none"> <li>➤ forested areas - 8 April to 28</li> <li>➤ open areas - 21 April to 28 August; and</li> <li>➤ wetland areas - 8 April to 16 August.</li> </ul> <p>With respect to Zone C3, the information provided below was taken directly from ECCC's website regarding the general nesting periods of migratory birds.</p> <p>For nesting Zone C3, within the species used, there are 84 species known to nest in forest habitats. The percentages of species actively nesting are:</p> <ul style="list-style-type: none"> <li>➤ 0 % from August 29 to April 7;</li> <li>➤ &lt; 5 % from April 12 to 16 and from August 17 to 27;</li> <li>➤ 6 % to 10 % percent from April 17 to 21 and from August 12 to 16;</li> <li>➤ 11 % to 20 % from April 22 to May 4 and from August 4 to 11;</li> </ul>	Section 3.2.5.2.3 – Birds Section 4.3.3.1.2 - Mitigation	Migratory birds



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			<ul style="list-style-type: none"> <li>➤ 21 % to 40 % from May 5 to 15 and from July 29 to August 3;</li> <li>➤ 41 % to 60 % from May 16 to 23 and from July 23 to 28; and</li> <li>➤ 61 % to 100 % from May 24 to July 22.</li> </ul> <p>For nesting Zone C3, within the species used, there are 88 species known to nest in open habitats. The percentages of species actively nesting are:</p> <ul style="list-style-type: none"> <li>➤ 0 % from August 29 to April 11;</li> <li>➤ &lt; 5 % from April 17 to 21 and from August 18 to 27;</li> <li>➤ 6 % to 10 % from April 22 to 25 and from August 14 to 17;</li> <li>➤ 11 % to 20 % from April 26 to May 4 and from August 4 to 13;</li> <li>➤ 21 % to 40 % from May 5 to 15 and from July 28 to August 3;</li> <li>➤ 41 % to 60 % from May 16 to 21 and from July 23 to 27; and</li> <li>➤ 61 % to 100 % from May 22 to July 22.</li> </ul> <p>For nesting Zone C3, within the species used, there are 60 species known to nest in wetland habitats. The percentages of species actively nesting are:</p> <ul style="list-style-type: none"> <li>➤ 0 % from August 17 to April 7;</li> <li>➤ &lt; 5 % from April 12 to 14 and from August 9 to 15;</li> <li>➤ 6 % to 10 % from April 15 to 16 and from August 3 to 8;</li> <li>➤ 11 % to 20 % from April 17 to 21 and from July 30 to August 2;</li> <li>➤ 21 % to 40 % from April 22 to May 9 and from July 25 to 29;</li> <li>➤ 41 % to 60 % from May 10 to 13 and from July 20 to 24; and</li> <li>➤ 61 % to 100 % from May 14 to July 19.</li> </ul> <p><u>Section 4.3.3.1.2</u></p> <ul style="list-style-type: none"> <li>➤ Horizon Management will ensure that Project activities are managed so as to ensure compliance with the <i>Migratory Birds Convention Act, 1994</i> [S.C. 1994, c. 22] and associated regulations.</li> <li>➤ Any tree clearing activity should be undertaken outside of the annual migration and breeding season for migratory birds in the greater Saint John region, which generally occurs between 5 April and 31 August, in order to protect nesting areas.</li> <li>➤ If tree clearing is required within the annual migration and breeding season for migratory birds in the greater Saint John region (<i>i.e.</i>, between 5 April and 31 August), then additional measures should be implemented, such as having a qualified biologist and / or experienced birder conduct a survey of the area prior to clearing to ensure no active nests are present and only after approval from the New Brunswick Department of the Environment and Local Government.</li> <li>➤ Tree clearing within 30 m from the highwater mark of any water body should be minimized in order to maintain movement for migratory birds and if any tree clearing is required within 30 m then it will only be done through</li> </ul>		

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			<p>regulatory approval, such as under the Watercourse and Wetland Alteration Regulation [90-80] of the New Brunswick <i>Clean Water Act</i> [S.N.B. 1989, c. C-6.1].</p> <ul style="list-style-type: none"> <li>➤ If an active nest, den, <i>etc.</i> is encountered, a no-disturbance buffer zone of 30 m+ should be established around the area (<i>n.b.</i>, flagging tape should not be used to mark the feature as it increases the change of predation and representatives with the Canadian Wildlife Service should be contacted to determine the appropriate buffer size) until a qualified biologist determines if the buffer zone shall remain, if the size should be increased, or if the buffer zone can be eliminated (<i>i.e.</i>, the animal has abandoned the feature).</li> <li>➤ Large piles of soil should not be left uncovered / unvegetated during the annual migration and breeding season for migratory birds in the greater Saint John region (<i>i.e.</i>, between 5 April and 31 August) in order to discourage the use by certain species (<i>i.e.</i>, bank swallows) for nesting and roosting unless slopes are reduced to &lt; 70°.</li> <li>➤ If injured or diseased wildlife are encountered, then the Department of Natural Resources and Energy Development and the Canadian Wildlife Service should be contacted to determine the appropriate course of action.</li> <li>➤ If deceased animals are encountered, they should be removed and disposed of, as soon as possible, in consultation the Department of Natural Resources and Energy Development and the Canadian Wildlife Service.</li> <li>➤ If species listed under the federal <i>Species At Risk Act</i> are observed on the Project site, then their sightings will be reported to Environment and Climate Change Canada's Canadian Wildlife Service branch.</li> </ul>		
<b>CLIMATE CHANGE SECRETARIAT QUESTIONS AND COMMENTS</b>					
TRC2-33	For the following comments 53, 54, 55, 57, 58, 59 please provide more information. If the "Storm Water Management Strategy and Stream Hydraulic Report" is cited as an answer, please indicate in which section of the report addresses the specific comment. If "Noted" is cited as an answer please provide more information with specifics on how the proponent intends to use or address the comment.			Refer to responses below.	Stormwater
TRC2-34	When conducting adaptation planning to address potential impacts from flooding it is important to consider the type of development and associated infrastructure and its life expectancy. For the proposal in question, which involves planning for future development and major infrastructure that is expected to have a life expectancy beyond 2050; it is recommended to examine flood / rainfall levels associated with a 1 in 100 year event in 2100, which generally represents a significant storm event and accompanying significant impacts. Please provide the		<ul style="list-style-type: none"> <li>➤ Input to the model included existing 100 year rainfall (<i>i.e.</i>, Environment Canada Meteorological Station Data with AR5 New Brunswick climate change predictions), predicted 100 year rainfall for 2050 (<i>i.e.</i>, University of Western Ontario climate change model, Scenario RCP 2.6 for Saint John), existing 100 year tidal curves with storm surge, and predicted 100 year tidal curves with storm surge for 2050.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	<p>following information in reference to <i>the Storm Water Management Strategy and Stream Hydraulic Report</i>.</p> <p>a. In Section 2 under Effects of Climate Change - Rainfall modelling was completed for 2050 using the RCP 2.6 Scenario. Please provide the modelling for 2100 using the RCP 8.5 scenario as this is recognized as a more likely scenario for future climate condition. Tools available for these calculations include the IDF Climate Change Tool produced by the University of Western Ontario. <a href="http://www.idf-cc-uwo.ca/">http://www.idf-cc-uwo.ca/</a>.</p> <p>b. In Section 2 under Effects of Climate Change – 2050 was used for the HHWLT scenario. Please provide modelling results for 2100 HHWLT scenario. Please refer to the Updated Sea-Level Rise and Flooding Estimates for New Brunswick Coastal Sections – Based on the IPCC 5<sup>th</sup> Assessment Report 2014 by Réal Daigle (R. J. Daigle Enviro). Also, refer to comment 57 of the original TRC submission. <a href="https://atlanticadaptation.ca/en/islandora/object/aca%3A731">https://atlanticadaptation.ca/en/islandora/object/aca%3A731</a></p> <p>c. In Section 3 under the Final Modeled Scenario - S2, please adjust for climate change to the year 2100.</p> <p>d. How does the new modeling criteria compare to the original and how does this affect the proponents storm water management planning?</p>				
TRC2-35	<p>As a Follow-up to comments 60 and 61 - The proponent should identify all beneficial greenhouse gas reduction measures they plan on incorporating or considering during the development of the project. Please refer to the original comments to review the suggestions provided and explain why or why not these will be implemented into the Project.</p>		<p>Although Horizon Management will not be the sole developer of <i>The Crossing</i>, they are uniquely positioned to enable a low-carbon development. Project buildings will be designed to include taking into consideration environmentally-friendly features, such as highly-efficient low-emissivity glass, canopies over windows to reduce cooling requirements, the use of natural gas by all tenants, and computer controls on building heating, ventilation, and air-conditioning systems.</p> <p>Aligning with New Brunswick's Climate Change Action Plan for transitioning to a low-carbon economy [PNB, 2016], Horizon will strive to implement into the overall design of <i>The Crossing</i>:</p> <ul style="list-style-type: none"> <li>➤ energy conservation;</li> <li>➤ energy efficiency;</li> <li>➤ renewable energy sources; and</li> <li>➤ alternative transportation.</li> </ul> <p>The Proponent will also consider beneficial greenhouse gas reduction measures and incorporate practical and feasible measures into the development. Those measures will include:</p> <ul style="list-style-type: none"> <li>➤ reducing vehicle idling;</li> <li>➤ striving for a no net loss of carbon sinks; and</li> <li>➤ improving energy performance.</li> </ul>	Section 2.7.4 – Low-Carbon Development and Energy Efficient Design	Climate change
CITY OF SAINT JOHN QUESTIONS AND COMMENTS					

