



TL 267 Decommissioning Plan

TABLE OF CONTENTS

	PAGE
1.0 INTRODUCTION	3
2.0 SCOPE	3
3.0 OBJECTIVE	4
4.0 DEFINITIONS	5
5.0 ABBREVIATIONS AND ACRONYMS	5
6.0 PROJECT DESCRIPTION.....	5
7.0 PLANS TO LIMIT & DISCOURAGE ILLEGAL PUBLIC ACCESS	7
8.0 COMMITMENTS.....	7
8.1 Assets To Be Decommissioned.....	7
8.1.1 Bridges.....	7
8.1.2 Access Trails.....	8
8.1.3 Culverts.....	9
8.1.4 Borrow Pits and Quarries	9
9.0 TIMELINE.....	33
9.1 Asset Decommissioning.....	33
9.2 Actions To Discourage Illegal Public Access	33
10.0 REHABILITATION MEASURES.....	33
10.1 General Rehabilitation Measures	34
10.2 Quarry/Borrow Area Rehabilitation Measures	34
10.3 Roads/Trails and Culverts/Bridges Rehabilitation Measures	35
11.0 ENVIRONMENTAL MONITORING PROCEDURES - POST CONSTRUCTION.....	36
12.0 CLEAN – UP AND RECLAMATION.....	37
13.0 REFERENCES	37
13.1 Internal references	37
APPENDIX A - EROSION PREVENTION.....	38

1.0 INTRODUCTION

Newfoundland Labrador Hydro (Hydro) owns and operates an extensive electrical generation and transmission system on the Island of Newfoundland, which includes a 613 megawatt (MW) hydroelectric generation station at Bay d’Espoir in the south-central portion of the Island. Associated with the station are several transmission lines that extend between it and other electrical infrastructure and load centres across the Island.

The TL 267 project includes the construction and operation of a new 230 kilovolt (kV) transmission line that will be approximately 188 km long and connect the existing Bay d’Espoir and Western Avalon terminal stations (hereinafter referred to as the “Project” or “TL 267”). The Project will parallel existing transmission line infrastructure (TL 202 and TL 206) from Bay d’Espoir to Come By Chance and further parallels TL 203 (and eventually, the existing TL 237) from Come By Chance to the Western Avalon substation in Chapel Arm. Approximately 13 km of the proposed TL 267 right of way has been excised from the Bay du Nord Wilderness Reserve as per the Bay du Nord Wilderness Reserve Order (Amendment), published on August 19, 2016. As well, approximately 22 km of the right of way will run adjacent to the Reserve boundary, south of the existing lines TL 202 and 206. Along with the planned construction of TL 267, upgrades to existing infrastructure at the Bay d’Espoir and Western Avalon terminal stations are also required as part of this Project.

This project was subject to an Environmental Assessment (EA) as per the Environmental Protection Act. The EA was submitted in July, 2015 and released on June 15, 2016. As a condition of the EA release Hydro is required to complete a decommissioning plan prior to construction in areas excised from the Bay du Nord Wilderness Reserve as per the Bay du Nord Wilderness Reserve Order and adjacent to the Bay du Nord Wilderness Reserve which will be subject to Ministerial approval.

2.0 SCOPE

This decommissioning plan has been prepared to address concerns specific to Hydro’s operations and assets to be constructed within excised areas from the Bay du Nord Wilderness as referenced in Section 1.0, as well as assets that are adjacent to the Bay du Nord Wilderness Reserve. This plan details what assets are to be decommissioned in the Reserve as well as detail Hydro’s plans for limiting and discouraging illegal public access to the Reserve.

These plans also detail the proposed methods for rehabilitating quarries; borrow areas, roads and trails following the completion of construction on the Project. A more in-depth description

of rehabilitation measures involved with the construction of TL 267 will be included in the Site Specific Rehabilitation Plan.

As per the conditions of release from further environmental assessment this decommissioning plan includes:

- Objectives, Goals, Targets, Timelines and Commitments;
- Removal of Bridge 47 (Little River) and Dunn's River Bridge 202/202A immediately after Project construction is complete;
- Removal of proposed Bridge 67 (between Little River and the westernmost boundary of the Reserve.);
- Removal of Bridge 244 at Wigman's Brook unless information acquired during the monitoring of off-road vehicle access to the Reserve (particularly between Dunn's River and Wigman's Brook) indicates that it will not increase access to the Reserve;
- Proposed methods for restoring/rehabilitating quarries and roads/trails no longer required for maintenance; and
- Detailed information on plans to discourage illegal public access both during and post construction for the purpose of protecting the Bay du Nord Wilderness Reserve and sensitive wildlife values.

3.0 OBJECTIVE

As per the request of the Department of Environment and Climate Change, this decommissioning plan for TL 267 has been prepared to satisfy requirements to release the construction of TL 267 from further environmental assessment. The objective of this plan is to:

- Detail specific assets for decommissioning within areas excised from the Bay du Nord Wilderness Reserve described in Section 1.0, and adjacent to the Bay du Nord Wilderness Reserve.
 - Document time specific goals and targets directly related to limiting illegal public access to the Bay Du Nord Wilderness Reserve to pre-construction levels both during and post construction of the Project, while maintaining appropriate access for proper line maintenance.
 - Detail methods for rehabilitating trails, bridges, quarries and borrow pits within and adjacent the Bay du Nord Wilderness Reserve including areas excised from the Bay du Nord Wilderness Reserve as referenced in Section 1.0, that are not required for maintenance after the Project has been completed.
-

4.0 DEFINITIONS

Site: Construction areas between the terminal station at Bay d’Espoir and the terminal station at Western Avalon and the transmission line between the two stations for TL 267.

5.0 ABBREVIATIONS AND ACRONYMS

ATV	All Terrain Vehicle
EA	Environmental Assessment
ENCC	Department of Environment and Climate Change
EPP	Environmental Protection Plan
MW	Megawatt
OSEM	On-site Environmental Monitor
PAG	Potential Acid Generation
PNAD	Parks and Natural Areas Division
ROW	Right Of Way
TL	Transmission Line

6.0 PROJECT DESCRIPTION

The Project will involve the construction of approximately 188 km of new, 230 kV steel tower transmission line between Bay d’Espoir and the western portion of the Avalon Peninsula on the Island of Newfoundland.