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC2-36	<p>Please note the concept plan differs from that presented previously. The Section 39 conditions imposed on the original rezoning of the site require the preparation of detailed plans for the development including, but not limited to, a context plan, a site plan, typical building floor plans, typical building elevations, and a landscape plan. These plans are to be prepared by the proponent and are subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p>The Section 39 conditions also require that should a significant change be proposed in the project concept plan, an addendum is required to the market study, to be prepared by the developer that provides additional analysis of the impacts of the proposed development on the regional retail sector as a whole. This addendum to the market study is subject to the approval of Common Council, as a statutory amendment to the original Section 39 conditions imposed on the original rezoning. Additional information will be required from the proponent to define the uses and the floor areas of the individual buildings in the development in order to understand the impacts on municipal servicing infrastructure in the area. We would also note that in accordance with the existing Section 39 conditions, the maximum floor area of a building in the rezoned area is limited to 3000 square metres.</p>		<p>The site plans submitted with the original EIA application of 25 November 2016 and the modified EIA application of 14 February 2019 have been modified to reduce the Project's impacts on wetlands and to minimize the volume requirement for floodplain compensation. The current proposal for <i>The Crossing</i>, which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched</p>	Section 2.6.2 – Environmental Features Impact Reduction / Avoidance	Market study
TRC2-37	<p>Please submit additional information regarding the costs for infrastructure to support the development and provide clarity on expectations in terms of who is responsible for these costs. The reports as submitted do not mention any infrastructure costs required to support the development. The Section 39 conditions imposed on the original rezoning of the site require that any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's full responsibility and cost. In addition, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, such cost-sharing agreement will be subject to the approval of Common Council, as a statutory amendment to the existing Section 39 conditions.</p>		<p><u>Section 2.8.1.1</u>  <b>1. Municipal Infrastructure Upgrades</b> - Any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's responsibility and cost. However, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, that such cost-sharing agreement be subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p><u>Section 4.3.4.4.1</u>  Operating the various Project Phases will require upgrades to municipal infrastructure, such as water and sanitary systems as noted in Section 2.8.3.3. The <i>exp Services Inc.</i> [2017b] water and sanitary servicing report (<i>i.e.</i>, refer to Appendix XIII) proposes possible approaches to provide water and sewerage services to <i>The Crossing</i>. Any upgrades required to those systems will be determined during detailed engineering design. It is understood that the City requires a comprehensive understanding of the Project's impacts on those system prior to providing Section 39 / 59 approval. As more details become available regarding the Project Phases, Horizon Management will submit a revised Water and Sanitary Servicing Study to the City.</p>	Section 2.8.1.1 – Existing Approvals Section 4.3.4.4.1 – Potential Impacts	Infrastructure

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
TRC2-38	Please note that in several locations assessed in the traffic impact study there are not specific improvement options identified and future evaluation of the development's impact on the transportation network is not referenced. Please identify the required transportation network improvements for all phases of the development.		<p><u>Section 2.8.3.2.1</u>  Projected traffic associated with Phase 1 of the Project can adequately be accommodated with relatively minor improvements (<i>i.e.</i>, traffic control changes, additional turning lanes, and intersection realignment) to the existing road network (<i>i.e.</i>, refer to Traffic Study in Appendix X). Those improvements include:</p> <ul style="list-style-type: none"> <li>➤ installing actuated-coordinated traffic signals and additional turning lanes on the approaches to the Rothesay Road / Rothesay Avenue intersection;</li> <li>➤ installing actuated-coordinated traffic signals and a separate left lane on the northbound approach (<i>i.e.</i>, on Rothesay Road) to the Rothesay Road / Ashburn Road intersection;</li> <li>➤ installing actuated-coordinated signal and a separate through lane pocket on the eastbound approach (<i>i.e.</i>, on Rothesay Avenue) to the Rothesay Avenue / NB Route 1 off-ramp;</li> <li>➤ installing separate left turning lanes on Ashburn Road at all accesses on all approaches to accommodate future traffic demand;</li> <li>➤ installing traffic signals at the main Project entrance from Ashburn Road;</li> <li>➤ adding a separate right turning lane on the southbound approach (<i>i.e.</i>, Ashburn Road) to accommodate the increase in right turning traffic exiting the development at the Foster Thurston Drive / Ashburn Road intersection; and</li> <li>➤ aligning the truck stop access with Fulton Lane and making access right in / right out (<i>i.e.</i>, left turners use access on Ashburn Road) to prevent left turners from blocking through movement and causing queuing back-up at the Rothesay Road / Fulton Lane intersection.</li> </ul> <p>In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NBDTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes (<i>n.b.</i>, these have yet to be installed as of December 2019, but the bases are in place).</p> <p><u>Section 2.8.3.2.2</u>  Projected traffic associated with Phases 2 and 3 of the Project will require major modifications to the existing road network. The major modification would involve the construction of a new interchange at the Ashburn Lake Road / Foster Thurston Drive intersection. This would significantly redistribute traffic from the existing interchange at Rothesay Road (<i>i.e.</i>, Exit 129). In February 2018, the Province announced funding to begin planning for the new Route 1 interchange (<i>i.e.</i>, an overpass to connect Foster Thurston Drive / Ashburn Road area to Ashburn Lake Road. It is not known when the interchange will be built; however, its construction would also improve safety and traffic flow at the Ashburn Lake Road / Rothesay Avenue / Retail Drive intersections.</p>	Appendix X – exp Services Inc. Traffic Impact Study Section 2.8.3.2.1 – Phase 1 Section 2.8.3.2.2 – Phase 2 Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			<p><u>Section 2.8.3.2.3</u></p> <ul style="list-style-type: none"> <li>➤ <i>exp Services Inc.</i> [2017a] completed the Traffic Impact Study for this Project and for the upgrades to the redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps.</li> <li>➤ Final details of the road network upgrades recommended by <i>exp Services Inc.</i> (<i>i.e.</i>, refer to Sections 2.8.3.2.1 and 2.8.3.2.2) will need to be adjusted as detailed engineering design of the development is undertaken. This will also be required as changes were recently undertaken by NBDTI on the Rothesay Road, Rothesay Avenue, and NB Route 1 ramps. Additionally, it is anticipated that the Province will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those upgrades were both considered within the Traffic Impact Study.</li> <li>➤ In November 2017, Horizon Management arrived at an initial agreement with the City of Saint John regarding near-term infrastructure cost-sharing. Horizon Management intends to continue cost-sharing discussions with City staff as the Section 59 re-zoning process advances.</li> </ul>		
TRC2-39	Please provide additional information and identify necessary pedestrian facilities to support the development.		Internally, vehicle circulation will maximize the separation between tenants, customers, and service users. It is tantamount that vehicle and pedestrian traffic are segregated within a mixed-used development. During detailed design, a plan will be implemented that prioritizes accessible pedestrian walkways throughout the Project. Horizon will continue discussions with City Staff regarding pedestrian facilities ( <i>e.g.</i> , crosswalks, pedestrian signals, sidewalks, <i>etc.</i> ) as the Section 59 re-zoning process advances.	Section 2.7.3.6 - Traffic	Traffic
TRC2-40	Please provide additional information regarding the basis for the 20% synergy rate and 25% pass-by rate used in the assessment of trips generated by the development. The justification for these assumptions must be provided in order to fully understand the impacts of the development on the adjacent roadway network as these rates account for a significant portion of the overall traffic that will access the development site.		<ul style="list-style-type: none"> <li>➤ Studies of other retail shopping facilities indicate that a bypass component of up to 34 % can occur. <i>exp Services Inc.</i> [2017a] considered a 25 % bypass component, which also includes diverted traffic from other parts of the road network, including new roadways within the Project site.</li> <li>➤ Retail shopping facility studies suggest that the synergy rate (<i>i.e.</i>, internal capture rate) can vary from 24 % to 55 % for mixed use developments like <i>The Crossing</i>. In their study, <i>exp Services Inc.</i> used a conservative synergy rate of 20 %.</li> </ul>	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-41	The Retail Drive / Rothesay Avenue / Ashburn Lake Road intersection will be utilized by traffic accessing the proposed development, development in the East Point Area and development along Rothesay Avenue. The development of The Crossing, along with the provision of a new interchange has the potential to increase traffic volumes and exacerbate current issues at this location through traffic from The Crossing accessing East Point and vice versa. This should be evaluated with respect to the impact on the City's roadway network, in		<ul style="list-style-type: none"> <li>➤ Final details of the road network upgrades recommended by <i>exp Services Inc.</i> (<i>i.e.</i>, refer to Sections 2.8.3.2.1 and 2.8.3.2.2) will need to be adjusted as detailed engineering design of the development is undertaken. This will also be required as changes were recently undertaken by NBDTI on the Rothesay Road, Rothesay Avenue, and NB Route 1 ramps. Additionally, it is anticipated that the Province will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those</li> </ul>	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	particular the Retail Drive / Rothesay Avenue / Ashburn Lake Road intersection.		upgrades were both considered within the Traffic Impact Study.		
TRC2-42	The existing operation of the left turn from Rothesay Avenue to Retail Drive is shown as operating with a LOS A and maximum v/c ratio of 0.53 to 0.54. It is of the understanding that existing operations of this movement had higher delays. In addition, the description of existing traffic operations at the Rothesay Avenue / Ashburn Lake Road intersection does not accurately portray current operational deficiencies at this intersection. Please confirm calculations related to traffic operations at this location.		➤ Since the Traffic Impact Study was completed, traffic signal timing and phasing changes have been completed to improve the level of service to reflect the actual operating conditions at the Rothesay Avenue / Ashburn Lake Road / Retail Drive Intersection.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-43	The report does not provide an overview of the impacts of vehicle queues at the study area intersections. For example, queuing along Ashburn Road from the Ashburn Road / Rothesay Road intersection currently can extend beyond Drury Cove Road in the afternoon, preventing some ease of access from Drury Cove Road. An analysis of the impacts of queueing is required to be provided by the proponent's consultant. Also please confirm if the LOS F at the Rothesay Road / Route 1 on-ramp is a result of the inability to turn left from Rothesay Road to Rothesay Avenue. Ashburn Road is a heavily travelled route for eastbound traffic accessing Rothesay Road during the afternoon hospital shift change with significant eastbound queuing from Ashburn Road to Rothesay Road. This was not noted in the report.			Please refer to the Response to TRC2-42 provided above.	Traffic
TRC2-44	Proposed improvements at the Foster Thurston Drive / Ashburn Road intersection will require re-work if/when the interchange is built. Please identify what improvements are required if the interchange is constructed.		➤ Final details of the road network upgrades recommended by exp Services Inc. will need to be adjusted as detailed engineering design of the development is undertaken. This will also be required as changes were recently undertaken by NBDTI on the Rothesay Road, Rothesay Avenue, and NB Route 1 ramps. Additionally, it is anticipated that the Province will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those upgrades were both considered within the Traffic Impact Study.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-45	Please clarify what development related traffic will use Ashburn Lake Road / NB Route 1 Access Ramps without the interchange.		➤ The traffic assignments included in the Traffic Impact Study were based on existing traffic conditions within the Study Area; however, assumptions were made regarding how traffic would access the proposed development during Phase 1 (i.e., minor road network improvements) and Phase 2 and 3 (i.e., major road network improvements) as detailed in the report.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-46	With respect to the proposed roundabout option at the NB Route 1 / Rothesay Avenue interchange, a concern is the introduction of a double lane roundabout as the first roundabout in the City and the possibility that this infrastructure will be overbuilt. Can the proponent's		➤ The redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps by NBDTI in Summer / Fall 2019 will accommodate the Phase 1 traffic; however, it will not accommodate the traffic associated with Phase 2 and 3. The new interchange on NB Route 1 with a	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic

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	consultant comment on the potential risk of designing traffic signals for Phase 1 which will also be oversized for Phase 2 and 3 if/when the Interchange is constructed? This aspect is not discussed in Section 7.1.8 of the Traffic Impact Study.		full overpass at the Ashburn Road / Foster Thurston Drive intersection being considered by the Province would be required to adequately accommodate the Phase 2 and 3 traffic. That overpass would also address existing deficiencies at that Ashburn Road / Foster Thurston Drive intersection.		
TRC2-47	The report notes nine accesses will be provided from the development to Ashburn Road, with five of these accesses constructed in Phase 1. It is recommended that the number of accesses be reduced to balance the role of Ashburn Road as a collector roadway with the need to provide access to the development. The development must incorporate an internal roadway network to control and distribute the traffic between a limited number of access points to the Public Street network and points within the development. The excellent LOS of A for driveway traffic from the development accessing Ashburn Road demonstrates that access to the development is given too great a weight over traffic flow on Ashburn Road and its role as a collector street. Reducing the number of accesses will also reduce the width of a widened Ashburn Road to accommodate the left turn lanes into the development. We note the number of accesses has changed since the last site plan was provided and Section 39 conditions imposed. Please assess if the internal roadway network can be designed to function with one signalized intersection onto Ashburn Road.		➤ The Traffic Impact Study identified nine access points from Ashburn Road to the development. Horizon Management accepts the conclusions and recommendations contained within the <i>exp Services Inc.</i> [2017a] study; however, they are open to revisiting the number of access points from Ashburn Road. They welcome discussing possible changes with staff of the City of Saint John Growth and Community Development Services and Transportation and Environment Services Departments.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-48	The last sentence of Section 7.1 states “Results for the development access points will not be affected, however, intersections west of the development may change as more details for the Ashburn underpass become available.” Please provide additional information regarding this statement?		➤ ... it is anticipated that the Province will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those upgrades were both considered within the <i>exp Services Inc.</i> [2017a] Traffic Impact Study.	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-49	Section 7.1.4 – A more detailed analysis of this intersection re-alignment is required i.e. the amount and length of lanes will impact construction and land acquisition costs. This detailed analysis should build on the work that was completed by Stantec in 2008; perhaps verifying the designs proposed in the 2008 Stantec study.		➤ NBDTI is using information contained in the <i>exp Services Inc.</i> [2016] report regarding the new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection ( <i>i.e.</i> , refer to Appendix XXIV). That information includes the associated impacts to traffic and land acquisition.	Section 2.8.3.2.3 – Notes on Traffic Impact Study Appendix XXIV – <i>exp Services Inc.</i> Route 1 Corridor Study	Traffic
TRC2-50	Section 7.1.10 of the report notes “This location (Rothesay Avenue / Route 1 on-ramp intersections) should be re-evaluated in the future when more details with respect to the development become available to determine if signals are warranted.” It is our opinion that now is the time to identify likely deficiencies in the system and recommend solutions unless there is another chance at reviewing an updated study as part of the development approval process.		In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NBDTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes ( <i>n.b.</i> , these have yet to be installed as of December 2017, but the bases are in place).	Section 2.8.3.2.1 – Phase 1	Traffic
TRC2-51	Section 7.1.11 of the report notes. “This ramp should be monitored and re-evaluated as more details about the development are finalized.” This analysis and final			Please refer to the Response to TRC2-50 provided above.	Traffic



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	design of this location must be completed before the Traffic Study for the development can be finalized and approved by City Staff as part of the development approvals process.				
TRC2-52	Please provide additional information as it is not clear what transportation infrastructure will be required for the full build-out of the development site.	The only area where the transportation infrastructure requirements are unclear for full build-out of the development site is the Rothesay Avenue / Route 1 on-ramp intersection. It would be appropriate to re-evaluate these intersection requirements as a condition of Phases II and III of the development.	<p><u>Section 2.8.3.2.1</u>  Projected traffic associated with Phase 1 of the Project can adequately be accommodated with relatively minor improvements (<i>i.e.</i>, traffic control changes, additional turning lanes, and intersection realignment) to the existing road network (<i>i.e.</i>, refer to Traffic Study in Appendix X). Those improvements include:</p> <ul style="list-style-type: none"> <li>➤ installing actuated-coordinated traffic signals and additional turning lanes on the approaches to the Rothesay Road / Rothesay Avenue intersection;</li> <li>➤ installing actuated-coordinated traffic signals and a separate left lane on the northbound approach (<i>i.e.</i>, on Rothesay Road) to the Rothesay Road / Ashburn Road intersection;</li> <li>➤ installing actuated-coordinated signal and a separate through lane pocket on the eastbound approach (<i>i.e.</i>, on Rothesay Avenue) to the Rothesay Avenue / NB Route 1 off-ramp;</li> <li>➤ installing separate left turning lanes on Ashburn Road at all accesses on all approaches to accommodate future traffic demand;</li> <li>➤ installing traffic signals at the main Project entrance from Ashburn Road;</li> <li>➤ adding a separate right turning lane on the southbound approach (<i>i.e.</i>, Ashburn Road) to accommodate the increase in right turning traffic exiting the development at the Foster Thurston Drive / Ashburn Road intersection; and</li> <li>➤ aligning the truck stop access with Fulton Lane and making access right in / right out (<i>i.e.</i>, left turners use access on Ashburn Road) to prevent left turners from blocking through movement and causing queuing back-up at the Rothesay Road / Fulton Lane intersection.</li> </ul> <p>In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NB DTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes (<i>n.b.</i>, these have yet to be installed as of December 2017, but the bases are in place).</p> <p><u>Section 2.8.3.2.2</u>  Projected traffic associated with Phases 2 and 3 of the Project will require major modifications to the existing road network. The major modification would involve the construction of a new interchange at the Ashburn Lake Road / Foster Thurston Drive intersection. This would significantly redistribute traffic from the existing interchange at Rothesay Road (<i>i.e.</i>, Exit 129). In February 2018, the Province announced funding to begin planning for the new Route 1 interchange (<i>i.e.</i>, an overpass to connect Foster Thurston Drive / Ashburn Road area to Ashburn</p>	Appendix X – exp Services Inc. Traffic Impact Study Section 2.8.3.2.1 – Phase 1 Section 2.8.3.2.2 – Phase 2 Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			<p>Lake Road. It is not known when the interchange will be built; however, its construction would also improve safety and traffic flow at the Ashburn Lake Road / Rothesay Avenue / Retail Drive intersections.</p> <p><u>Section 2.8.3.2.3</u></p> <ul style="list-style-type: none"> <li>➤ <i>exp Services Inc.</i> [2017a] completed the Traffic Impact Study for this Project and for the upgrades to the redeveloped intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps.</li> <li>➤ Final details of the road network upgrades recommended by <i>exp Services Inc.</i> will need to be adjusted as detailed engineering design of the development is undertaken. This will also be required as changes were recently undertaken by NBDTI on the Rothesay Road, Rothesay Avenue, and NB Route 1 ramps. Additionally, it is anticipated that the Province will construct a new interchange on NB Route 1 with a full overpass at the Ashburn Road / Foster Thurston Drive intersection, which will include the realignment of the Rothesay Avenue / Retail Drive intersection. Those upgrades were both considered within the Traffic Impact Study.</li> </ul> <p>In November 2017, Horizon arrived at an initial agreement with the City of Saint John regarding near-term infrastructure cost-sharing. Horizon intends to continue cost-sharing discussions with City staff as the Section 59 re-zoning process advances.</p>		
TRC2-53	Several sections in the document do not identify solutions but defer to future details of development that still need to be worked out and there are many references to the need for future re-evaluations. This study must identify likely deficiencies in the system and solutions be recommended unless there is another opportunity to review an updated study before being approved as part of the development approval process.		<ul style="list-style-type: none"> <li>➤ Once Phase 1 is under development, it would be appropriate to re-evaluate the road network upgrades recommended by <i>exp Services Inc.</i> for Phase 2 and 3 to ensure they are still appropriate and necessary. This would include updating the traffic impact study from the residential component as the ultimate number of residential units proposed could exceed the number of units included in the traffic study.</li> </ul>	Section 2.8.3.2.3 – Notes on Traffic Impact Study	Traffic
TRC2-54	<p>The Water and Sanitary Servicing – Conceptual Design Report does not speak to any actual demand requirements based on site use. Please identify what commercial and residential land uses will be constructed in the development in order to assess loads on the municipal infrastructure.</p> <p>The Water and Sanitary Servicing – Conceptual Design Report does not speak to any actual demand requirements based on site use. Please identify what commercial and residential land uses will be constructed in the development in order to assess loads on the municipal infrastructure.</p>		<p>In 2017, <i>exp Services Inc.</i> completed a conceptual design report regarding the water and sanitary servicing for the Project (<i>i.e.</i>, refer to Appendix XIII). Horizon Management understands that more detailed plans (<i>i.e.</i>, comprehensive technical design report with supporting documentation and calculations for each Phase of the Project) will need to be developed in cooperation with representatives of the City of Saint John as the Project design and municipal approval process proceeds. Information below is from the <i>exp Services Inc.</i> [2017b] report.</p>	Section 2.8.3.3 – Utilities Appendix XIII – <i>exp Services Inc.</i> Conceptual Design Report for Water and Sanitary Servicing	Infrastructure
TRC2-55	Please provide a completed hydraulic analysis to determine the flow demands and pressure requirements for full build-out of the development. Please define assumptions with respect to the full build-out projections (identified per Phase) used to determine the average and maximum daily demands.			Please refer to the Response to TRC2-54 provided above.	Infrastructure