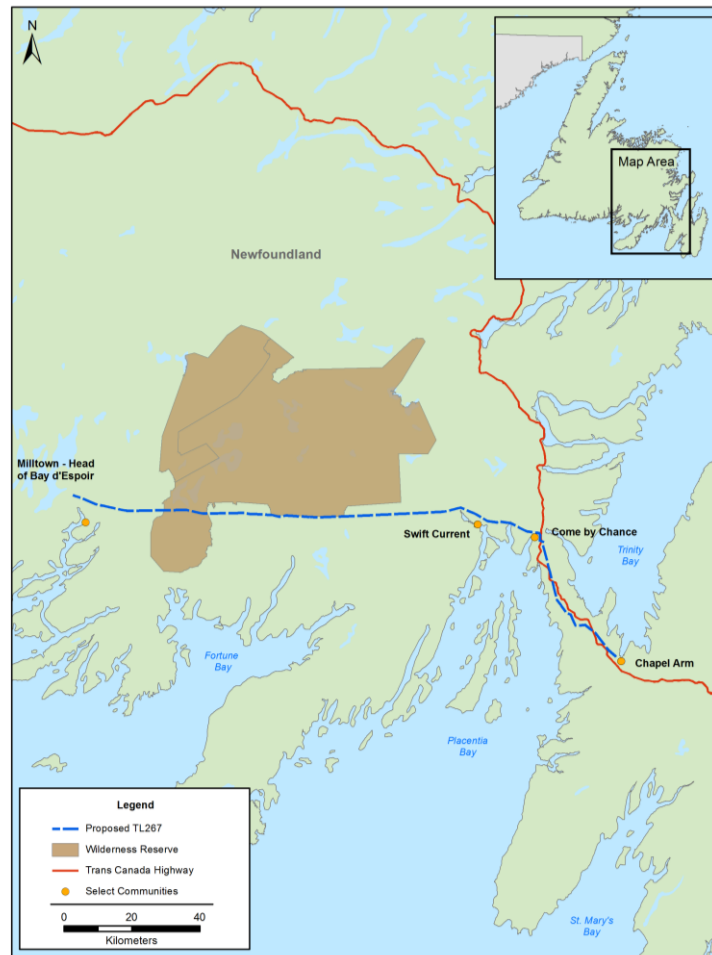


Figure 1: The Proposed Bay d’Espoir To Western Avalon Transmission Line (TL 267)

As shown in Figure 1, approximately 13 km of the proposed TL 267 right of way will be located within a right-of-way that has been excised from the Reserve boundary as described in Section 1.0. As well, approximately 22 km of the right of way will run adjacent to the Reserve boundary, south of the existing lines TL 202 and 206.

Commencing in 2015 with detailed engineering and the procurement and manufacture of key long-lead components, the current Project schedule has seen construction activity in the field beginning in the summer of 2016 and continuing year-round, concluding in late 2017/ early 2018 followed by eventual commissioning of the Project and the commencement of operations of the new line.

7.0 PLANS TO LIMIT & DISCOURAGE ILLEGAL PUBLIC ACCESS

As part of Hydro's target to return public access to the Reserve to pre-construction levels following completion of the Project, there are a number of measures planned to limit and discourage illegal public access to the Reserve both during and post construction of TL 267. These measures include:

- The removal of temporary bridges and culverts
- The abandonment of roads and access trail
- Funding for an independent onsite environmental monitor
- Funding of two temporary conservation staff positions
- Provision and installation of cameras and/or other monitoring devices
- Funding of signage in areas adjacent to the Bay du Nord Wilderness Reserve.

These measures are discussed in more detail in the following sections of this plan.

8.0 COMMITMENTS

8.1 Assets To Be Decommissioned

A key part of decommissioning assets such as bridges, culverts and access trails is erosion control. Appendix A provides a comprehensive list of the type of erosion control measures that will be used to prevent erosion.

The following section describes the assets to be decommissioned post-construction.

8.1.1 Bridges

As per the environmental assessment release conditions, the following bridges are to be removed immediately after construction of the Project is complete:

- Bridge 47 – Crossing Little River
 - Bridge 67 – Between Little River and the westernmost boundary of the Reserve
 - Bridge 202/202 A – Crossing Dunn's River
-

- Bridge 244 – Crossing Wigman’s Brook

In addition, following careful consideration of the operational requirement of assets such as bridges post-construction, Hydro has decided that all bridges will be removed. As per the Minister’s letter releasing the Project from EA, consultation regarding Wigman’s Brook no longer will require consultation with ENCC.

Figures 2-21 identify all locations that were field identified as requiring bridges at the preliminary stage of design and engineering. In addition, if during construction a bridge is identified as a more appropriate crossing than a culvert, all such bridges will also be removed following construction. Hydro will consult with and report to Water Resources Management Division (WRMD) on the removal of bridges, as required under the *Water Resources Act, 2002*, specifically Section 48 <http://assembly.nl.ca/Legislation/sr/statutes/w04-01.htm>. Any effluent or runoff leaving the site will be required to conform to the requirements of the *Environmental Control Water and Sewage Regulations, 2003* <http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm>. If water quality monitoring and reporting is deemed necessary by WRMD, Hydro will fulfil that obligation.

In addition, any and all conditions, provisions or statements contained in this plan shall strictly be followed along with those detailed in terms, conditions, provisions or reservations of any and all permits, approvals, licences, authorizations or other instruments issued under NL provincial or federal legislation, policies and guidelines. Where a condition, provision, statement or correspondence contained in or made under this plan is inconsistent or conflicts with a term, condition, provision or reservation of NL provincial or federal legislation, policies and guidelines or a permit, approval, licence, authorization or other instrument issued under them, NL provincial or federal legislation, policies and guidelines along with terms, conditions, provisions or reservations of any and all permits and approvals, licences, authorizations or other instruments issued under NL provincial or federal legislation, policies and guidelines shall prevail to the extent of the inconsistency or conflict.

8.1.2 Access Trails

Trails no longer required for the maintenance of TL 202/206, or for the future maintenance of TL 267 will be left to re-vegetate naturally. Key infrastructure such as TL 202/206 and TL 267 requires permanent access for reliability of the system, and for the safety of Hydro’s maintenance staff that conducts inspections and performs maintenance on these lines via ground access. Trails no longer required for future maintenance are identified in Figures 2-21. These trails will re-vegetate naturally and will not include the use non-native plant species. Figures 2-21 also present the trails required for the maintenance of TL 202/206.

8.1.3 Culverts

Following careful consideration of the operational requirement of assets such as culverts post-construction, Hydro has decided that all culverts will be removed. Figures 2-21, all locations that were field identified as requiring culverts at the preliminary stage of design and engineering are shown. In addition, if during construction a bridge is identified as a more appropriate crossing than a culvert, all such bridges will also be removed following construction.

Figures 2-21 identify all locations that were field identified as requiring culverts at the preliminary stage of design and engineering. In addition, if during construction a culvert is identified as a more appropriate crossing than a bridge, all such culverts will also be removed following construction.

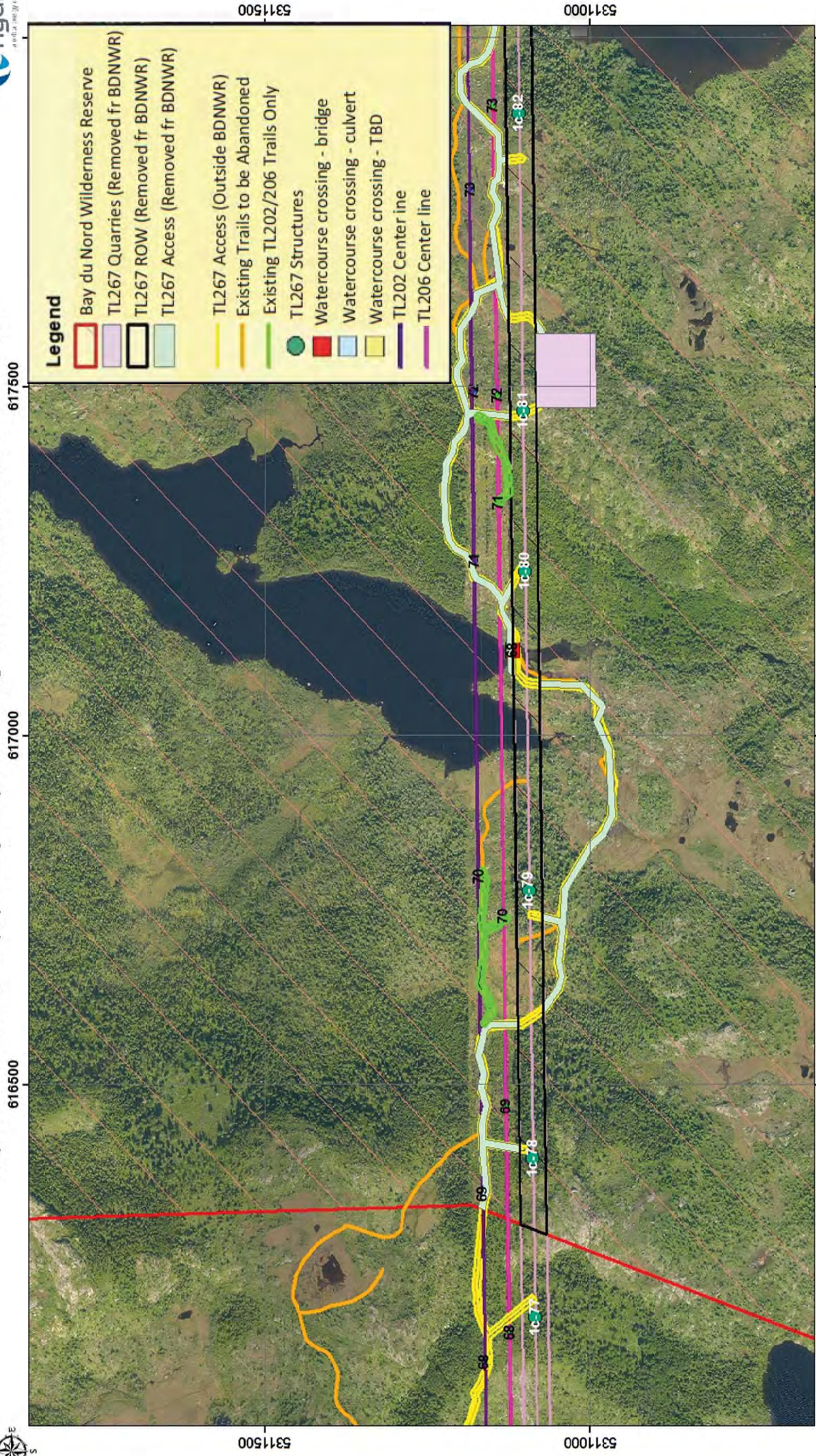
Hydro will consult with and report to Water Resources Management Division (WRMD) on the removal of culverts, as required under the *Water Resources Act, 2002*, specifically Section 48 <http://assembly.nl.ca/Legislation/sr/statutes/w04-01.htm>. Any effluent or runoff leaving the site will be required to conform to the requirements of the *Environmental Control Water and Sewage Regulations, 2003* <http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm>. If water quality monitoring and reporting is deemed necessary by WRMD, Hydro will fulfil that obligation.

Hydro will also consult with Fisheries and Oceans Canada on the removal of culverts and the proposed rehabilitation efforts to minimize disturbance to fish and fish habitat.

8.1.4 Borrow Pits and Quarries

Borrow pits and quarries excavated along the ROW will be rehabilitated as work is completed in that area. Rehabilitation will include the replacement of unused excavated material, grading to a stable slope, grading to re-establish natural drainage patterns, replacement of topsoil where available, installation of erosion control structures and natural revegetation as appropriate. Topsoil will be sourced with local material and will not use replacement topsoil from outside the Reserve that could introduce non-native species. The exception to this statement are materials from within the four quarries that were also excised from the Bay du Nord Wilderness Reserve under the Bay du Nord Wilderness Reserve Order (Amendment), published on August 19, 2016.