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TRC2-56	Please provide further clarification on what building design (heights) and uses (residential-commercial) have been considered to determine required minimum pressures.			Please refer to the Response to TRC2-54 provided above.	Infrastructure
TRC2-57	Please provide further clarification on what is needed on whether or not any water modeling has been completed to determine system adequacy of system to support the development and to size the proposed servicing.			Please refer to the Response to TRC2-54 provided above.	Infrastructure
TRC2-58	At this time, the Report submitted is relatively theoretical in nature and does not contain any of the required level of detail and supporting technical information and calculations necessary to be able to review and comment on servicing the development site. A comprehensive technical design report and supporting documentation/calculations is required in order to understand the full development build out. Without a more detailed submission, an operational and professional review on the suitability of servicing for this development site is not possible.			Please refer to the Response to TRC2-54 provided above.	Infrastructure
TRC2-59	Sanitary Servicing Section: Please confirm if the latest amendments in the report are accurate. Previous information provided notes the development first as 41 ha – 46,500 m <sup>2</sup> ; then 49 ha - 60,000 m <sup>2</sup> . This report now notes the development site as 50 ha – 79,000 m <sup>2</sup> .		Overall, the proposal anticipates a total development footprint of 114 500 m <sup>2</sup> . The tenant mix is subject to change based on future market conditions.	Section 2.6.2.3 – Current Proposal	Infrastructure
TRC2-60	None of the required supporting calculations or sewer modeling results have been included with the servicing design report to support the numbers estimated. Please provide this information.			Please refer to the Response to TRC2-54 provided above.	Infrastructure
TRC2-61	The Report notes that capacity exists in the Drury Cove WWPS and forcemain for all of the Phase 1 development and potentially most or all of Phase 2 development and that potential WWPS and force main upgrades may be required to provide sufficient capacity to service Phase 3 of the development. It was identified that the existing Drury Cove WWPS was designed to accommodate the Drury Cove residential subdivision. The existing Lift Station as is would not be able to support this development proposal. Additionally it was noted that upgrades at the station and any associated piping may be required. An additional report also indicated that upgrades to the existing Drury Cove lift station would be required. Will this be completed and if so please provide additional information?			Please refer to the Response to TRC2-54 provided above.	Infrastructure
TRC2-62	The Report notes that future flow monitoring and analysis is recommended after Phase 1 development and prior to proceeding with Phase 2 to confirm existing flows and available capacities in the WWPS and forcemain although the Report indicates capacity for potentially most or all of Phase 2 development. Please indicate if any in field measurements or any flow monitoring to support the conceptual Design Report was completed. Also was there any draw down			Please refer to the Response to TRC2-54 provided above.	Infrastructure

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	measurements in the wet well of the Drury Cove WWPS as part of the technical review. The report notes the peak hourly flows (wastewater) but does not provide design average flows, design maximum daily flows, design peak instantaneous flow and design minimum day flow.				
TRC2-63	The report notes that the proposed site pressure sewer system can inject wastewater into the Drury Cove Force Main downstream of the existing WWPS. Please clarify what downstream assessments were completed and if additional flows can be received downstream. Also please clarify if there were any meetings with City operational staff to discuss this proposed approach and understand the City's system.		<p>Refer to Response TRC2-54 above.</p> <p><u>Section 2.8.1.1</u></p> <p>1. <b>Municipal Infrastructure Upgrades</b> - Any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's responsibility and cost. However, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, that such cost-sharing agreement be subject to the approval of Common Council, as a statutory amendment to these conditions.</p> <p><u>Section 2.8.3.3.2</u></p> <p>In reviewing the sanitary sewer system for Phases 2 and 3, it is understood that a downstream assessment that includes the Walter Street Waste Water Pumping Station will be required.</p> <p><u>Section 4.3.4.4.1</u></p> <p>Operating the various Project Phases will require upgrades to municipal infrastructure, such as water and sanitary systems as noted in Section 2.8.3.3. The <i>exp Services Inc.</i> [2017b] water and sanitary servicing report (<i>i.e.</i>, refer to Appendix XIII) proposes possible approaches to provide water and sewerage services to <i>The Crossing</i>. Any upgrades required to those systems will be determined during detailed engineering design. It is understood that the City requires a comprehensive understanding of the Project's impacts on those system prior to providing Section 39 / 59 approval. As more details become available regarding the Project Phases, Horizon Management will submit a revised Water and Sanitary Servicing Study to the City.</p>	<p>Please refer to the Response to TRC2-54 provided above.</p> <p>Section 2.8.1.1 – Existing Approvals Section 2.8.3.3.2 – Phase 2 and 3 Section 4.3.4.4.1 – Potential Impacts Appendix XIII – exp Services Inc. Conceptual Design Report for Water and Sanitary Servicing</p>	Infrastructure
TRC2-64	Would the proposed pressure sewer system be owned, maintained and operated by the developer or the City?			Please refer to the Response to TRC2-63 provided above.	Infrastructure
TRC2-65	Phase 2 and 3 servicing indicates a most likely servicing approach. Full development build-out must be considered now, not after the development is underway. The City and the developer must understand upfront any issues or challenges to servicing this site.			Please refer to the Response to TRC2-63 provided above.	Infrastructure
TRC2-66	The report mentions measures to promote water conservation such as high efficiency plumbing and commercial kitchen equipment. Please indicate what percentage of efficiency will be gained.		The report provides recommendations on measures to conserve water, such as high efficiency plumbing and commercial kitchen equipment. Typically, those best management practices can yield a 10 % to 20 % reduction in water consumption.	Section 2.8.3.3.2 – Phase 2 and 3	Infrastructure and water use
TRC2-67	What downstream sewer analysis was conducted to determine infrastructure servicing and associated capacity? Were any restraints identified in either downstream receiving systems or downstream Lift			Please refer to the Response to TRC2-63 provided above.	Infrastructure

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	Stations? What information was reviewed to support the conceptual design other than reviewing the Drury Cove WWPS and forcemain? Any required infrastructure upgrades necessary to support this development are the full responsibility and cost of the developer.				
TRC2-68	Please clarify was any hydrologic and hydraulic modeling completed for the Marsh Creek Watershed system to determine the effects on the Marsh Creek Watershed.		<p>In 2008, Terrain Group Inc. issued a hydraulics and hydrology report for the Project site (<i>i.e.</i>, refer to Appendix V). Stormwater models indicated that development of The Crossing will not have a negative effect on flooding in the Marsh Creek watershed. The Proponent recognized that Marsh Creek had been the subject to considerable attention and remediation efforts since 2008. Therefore, they chose to have more current modelling done.</p> <p>In 2017, exp Services Inc. issued a storm water management strategy and stream hydraulics and hydrology concept design report (<i>i.e.</i>, refer to Appendix XIV). The study was commissioned by Horizon because the Project has the potential to displace significant flood water storage in the Marsh Creek drainage basin. To compensate for displaced flood water storage, compensatory flood storage is anticipated to be constructed on <i>The Crossing</i> site and on lands along Rothesay Avenue. A deterministic hydraulic and hydrologic model (<i>i.e.</i>, Autodesk SSA) was used to assess the impacts. The model was used to assess the impact of the modified proposal on the drainage system. Although the impacts will be different for the current proposal, it is believed they will be reduced because Little Marsh Creek and its contiguous wetland will both remain largely untouched, which was not the case for the modified proposal.</p> <p><i>exp Services Inc.</i> [2017c] determined at full Project build-out, assuming compensatory storage is provided, that:</p> <ul style="list-style-type: none"> <li>➤ water surface elevation will remain at or below existing levels for post-development conditions; and</li> <li>➤ the development will not negatively affect upstream, downstream, or adjacent property or infrastructure for the modeled design storms.</li> </ul> <p>Compensatory storage options considered in the assessment include:</p> <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>e.g.</i>, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, <i>etc.</i>); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas to provide compensatory storage capacity).</li> </ul> <p>Surface water runoff attenuation options provided in the assessment to yield a net zero increase in post-development storm water discharge for the 100 year + 20 % return period for storms include:</p> <ul style="list-style-type: none"> <li>➤ parking lot ponding;</li> </ul>	Section 2.8.2.10 – Storm Water Management Appendix V – Terrain Group Inc., Hydraulics and Hydrology Report Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater

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			<ul style="list-style-type: none"> <li>➤ landscaped dry detention ponds; and</li> <li>➤ roof rainwater infiltration galleries.</li> </ul> <p>To determine the maximum allowable off-site compensatory storage that could be provided without negative impact on upstream, downstream or adjacent properties, a variety of scenarios with compensatory volumes on-site and at the off-site location along Rothesay Avenue were modeled until the maximum off-site volume was determined. The maximum allowable off-site volume was determined by comparing water surface elevations for pre- and post-development scenario conditions. Modeled post-development scenarios deemed acceptable were those that resulted in water surface elevations at all control points equal to or lower than existing (<i>i.e.</i>, undeveloped) condition scenarios. Water surface elevations at several control points were used as the basis for comparing existing conditions to proposed development compensatory flood volume storage location scenarios.</p>		
TRC2-69	What modeling was completed to determine the effects of creating downstream storage? Were hydrographs generated to compare pre-development and post-development flow rates?			Refer to the Responses to TRC2-34 and TRC2-68 provided above.	Stormwater
TRC2-70	Where is the location of the proposed downstream (off-site) storage?			Section 1.5 – Property Ownership	Stormwater
TRC2-71	Is the proposed compensatory storage area within the confines of the Marsh Creek Catchment Basin or the Marsh Creek Flood Risk Area?		<p>Compensatory storage options considered in the assessment include:</p> <ul style="list-style-type: none"> <li>➤ on-site constructed channel storage;</li> <li>➤ on-site rock fill void storage (<i>i.e.</i>, under parking lot storage);</li> <li>➤ on-site constructed ponds (<i>e.g.</i>, new detention and retention ponds, expanding the existing compensatory storage ponds across from Jones Drive, <i>etc.</i>); and</li> <li>➤ off-site downstream constructed storage volume directly connected to Marsh Creek (<i>i.e.</i>, excavated areas to provide compensatory storage capacity).</li> </ul>	Section 2.8.2.10 – Storm Water Management	Stormwater
TRC2-72	What modelling calculations were considered for winter runoff and snow melt conditions?		<ul style="list-style-type: none"> <li>➤ exp Services Inc. were contacted regarding the modelling and indicated that winter runoff scenarios do not control storm water storage management for this site. Peak winter storm runoff scenarios were greatly reduced under post-development conditions with the proposed attenuation when compared to pre-development scenarios.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	
TRC2-73	What modelling and calculations were considered regarding climate change impacts?			Refer to the Response to TRC2-34 provided above.	Stormwater
TRC2-74	Were any historical rainfall events/data used to calibrate the model?		<ul style="list-style-type: none"> <li>➤ The model was verified by comparing modelled results under existing conditions with the modelled results (<i>i.e.</i>, surface water elevations) from the Terrain Group Inc. 2008 Hydraulics and Hydrology Report (<i>i.e.</i>, Appendix V).</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report	Stormwater
TRC2-75	Were any flow measurements and water levels measured to incorporate into the model?		<ul style="list-style-type: none"> <li>➤ <i>exp Services Inc.</i> [2017c] did not perform any flow measurements or measure any water levels for incorporation into the model. The initial existing conditions model was developed for Marsh Creek and its tributaries using a combination of LIDAR data, existing and new survey data, and historical information for hydraulic</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater

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			structures and aerial photography for catchment land-use and runoff characteristics.		
TRC2-76	What modeling checks, calculations were completed to conclude that the development will not negatively affect upstream, downstream or adjacent property or infrastructure?			Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report	Stormwater
TRC2-77	The report notes that at each Phase of development, the associated displaced volume and compensation volume scenarios will be re-evaluated and updated to ensure a volume balance is maintained and Marsh Creek water surface elevations are not negatively affected. What is the course of action if there is not a volume balance or volumes are exceeded? It is required now, prior to commencing the next steps of the approvals process, to understand the full impacts of development relative to the watershed, upstream, downstream, adjacent lands and existing infrastructure.		➤ Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.	Section 4.3.2.3.2 – Proposed Mitigation	Stormwater
TRC2-78	The Report notes a 0.40m parking lot ponding depth. What is the basis of this depth? How will this be managed – will the development close for storms? How will this be affected by high tides? What are the impacts of property damage for customer / staff vehicles parked in the parking areas?		➤ Parking lot ponding can provide an economic solution for the storage volume required to attenuate the design storms. In the lower lying areas of the site, where detention ponds are not feasible, the peak flows may be attenuated using this method. The proposed development concept has approximately 10 ha of parking areas. Preliminary design calculations indicate parking lot ponding will require approximately 8.0 ha of lot ponded area or approximately 80 % of paved areas would be utilized to provide storm water attenuation storage during the 100 year + 20 % return period design storms. Maximum parking lot ponded depth during the modelled design storm was 0.40 m. Ponded areas typically can be limited to low traffic zones away from building accesses as was the case in the concept model.	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-79	The report notes that 17,400 cubic metres of compensatory flood risk storage will be provided on site by voids in the rock fill. What provisions have been made to prevent eventual consolidation of the rock fill and/or the infiltration of fine material into the rock voids?		➤ When calculating compensatory flood risk storage volume on-site between voids in the rock fill, a conservative void ratio of 0.2 (i.e., 20 %) was used. This conservative void ratio accounts for consolidation and contamination of the void spaces by fines. Geotextile will be used to reduce the transmission of fines into and through the rock fill.	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-80	The Report notes all storm water storage zones are required to be above the flood plain elevation of 4.1 m? How was this elevation determined? Is this specific to the site or the drainage basin?	This is the modeled 100year flood water elevation. This elevation may be modified subject to the revised climate change modeling requested in comment/question 34.	➤ Modelling suggests that all storm water storage zones should be above the modelled 100 year floodplain elevation of 4.1 m; however, that elevation is subject to change based on future modelling during detailed design.	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-81	What consideration was given to the Marsh Creek System draining into Courtenay Bay and the associated high water levels in the forebay? What about high water levels during a storm surge and high tide?		➤ Tidal curves for the Marsh Creek outlet / floodgates at Courtney Bay for the 100 year return periods were generated by the model and included surge residuals of 1.14 m. Tidal Higher High Water Large Tide (HHWLT) scenarios modelled included the 2010 HHWLT + storm surge (i.e., 5.74 m) and the predicted year 2050 HHWLT + storm surge (i.e., 6.19 m).	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-82	For the stormwater analysis there are some differences between the assumptions in this report and previous studies that have been provided (i.e. the flood plain			Refer to the Response to TRC2-81 provided above.	Stormwater

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	elevation, storm surge levels) – what is the rationale for the different numbers?				
TRC2-83	<p>The EIA Registration Document contains a Hydraulics and Hydrology report prepared by Terrain Group, dated March 6, 2008. This document relates to the hydrotechnical and stormwater management impacts of the development, which were identified as important considerations by City Staff in the planning approvals process. Upon reviewing this document, the following can be noted:</p> <ul style="list-style-type: none"> <li>➤ This document is dated 2008 and must be updated to reflect current conditions. For example, the site plan for the proposed "The Crossing" development contained in the 2008 report is different from the current proposal contained in the main EIA Registration Document and submitted as part of the 2016 planning approvals process. Specifically, the following major differences are noted between the two site plans: <ul style="list-style-type: none"> <li>○ The main EIA document notes the development site as 49 ha with a proposed 60,000 m<sup>2</sup> of mixed-use development. The supporting documentation (Terrain Report) prepared by the engineering consultant notes the site as 41 ha with 46,500 m<sup>2</sup> of commercial development only.</li> <li>○ The recent layout contains a residential component on the north side of Ashburn Road which is not shown in the 2008 site plan.</li> <li>○ The stream alignment / realignment shown on the 2016/2017 concept is different than that shown on the 2008 document.</li> <li>○ The 2016/2017 development concept appears to have more impervious area (roofs and paved parking) as compared to the 2008 development concept.</li> </ul> </li> <li>➤ Additional information is required relating to the Terrain Report in order to fully understand the stormwater modelling that was done as part of this exercise. This would include: assumptions made for the modelling, additional details regarding the scenarios modelled, and results at different locations and different times of the year (winter vs. summer – frozen ground impacts) and for different tidal conditions. Supporting information on the subwatersheds was analyzed with the model but not provided with the report. In addition, the assumptions relating to land use and the corresponding runoff coefficients made by the consultants may no longer be valid given the change in future land use outlined in new</li> </ul>		While the Terrain Group Inc. 2008 Hydraulics and Hydrology Report ( <i>i.e.</i> , Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the exp Services Inc. 2017 Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report ( <i>i.e.</i> , Appendix XIV).	Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater



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	Municipal Plan and Zoning By-law that have been enacted by the City since 2012.				
TRC2-84	How does the model account for Climate Change impacts and the relationship to heavy rainfall events occurring during the winter months when the ground is frozen?			Refer to the Response to TRC2-83 provided above.	Stormwater
TRC2-85	No detailed discussion was provided regarding the calibration of the model, specifically how the modelled water elevations compare with data observed from field monitoring and how the modelled water levels compare with the Procter and Redfern mapping.			Refer to the Response to TRC2-83 provided above.	Stormwater
TRC2-86	Responsibility for maintenance of any stormwater retention/detention ponds needs to be understood. In particular one of the scenarios modelled includes use of a City-owned parcel of land for additional water storage capacity: is there compensation for this use of City lands? Are there implications for adjacent properties?		<ul style="list-style-type: none"> <li>➤ Horizon Management would be responsible for any infrastructure constructed on its property. The <i>exp Services Inc.</i> [2017c] storm water management strategy does not propose, nor require, the use of any City of Saint John property for use as compensatory storage to adequately manage storm water. Should the use of any available properties, including those owned by the City of Saint John, be identified as a viable and / or more practical alternative, then appropriate arrangements would need to be made with the owner.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-87	How will a phased approach be taken with respect to stormwater management as the development proceeds in order to manage the stormwater requirements of the current site, phased development and adjacent impacts both upstream and downstream?		<ul style="list-style-type: none"> <li>➤ Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.</li> </ul>	Section 4.3.2.3.2 – Proposed Mitigation	Stormwater
TRC2-88	The phasing of the site preparation (mentioned on Page 10 of the Registration Document) should be better understood, as well as the implications on water levels downstream. For example, what are the stormwater management impacts for if the entire site is grubbed and trees removed but no further development occurs?		<ul style="list-style-type: none"> <li>➤ An erosion and sediment control plan should be developed and implemented prior to initiating construction for any part of the various Project Phases in order to limit and control erosion and sedimentation. Erosion control measures should be used to minimize and / or prevent erosion and may include the following: topsoil; mulching; hydro-seeding; jute mats; riprap; sod; trees and shrubs; polyethylene film; gravel; and gabions (<i>n.b.</i>, each measure has benefits and challenges that must be reviewed prior to using). Sedimentation control measures should be used to minimize and / or prevent the transportation and deposition of sediment as a result of erosion and may include the following: sediment control fences; sediment ponds; erosion control structures; and flumes (<i>i.e.</i>, slope drains).</li> <li>➤ Vegetation removal should be limited to that necessary for constructing the various facilities during each Project Phase.</li> <li>➤ Landscaping with trees, shrubs, and grasses should occur as soon as practical following construction activity to help slow surface water runoff from the site.</li> <li>➤ Hydraulic and hydrological modelling should be done prior to each Project Phase to ensure flood storage volume balance is maintained and Marsh Creek water surface elevations are not negatively affected.</li> </ul>	Section 4.3.2.3.2 – Proposed Mitigation	Stormwater