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



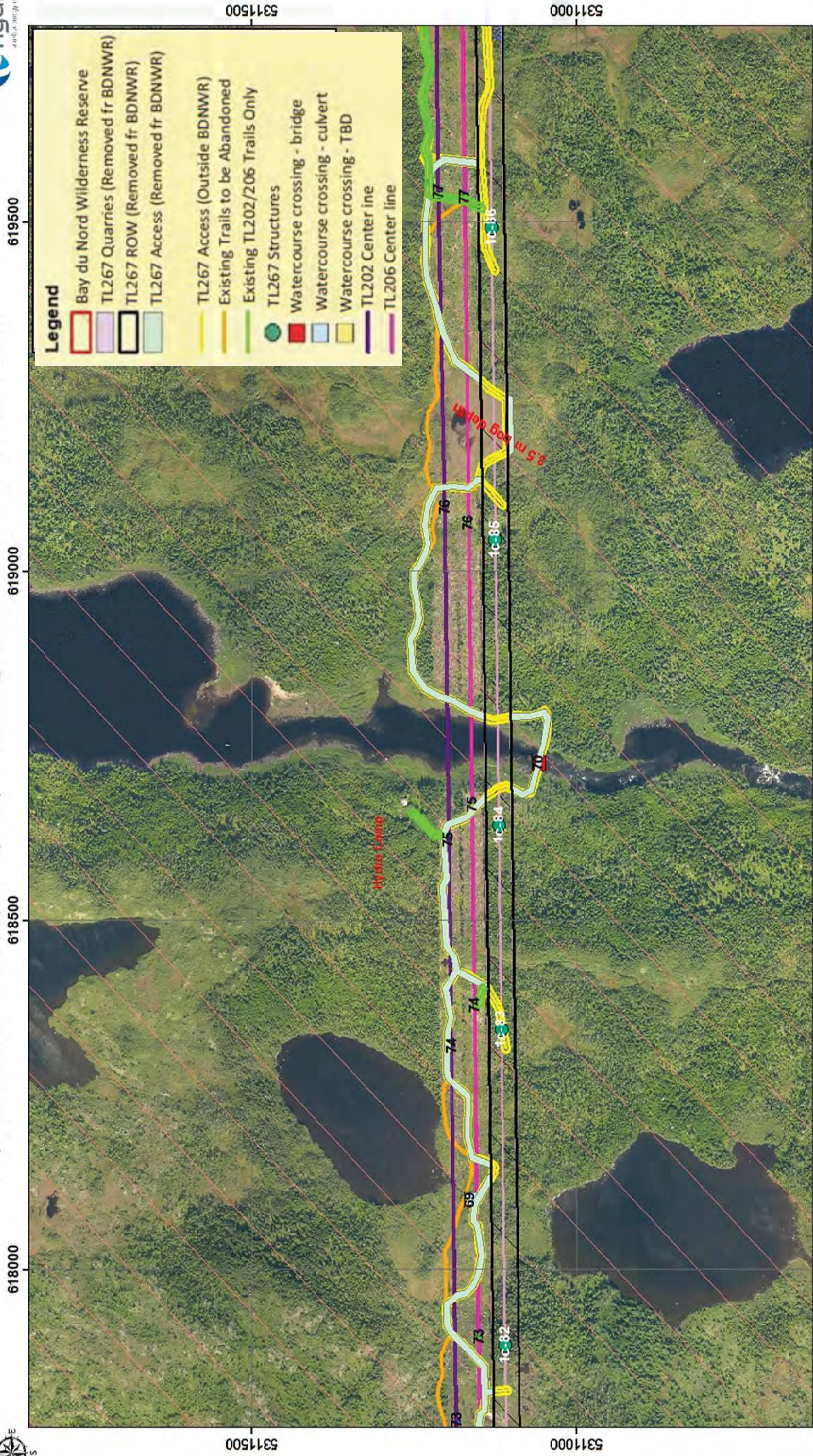
Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 2

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line

Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

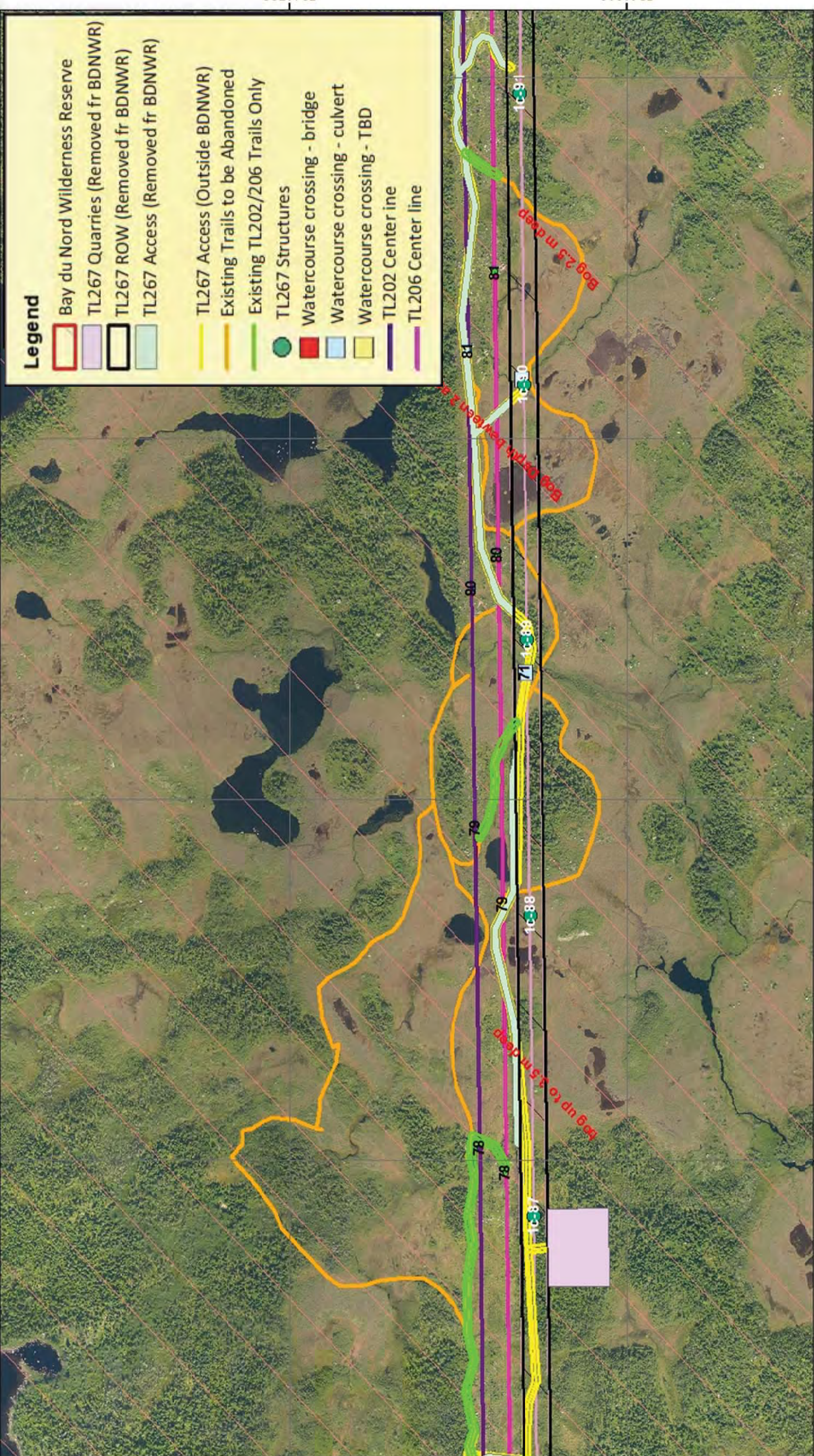
UTM Zone 21 NAD 83

1:5,000

Figure 3



Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

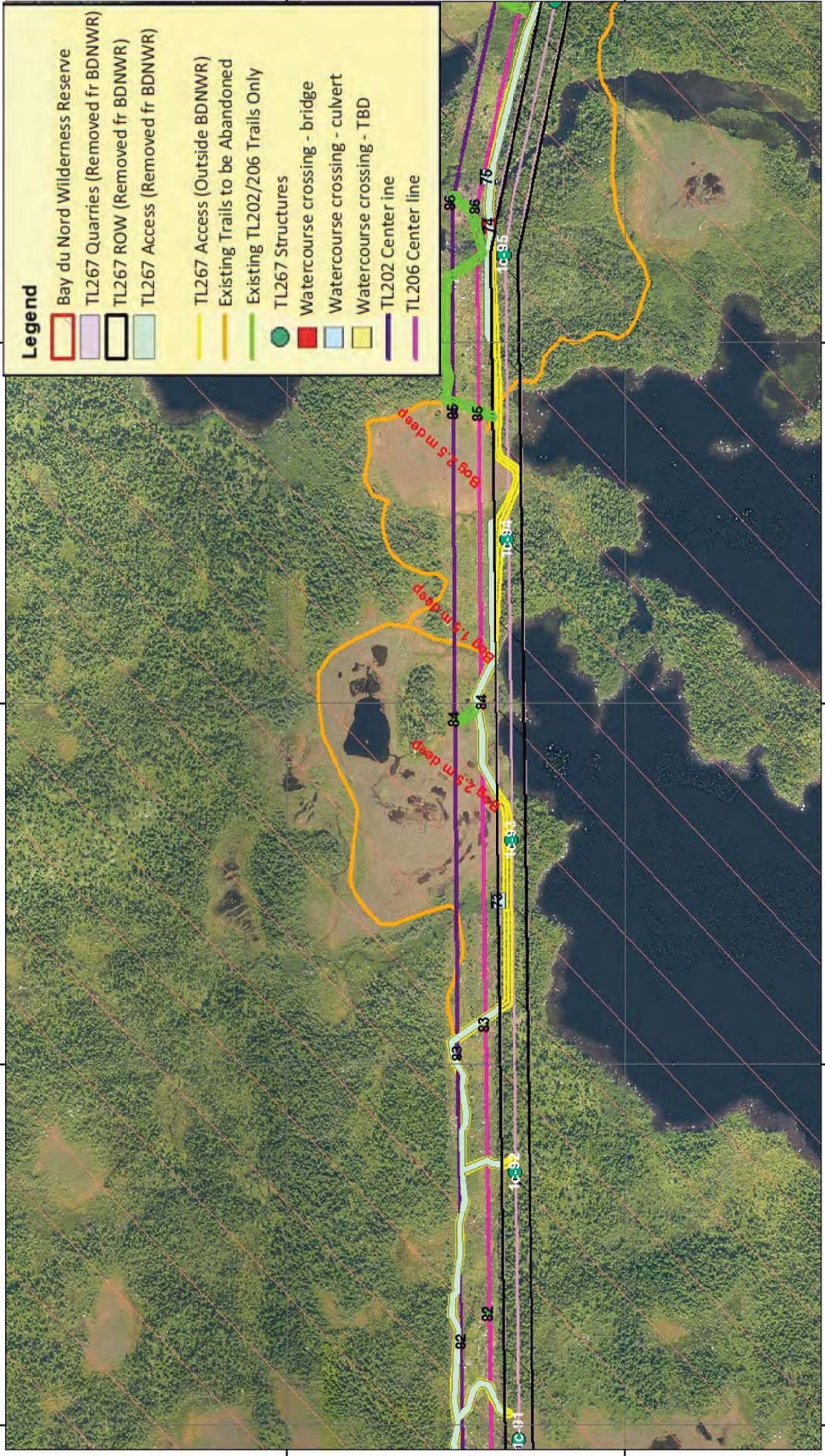
Figure 4



Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