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TRC2-89	We also note that this document is stamped draft and is not sealed by a Professional Engineer.		While the Terrain Group Inc. 2008 Hydraulics and Hydrology Report ( <i>i.e.</i> , Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the exp Services Inc. 2017 Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report ( <i>i.e.</i> , Appendix XIV).	Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater
TRC2-90	<p>Portions of the development site are within areas that are subject to regulation through the City's Flood Risk Area By-law which seeks to regulate development in the Marsh Creek Watershed to prevent flooding. This by-law requires that additional flood storage be developed to offset flood storage that is lost as development occurs within the Flood Risk Area. Specific concerns identified relating to "The Crossing Development" and the Flood Risk Area include:</p> <ul style="list-style-type: none"> <li>➤ The EIA Registration document indicates that the proposed work plan is to start in the spring of 2017 (section 2(vii) of Registration Document) by realigning the stream through straightening the loop in the watercourse on PID 00432203. It is also noted that initial development of the project will take place with this parcel of land being the hub of the development and that the infilling of lands with local aggregate to form an "aggregate mattress" will be undertaken on several parcels of land that are subject to the City of Saint John Flood Risk Areas By-law.</li> <li>➤ This work cannot occur until the studies required by the Section 39 conditions have been completed by the developer and reviewed and approved by City staff, the City's Planning Advisory Committee and Common Council through an amendment to the conditions attached to the rezoning. As the placement of the aggregate mattress constitutes a "development", permits for this work (including filling, excavating, relocating, altering land levels, etc.) such as Flood Risk Area permits cannot be issued until the required studies including the traffic impact study, servicing study, and stormwater management study are completed, a Certificate of Determination is issued by the Province relating to the EIA and all other required Section 39 conditions are fulfilled through an amendment to the Section 39 conditions.</li> </ul>		<p><u>Section 6.1.3</u> As per Part 4, Division E of the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19] and the Flood Risk Area By-Law of the City of Saint John [CP-11], a permit is required when building within a flood risk area of the City of Saint John (<i>i.e.</i>, Kelly Lake, Glen Falls, Lower Marsh Creek, and Indiantown). The permit is administered through the <i>City of Saint John One-Stop Development Shop</i>. A copy of the New Brunswick <i>Community Planning Act</i> can be found at: &lt;<a href="http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf">http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf</a>&gt;; a copy of the City of Saint John Flood Risk Area By-Law can be found at: &lt;<a href="http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn">http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn</a>&gt;; and a City of Saint John Flood Risk Area Development Permit application form can be found at: &lt;<a href="https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf">https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf</a>&gt;. Contact information for the <i>City of Saint John One-Stop Development Shop</i> is provided above. The Project area is located within the Glen Falls and Lower Marsh Creek Flood Risk Areas of Saint John. Building within those areas requires analysis of flood risk and volume and purchase of compensatory storage. Horizon Management Ltd. is proposing to develop buildings within the Glen Falls Flood Risk Area and provide compensatory storage within the Lower Marsh Creek Flood Risk Area. It is understood that the By-Law requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Area. <u>Section 2.8.1.1</u> On 15 March 2016, the City of Saint John's Planning Advisory Committee dealt with a Municipal Plan Amendment and Rezoning application for 459, 617 to 885, and 540 to 900 Ashburn Road and a parcel of land northeast of the One Mile Interchange Pursuant to Section 39 of the New Brunswick <i>Community Planning Act</i> [R.S.N.B. 1973, c. C-12], the proposed Project is subject to the 10 conditions noted below, which were registered in the Saint John County Registry Office on 1 June 2016 (<i>n.b.</i>, the <i>Community Planning Act</i> was repealed and replaced with the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19] where rezoning is covered under Section 59).</p>	Section 6.1.3 – Flood Risk Area Development Permit Section 2.8.1.1 – Existing Approvals	Stormwater

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
			<ol style="list-style-type: none"> <li>1. <b>Traffic Impact Study</b> - No portion of the site shall be developed prior to the completion of a Transportation Impact Study prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions. The scope of work for the transportation impact study will be established in cooperation with the City, NBDTI and the developer.</li> <li>2. <b>Site Servicing Study</b> - No portion of the site shall be developed prior to the preparation of a servicing study reviewing the impacts on the City's water supply and sanitary sewer collection systems prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.</li> <li>3. <b>Stormwater Management Study</b> - No portion of the site shall be developed prior to the preparation of a stormwater management study that details the approach for stormwater management on the development site and reviews the impacts of the development on upstream and downstream areas of the Marsh Creek watershed prepared by the developer and subject to the approval of Common Council, as a statutory amendment to these conditions.</li> <li>4. <b>Environmental Impact Assessment Approval</b> - No portion of the site shall be developed prior to the proponent registering the project with the Provincial Environmental Impact Assessment Process and a Certificate of Determination being issued by the Province.</li> <li>5. <b>Detailed Development Plans</b> - No portion of the site shall be developed except in accordance with detailed plans including, but not limited to, a context plan, a site plan, typical building floor plans, building elevations, and a landscape plan all of which are to be prepared by the proponent and subject to the approval of Common Council, as a statutory amendment to these conditions.</li> <li>6. <b>Market Study</b> - Should a significant change be proposed in the project concept plan, an addendum is required to the market study that provides additional analysis of the impacts of the proposed development on the regional retail sector as a whole, and is subject to the approval of Common Council, as a statutory amendment to these conditions. This addendum to the market study will be prepared by the developer.</li> <li>7. <b>Municipal Infrastructure Upgrades</b> - Any upgrades to the existing municipal infrastructure required to service this proposed development will be the developer's responsibility and cost. However, should any cost sharing agreement be proposed between the developer and City, which may involve another level of Government, related to costs associated with infrastructure upgrades, servicing, transportation network improvements or development of the project, that such cost-sharing agreement be subject to the approval of Common Council, as a statutory amendment to these conditions.</li> </ol>		

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			<p><b>8. Maximum Building Size</b> - The maximum floor area of a building in the rezoned area is limited to 3000 square metres.</p> <p><b>9. Additional Studies</b> – The required studies outlined in conditions a) through f) inclusive shall be completed within 5 years of the date of the Municipal Plan amendment and rezoning coming into effect. Should this not occur, Common Council reserves the right to take steps to immediately repeal the rezoning agreement and the rezoning pursuant to Sections 39(5) and 39(6) of the Community Planning Act and return the land shall return [sic] to its previous zone which existed prior to this agreement; and, No portion of the site shall be developed prior to the preparation of a detailed phasing plan that graphically outlines the timeline for completion of the site development, prepared by the developer and is subject to the approval of Common Council, as a statutory amendment to these conditions. Common Council reserves the right to impose additional conditions relating to the timeline for completion of the project phases and the repeal of the rezoning agreement and the rezoning pursuant to Section 39(5) and 39(6) of the Community Planning Act and the return of the land to its previous zone which existed prior to this agreement at the time the studies are reviewed as part of the required Section 39 Amendment.</p> <p><b>10. Costs</b> – In accordance with Section 39(8) of the Community Planning Act, the applicant shall provide a certified cheque in the amount of one thousand dollars (\$1,000.00) to cover expenses related to the cancellation of the conditional rezoning agreement and/or repeal of the rezoning in the event that the conditions attached to the rezoning cannot be met, as per policy 1-5 in the Municipal Plan. The certified cheque shall be repayable on the substantial completion of the development for which the rezoning is granted. This shall be provided by the Developer to the City within 30 days of Third Reading of the 2016 Municipal Plan Amendment and Rezoning.</p> <p>It is expected that the 10 conditions made by the City of Saint John's Common Council, as per the Proponent's Section 39 (59) application, will be conditions of the EIA Certificate of Determination.</p>		
TRC2-91	<p>How will the existing compensatory storage provided by ponds across from Jones Road be affected by the development? The Flood Risk Area By-Law requires compensatory flood storage for projects, such as the proposal, that occur within the Flood Risk Area. The report prepared by Terrain Group and attached to the Registration Document indicates there are a few ways of providing compensatory storage for this development, however, the proposal does not indicate that compensatory storage creation will initially take place and it seems that the requirements of the by-law will not be immediately addressed. Based on the information provided in the Terrain report (Section 5), it appears that compensatory storage may possibly be</p>		<p><u>Section 2.8.2.10.1</u>            While the Terrain Group Inc. 2008 Hydraulics and Hydrology Report (i.e., Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the exp Services Inc. 2017 Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report (i.e., Appendix XIV).  <u>Section 6.1.3</u>            As per Part 4, Division E of the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19] and the Flood Risk Area By-Law of the City of Saint John [CP-11], a permit is required when building within a flood risk area of the City of Saint John (i.e., Kelly Lake, Glen Falls, Lower Marsh Creek, and Indiantown).</p>	<p>Section 2.8.2.10.1 – Notes on Storm Water Management Study            Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report            Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report            Section 6.1.3 – Flood Risk Area Development Permit</p>	Stormwater