621500 622000 622500 623000 531100 5311500



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line

621500 622000 622500 623000 531100 5311500

UTM Zone 21 NAD 83

1:5,000

Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

Figure 5

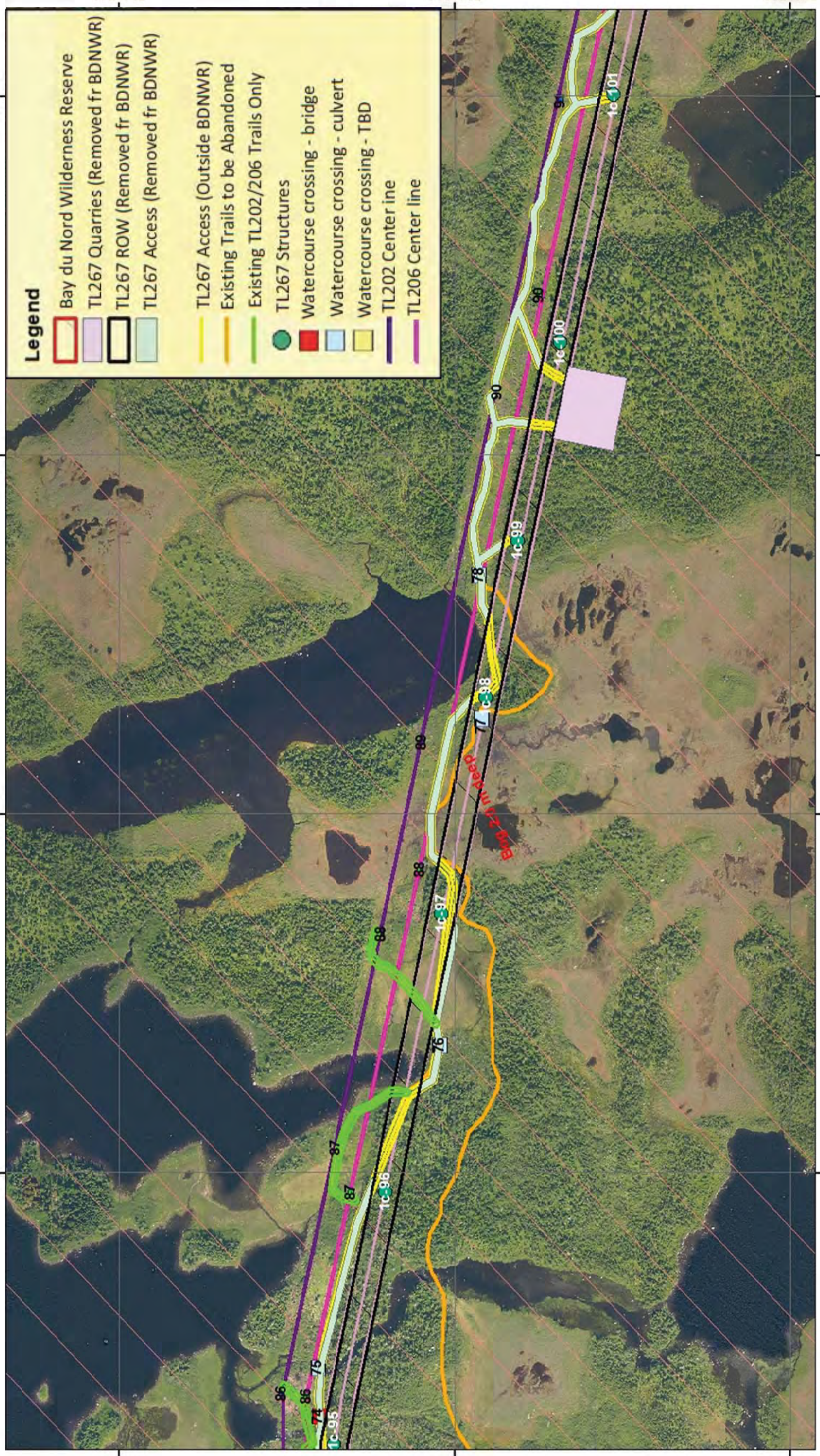


Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line



Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 6

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station

626500

626000

625500

625000

5311000

5311000

5310500

5310500

626500

626000

625500

625000

1:5,000

UTM Zone 21 NAD 83

Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

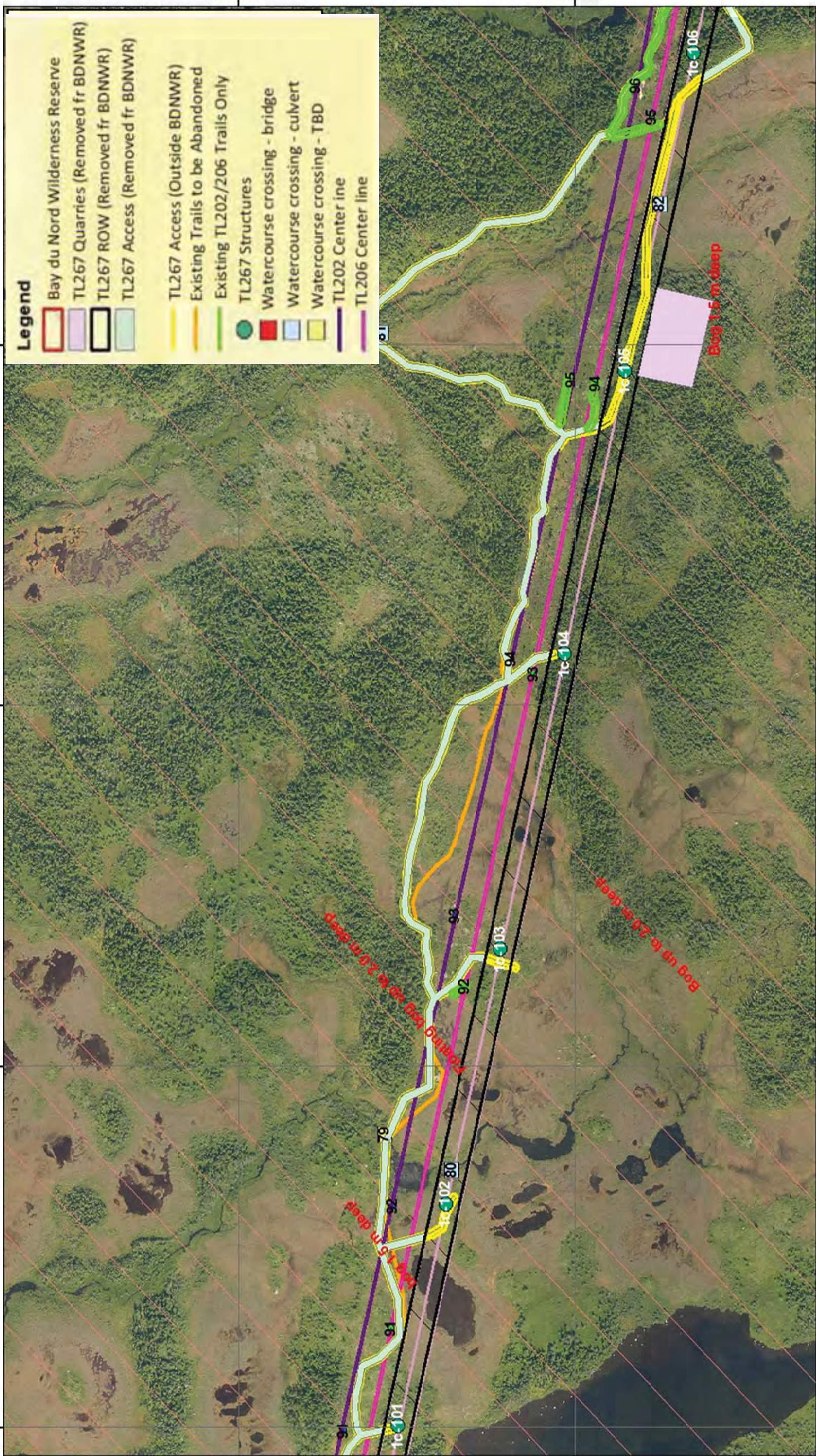
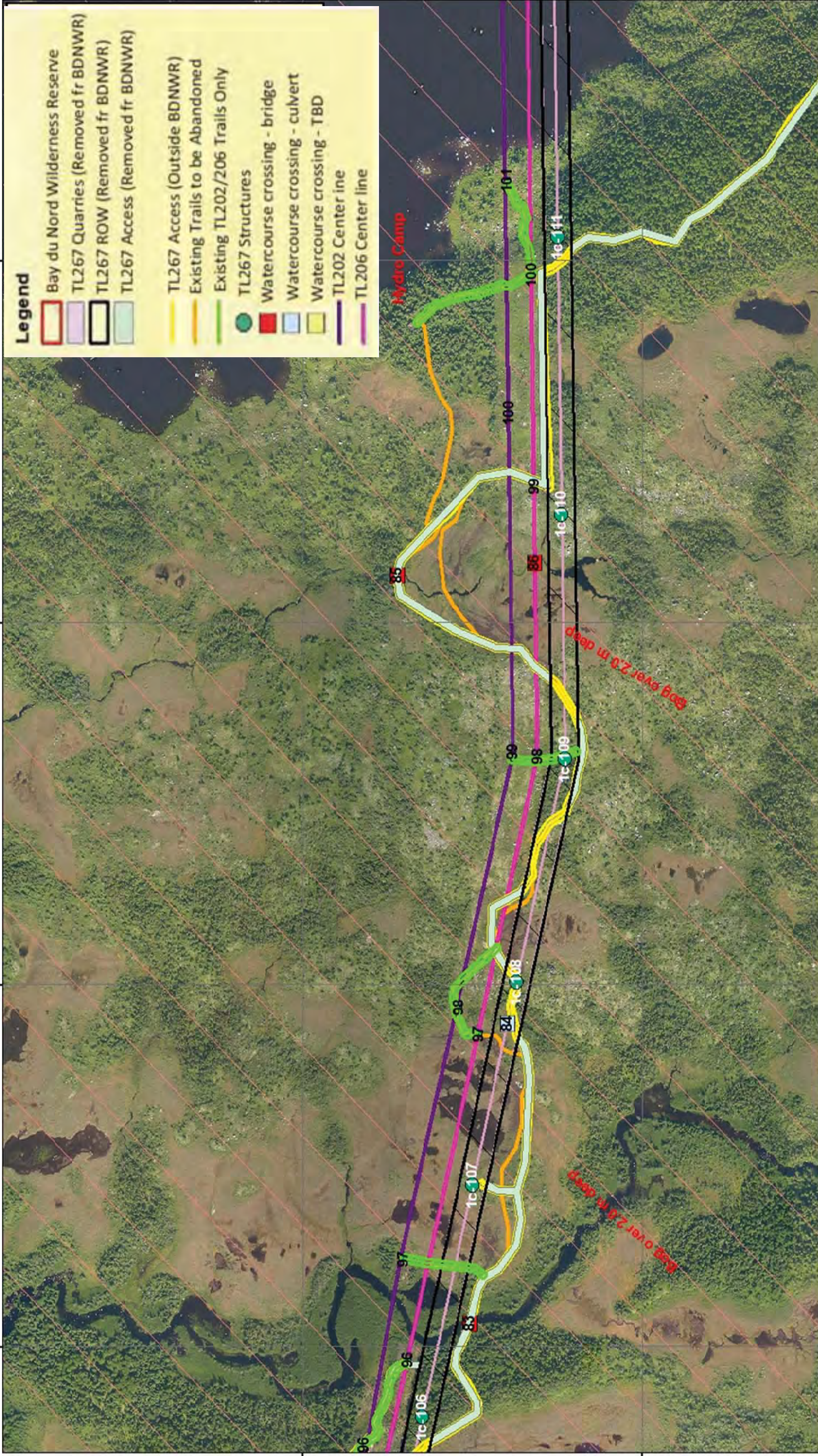