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	<p>addressed through the eventual development of an urban wetland and a naturalized storm water pond, however, this section also indicates that it will be some time before this work will be undertaken and it seems to be connected to developing in the regulated wetland area. The Flood Risk Areas By-law is not based upon development of Provincially Designated Wetlands and any compensatory storage required for the flood risk area is separate from compensation required through Provincial Legislation for impacts in Provincially Designated Wetlands. The Flood Risk Area By-law requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Areas and any such development is subject to a Flood Risk Area Permit.</p>		<p>The permit is administered through the <i>City of Saint John One-Stop Development Shop</i>.  A copy of the New Brunswick <i>Community Planning Act</i> can be found at:  <a href="http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf">http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf</a>;  a copy of the City of Saint John Flood Risk Area By-Law can be found at:  <a href="http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn">http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn</a>; and  a City of Saint John Flood Risk Area Development Permit application form can be found at:  <a href="https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf">https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf</a>.  Contact information for the <i>City of Saint John One-Stop Development Shop</i> is provided above.  The Project area is located within the Glen Falls and Lower Marsh Creek Flood Risk Areas of Saint John. Building within those areas requires analysis of flood risk and volume and purchase of compensatory storage. Horizon Management Ltd. is proposing to develop buildings within the Glen Falls Flood Risk Area and provide compensatory storage within the Lower Marsh Creek Flood Risk Area. It is understood that the By-Law requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Area.</p>		
TRC2-92	<p>The Terrain report presents 4 different scenarios that were assessed with a hydraulic model. Scenario 3 involves the lower Marsh Creek Parcel of land to be excavated (we assume this is the parcel designated as the Eco-Park in the planning application, PID 55189385, however it is not confirmed in the report). The scenario indicates that the proposal is to remove and dispose of 356,000 m<sup>3</sup> of soil to create about 400,000 m<sup>3</sup> of compensatory storage. The report does not favor this option due to the cost of excavation and disposal of soil. Another scenario, Scenario #2, involves developing "The Crossing" project but no creation of compensatory storage (the report indicates that about 17,000 m<sup>3</sup> of storage is required) and the last scenario, Scenario #4, seems to indicate that City-owned land (PID 55024921) could also be used to provide compensatory storage. Option #2 does not meet the requirements of the Flood Risk Area By-Law as no compensatory storage is provided to offset that lost by the development. Option 4 would not be considered at this time as it would require a decision of Common Council to provide compensatory storage on City-owned land in lieu of the proponent providing it on their land. The Terrain report does not contain a recommended approach, based on a thorough assessment, to provide for the 17,000 cubic metres of compensatory flood storage that will be lost with completion of the development. This assessment is required in order to understand the impacts of the development on</p>		<p>While the Terrain Group Inc. 2008 Hydraulics and Hydrology Report (<i>i.e.</i>, Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the exp Services Inc. 2017 Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report (<i>i.e.</i>, Appendix XIV).</p>	<p>Section 2.8.2.10.1 – Notes on Storm Water Management Study  Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report  Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report</p>	Stormwater

ID	Comment	Original Response	Updated / Amended Response	Location in Updated EIA	Comment Type
	upstream and downstream areas of the Marsh Creek watershed and its flood storage capacity.				
TRC2-93	Please be advised The Flood Risk Area by-law must be reviewed and Flood Risk Areas permits must be obtained, following the required Section 39 Amendment, prior to the commencement of any development on project lands within the flood risk area. The requirements for the permit application are clearly outlined, as are the need for plans showing draining patterns in the City's Flood Risk Area By-law. The applicant is required to provide the City with a proposed approach to provide the required compensatory storage. Upon receipt of this, it will be evaluated to determine its compliance with the by-law and form part of the necessary information, in addition to the required stormwater modelling and other supporting studies, for the required amendment to the Section 39 conditions.	The proponent is aware of the requirements outlined in the City's Flood Risk Area By-law and will work with the city to meet those requirements.	As per Part 4, Division E of the New Brunswick <i>Community Planning Act</i> [S.N.B. 2017, c.19] and the Flood Risk Area By-Law of the City of Saint John [CP-11], a permit is required when building within a flood risk area of the City of Saint John ( <i>i.e.</i> , Kelly Lake, Glen Falls, Lower Marsh Creek, and Indiantown). The permit is administered through the <i>City of Saint John One-Stop Development Shop</i> . A copy of the New Brunswick <i>Community Planning Act</i> can be found at: < <a href="http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf">http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf</a> >; a copy of the City of Saint John Flood Risk Area By-Law can be found at: < <a href="http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn">http://documents.saintjohn.ca/WebLink/DocView.aspx?id=19591&amp;dbid=0&amp;repo=CityofSaintJohn</a> >; and a City of Saint John Flood Risk Area Development Permit application form can be found at: < <a href="https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf">https://www.saintjohn.ca/site/media/SaintJohn/FILLABLE%20One-Stop%20General%20Application%20(English).pdf</a> >. Contact information for the <i>City of Saint John One-Stop Development Shop</i> is provided above. The Project area is located within the Glen Falls and Lower Marsh Creek Flood Risk Areas of Saint John. Building within those areas requires analysis of flood risk and volume and purchase of compensatory storage. Horizon Management Ltd. is proposing to develop buildings within the Glen Falls Flood Risk Area and provide compensatory storage within the Lower Marsh Creek Flood Risk Area. It is understood that the By-Law requires that compensatory storage be provided at the same time as development occurs within the Flood Risk Area.	Section 6.1.3 – Flood Risk Area Development Permit	Stormwater
<b>DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE QUESTIONS AND COMMENTS</b>					
TRC2-94	Please provide a detailed construction plan for the installation of signals and the widening and addition of turning lanes at Rothesay Ave, Rothesay Road, Route 1 east bound off-ramp, and Route 1 east bound on-ramp?		In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NB DTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes ( <i>n.b.</i> , these have yet to be installed as of December 2017, but the bases are in place).	Section 2.8.3.2.1 – Phase 1	Traffic
TRC2-95	Please be advised that in 2018, when weather permits, Gateway Operations Inc. intends to replace twin culverts located on Rothesay Road at the entrance to the Route 1 west bound on-ramp and adjacent to the proposed east entrance to the Development. This project includes potential upgrades the unsignalized intersections to signalized intersections in the area of Rothesay Ave/Rothesay Road. To avoid possible traffic congestion due to the culvert upgrades and new signage construction, this work should be coordinated with Gateway Operations Inc.		The unnamed tributary to Little Marsh Creek that flows on to the Project site near the Rothesay Road / Rothesay Avenue intersection may require some realignment to suit the overall development. Based on the uncharacteristically straight channel of that tributary on the property, it is believed that it was channelized in the past. In 2018, Gateway Operations Inc. replaced the twin culverts within this culvert on Rothesay Road.	Section 2.8.2.9 – Watercourse Realignment and Piping	Watercourses

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TRC2-96	The document states that "The models predict that the water elevation experienced just upstream of Highway #1 culvert will be the same following development of the Crossing as compared to the existing condition." Please provide a map with the location of this culvert on Highway #1.		While the Terrain Group Inc. 2008 Hydraulics and Hydrology Report ( <i>i.e.</i> , Appendix V) may contain useful background information related to storm water management, the study has been replaced and superseded by the exp Services Inc. 2017 Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report ( <i>i.e.</i> , Appendix XIV).	Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix V – Terrain Group Inc. Hydraulics and Hydrology Report Appendix XIV – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater
TRC2-97	Please provide additional details with regards to the timing of the stream re-alignment along the Rothesay Road near the Route 1 west bound on-ramp?		In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NB DTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes. NB DTI also did work in the vicinity of that intersection in 2018 to upgrade the culverts under the west bound on-ramp to NB Route 1. Part of that channel may be realigned within the boundaries of the Project site, but that would be > 30 m from the edge of the existing roadway. Therefore, because NB DTI has not installed guardrail in that area during their previous work, it is not believed that guiderail will be required.	Section 2.8.3.2.1 – Phase 1	Watercourses
TRC2-98	Under the development's current proposed footprint, it is estimated that 87500m <sup>3</sup> of existing flood storage would be eliminated below the 100 year flood elevation. Compensatory storage will be provided for this loss of flood storage. What is the total storage of the Ashburn Road Development area pre development?		➤ The total pre-development flood storage volume of the Project lands along Ashburn Road is 155 000 m <sup>3</sup> .	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-99	How close will the proposed realigned channel be to the Route 1 west bound on-ramp shoulder? Will guide rail be required?		In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NB DTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes. NB DTI also did work in the vicinity of that intersection in 2018 to upgrade the culverts under the west bound on-ramp to NB Route 1. Part of that channel may be realigned within the boundaries of the Project site, but that would be > 30 m from the edge of the existing roadway. Therefore, because NB DTI has not installed guardrail in that area during their previous work, it is not believed that guiderail will be required.	Section 2.8.3.2.1 – Phase 1	Traffic and Infrastructure
TRC2-100	Please confirm that the proponent is designing for storage to meet storm water peak flow attenuation requirements of net zero increase in Post-Development storm water discharge for the 100 year +20% return period storms which aligns with DTI storm-water management practices?		➤ Storage was modelled and will be designed to meet storm water peak flow attenuation requirements of net zero increase in post-development storm water discharge for the 100 year + 20 % return period storms, which aligns with NB DTI's storm water management practices.	Section 4.3.2.3.1 – Potential Impacts	Stormwater
TRC2-101	What will the stream elevations be relative to the three NBHC culvert locations for the following types of precipitation events? i. 2 hour duration - 100 year return + 20% ii. 24 hour duration - 100 year return + 20%		➤ In future modelling scenarios, the culverts located under the west bound on-ramp to NB Route 1 will be added as control points in order to determine surface water elevations for 2 hour and 24 hour duration storms with a 100 year + 20 % return period.	Section 4.3.2.3.1 – Potential Impacts	Stormwater
TRC2-102	Please provide the size and type of pipes placed at the entrance to the Development at Rothesay Road?		To facilitate Project development, tributaries of Little Marsh Creek will require alteration. The potential impacts to on-site	Section 4.3.2.3.1 – Potential Impacts	Stormwater

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			watercourses will be as follows ( <i>n.b.</i> , the overall linear length is ~ 600 m and the overall area is ~ 540 m <sup>2</sup> ; the actual linear length and area will be determined during detailed design and during permitting as will the design / sizing of piping and open channels).		
<b>AIR AND WATER SCIENCES BRANCH QUESTIONS AND COMMENTS</b>					
TRC2-103	What was the rationale of using a synthetic SCS type III design storm as opposed to the Chicago distribution design storm indicated in the City of Saint John's Storm Drainage Design Criteria Manual (2016)?		<ul style="list-style-type: none"> <li>➤ For larger catchment areas like Marsh Creek, exp Services Inc. has observed that the Soil Conservation Service (SCS) Type III design storms are more conservative (<i>i.e.</i>, yield higher runoff values) when compared to the Chicago distribution design storm. That is why they used the SCS Type III design storm as opposed to the Chicago distribution design storm indicated in the City of Saint John's Storm Drainage Design Criteria Manual (2016).</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-104	Please provide the design storm rainfall (hyetograph).		<ul style="list-style-type: none"> <li>➤ The 24 hour duration, 100 year + 20 % return rainfall Soil Conservation Service Type III hyetograph is shown in the figure below.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-105	Which is meant when referring to the 100 year + 20% storm: 100 year (2010) + 20% or 100 year (2050, RCP2.6) + 20%?		<ul style="list-style-type: none"> <li>➤ The international climate modelling community has adopted four RCPs through the Intergovernmental Panel on Climate Change (IPCC). The scenarios range from RCP 8.5, which corresponds to a "non-climate policy" scenario translating into high severity climate change impacts, to RCP 2.6, which is a future requiring stringent climate policy to limit greenhouse gas emissions, translating into low severity impacts. Two middle scenarios, RCP 4.5 and RCP 6.0, were selected by the IPCC to be evenly spaced between RCPs 2.6 and 8.5. The 100-year (<i>i.e.</i>, 2050, RCP 2.6) storm was used in modelling to determine water surface elevations under existing and proposed conditions, with and without climate change effects, and compensatory flood volumes requirements. The 24 hour 100 year 2050 RCP 2.6 return period storm rainfall depth is 177 mm.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC2-106	Was the 100 year +20% storm used solely to determine the required attenuation or also to determine water levels? Please clarify as this storm is only mentioned at the end of the report, after the conclusions.		<ul style="list-style-type: none"> <li>➤ The 100 year + 20 % storm was used solely within the modelling to determine the required storm water attenuation requirements.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC-107	It is stated that water surface elevations will remain at or below existing levels for post-development conditions. However, it seems that scenario S6 (compensation and climate change) water levels exceed scenario S1 (existing conditions) levels. Please clarify.		<ul style="list-style-type: none"> <li>➤ When comparing modeled water surface elevations for pre- and post-development conditions, the comparisons were made for the same climatic conditions: <ul style="list-style-type: none"> <li>○ Comparison 1: pre-development <u>without</u> climate change versus post-development <u>without</u> climate change; and</li> <li>○ Comparison 2: pre-development <u>with</u> climate change versus post-development <u>with</u> climate change.</li> </ul> </li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
TRC-108	It is stated that the development will not negatively affect upstream property or infrastructure for the modeled design storms. However, there are no upstream control points to support this conclusion. Please clarify how this conclusion is supported.		<p><u>Section 2.8.2.10.1</u></p> <ul style="list-style-type: none"> <li>➤ An upstream control point (<i>i.e.</i>, Ashburn Creek Road Culvert) was also included and showed that the Project will not negatively affect upstream properties or infrastructure for the model design storms.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study Appendix XIV (Amended) – exp Services Inc. Storm Water Management Strategy and Stream Hydraulics and Hydrology Conceptual Design Report	Stormwater
<b>DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE QUESTIONS AND COMMENTS</b>					



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TRC-109	<p>Will the reduction of velocity in the Little Marsh Creek result in sediments being deposited along the Urbanized Wetland or near the New Brunswick Highway Corporation (NBHC) culverts at Rothesay Road, Foster Thurston Drive, and at Route 1 – see photo below.</p> 		The current proposal for <i>The Crossing</i> , which is described and assessed within this EIA document, imagines Little Marsh Creek and its contiguous wetland as key design features where both remain largely untouched	Section 2.6.2.3 – Current Proposal	Stormwater
	Air and Water Sciences Branch				
TRC-110	What is meant by constructed channel storage? Please clarify.		Figure 8	Section 2.8.2.9 Watercourse Realignment and Piping	Stormwater
TRC-111	Please provide design details on any storage (ponds, channels, etc.) related to the project, as these are important to any hydrotechnical modeling.		<ul style="list-style-type: none"> <li>➤ The purpose of the storm water management study with respect to compensatory storage was to determine if required compensatory storage ponds could be physically accommodated on the Project lands to avoid any negative flooding impacts. Design of any compensatory storage ponds would be done during detailed engineering design and before applying for any required regulatory permits, such as a Watercourse and Wetland Alteration Permit or a Harmful Alteration, Disruption, and Destruction of fish and fish habitat Authorization.</li> </ul>	Section 2.8.2.10.1 – Notes on Storm Water Management Study	Stormwater
<b>DEPARTMENT OF HEALTH QUESTIONS AND COMMENTS</b>					
TRC-112	Please be advised that once this Development starts any Food Service Establishment that is planned must go through the New Brunswick Dept of Health for approval and licensing.		As per the Food Premises Regulation [2009-138] of the <i>Public Health Act</i> [O.C. 2009-457], food service establishments in New Brunswick require approval and licensing before serving food to the public. Depending on the types of food prepared and sold and the ways foods are handled, food premises licenses are divided into three classes: Class 3; Class 4; and Class 5. Any food establishments that are part of <i>The Crossing</i> will require approval and licensing.	Section 6.2.8 – Food Premises License	Permitting
<b>DEPARTMENT OF TOURISM, HERITAGE AND CULTURE QUESTIONS AND COMMENTS</b>					
TRC-113	Archaeological Service Branch has reviewed the updated EIA submission documents. As recommended by AMEC, we concur that there are no further archaeological investigations required at Area A. Area B remains an area of elevated archaeological potential and should there be plans for development in this area, the plans should be submitted for Archaeological Services to review as further archaeological work may be required. Archaeological Services suggests that an emergency plan for the accidental discovery of artifacts be drafted by the proponent and submitted for review. A reminder that		Historic places in New Brunswick are protected under the <i>Heritage Conservation Act</i> [O.C. 2010-453]. Unauthorized alteration of any archaeological, paleontological, burial heritage objects, and / or Provincial Heritage Places in New Brunswick is strictly prohibited under the <i>Act</i> . The Eco-Park lands, as noted in the AFW[2018] report ( <i>i.e.</i> , refer to Section <b>Error! Reference source not found.</b> ), are an area of elevated archaeological potential. Should there be plans for development of the Eco-Park, then there may be need for obtaining Heritage Site Alteration Permit (HSAP).	Section 6.2.7 – Heritage Site Alteration Permit	Permitting

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	any area within 80m of a watercourse/waterbody and 100m of a confluence contains elevated archaeological potential. As per Section 9 of the <i>Heritage Conservation Act</i> , any person who discovers an archaeological object, burial object, or human remains is required to report the discovery to the Minister as soon as practicable at (506) 453-2738.				
<b>DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE QUESTIONS AND COMMENTS</b>					
TRC2-113	Following review of the traffic light proposal, impacts are anticipated at various locations, particularly at the bottom of the westbound offramp and eastbound offramp at Exit 129. It is believed that Snow and Ice Removal (SNIC) operations may be impacted (e.g., increased plow cycle time), thereby lowering the level of service at various times, including during peak traffic flows. There are safety concerns that traffic lights will cause traffic to back up onto Route 1 and increase the risk of accidents. It is suggested that the proponent perform a traffic count study of the impacted area as well as consult with local policing authorities.		In Summer / Fall 2019, the New Brunswick Department of Transportation and Infrastructure (NBDTI) redeveloped the intersection of Rothesay Road, Rothesay Avenue, and the NB Route 1 ramps. Upgrades included adding actuated-coordinated traffic signals and installing separate turning lanes ( <i>n.b.</i> , these have yet to be installed as of December 2017, but the bases are in place).	Section 2.8.3.2.1 – Phase 1	Traffic
TRC2-114	It is anticipated that the culverts currently servicing Route 1 will be subject to higher flow rates during peak runoff, and it does not appear that they will be optimized. This increases risk for the Operations, Maintenance, and Rehabilitation (OMR) of these culverts. It seems that most of the watershed is designed to flow into the existing culverts located under the westbound on and offramps at Exit 128 and crossing the Route 1 Facility near kilometer marker 127.7. How does the proponent propose to address this concern? The type and size of the existing culverts are as follows: <ul style="list-style-type: none"> <li>➤ 3 - 1.2 m dia CSP culvert under ramps</li> <li>➤ 1 - 3.5 x 2.5 m bolt CSP culvert under highway</li> </ul>		NBDTI also did work in the vicinity of that intersection in 2018 to upgrade the culverts ( <i>i.e.</i> , three 1.2 m diameter corrugated steel pipe) under the west bound on-ramp to NB Route 1.	Section 2.8.3.2.1 – Phase 1	Stormwater
TRC2-115	At this time, it is expected that the proposed project would expose OMR to increased risk and costs.				Infrastructure

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506.635.1566

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Clyde River, PE C0A 1H1

902.675.4885

**HALIFAX OFFICE**  
PO Box 25083  
Halifax, NS  
B3M 4H4

902.492.1550