Figure 7

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



627000 627500 628000 628500 5310000 5310500



5310500 5310000 627000 627500 628000 628500 1:5,000

UTM Zone 21 NAD 83

Maps created by W.Lidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

Figure 8

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station

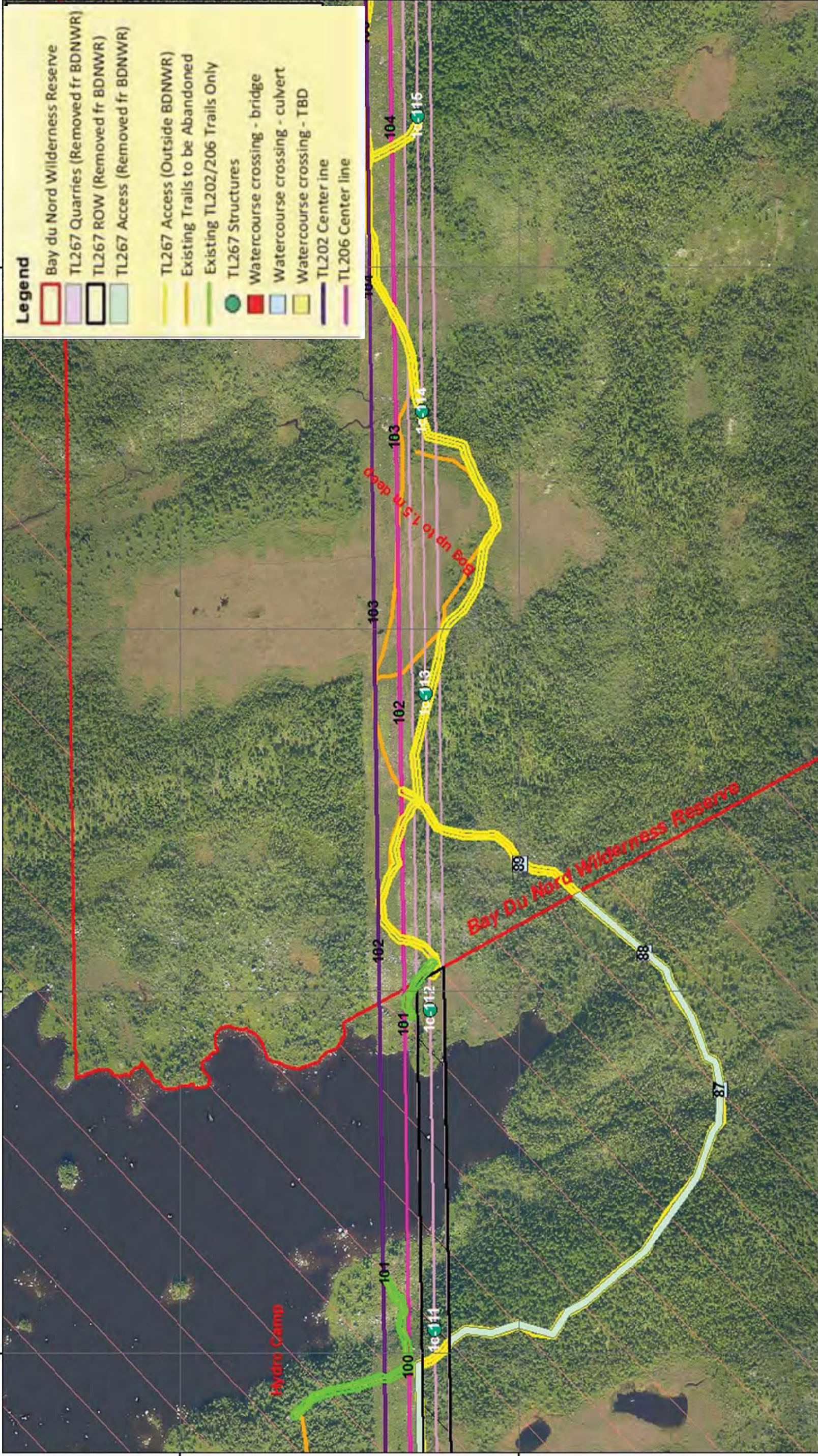


628500 629000 629500 630000

5310500 5310000

Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line



628500 629000 629500 630000

630000

5310500

629500

629000

628500

Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 9

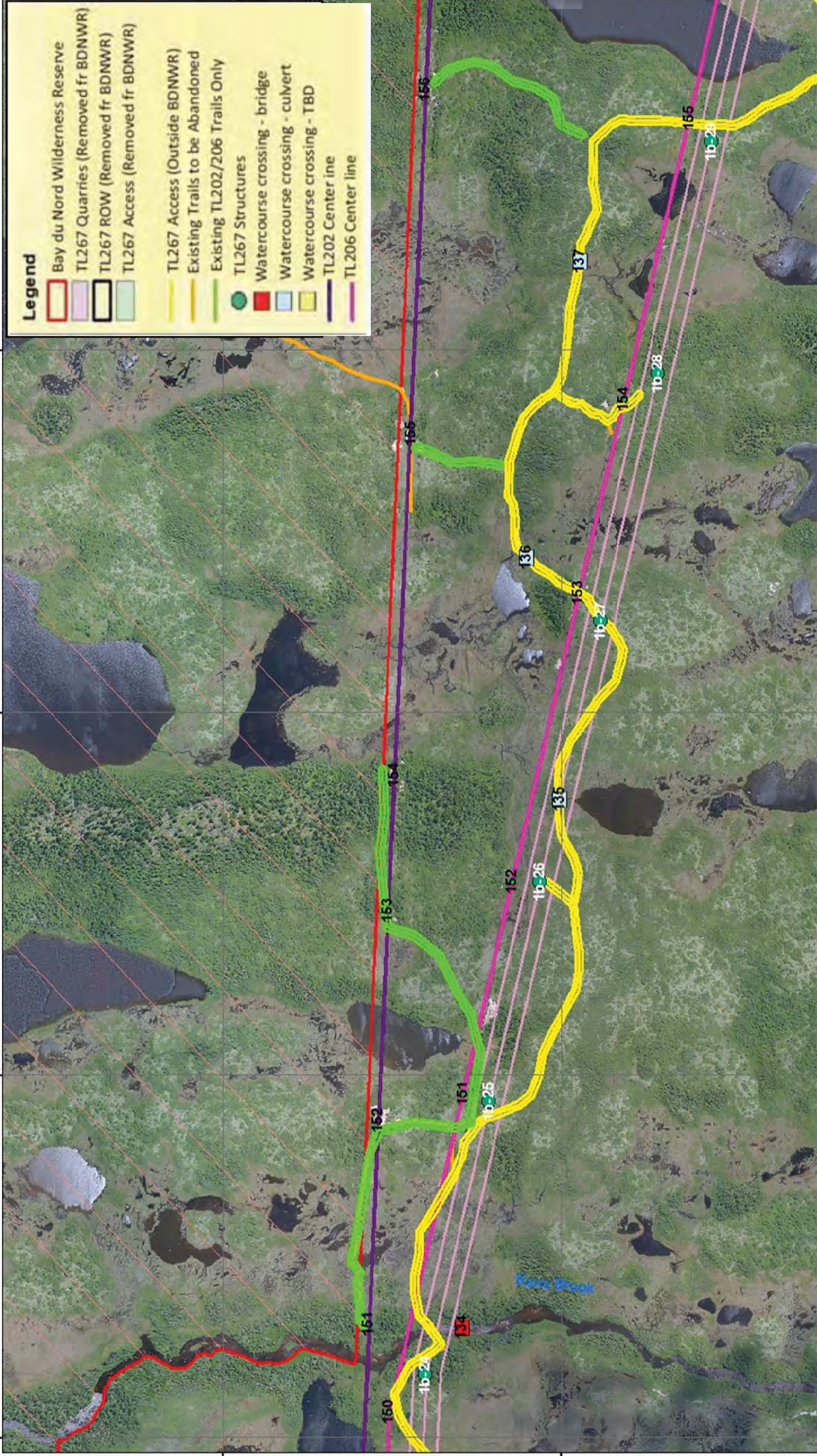
Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



648000 648500 649000 649500

531000 5309500

Legend	
	Bay du Nord Wilderness Reserve
	TL267 Quarries (Removed fr BDNWR)
	TL267 ROW (Removed fr BDNWR)
	TL267 Access (Removed fr BDNWR)
	TL267 Access (Outside BDNWR)
	Existing Trails to be Abandoned
	Existing TL202/206 Trails Only
	TL267 Structures
	Watercourse crossing - bridge
	Watercourse crossing - culvert
	Watercourse crossing - TBD
	TL202 Center line
	TL206 Center line



648000 648500 649000 649500

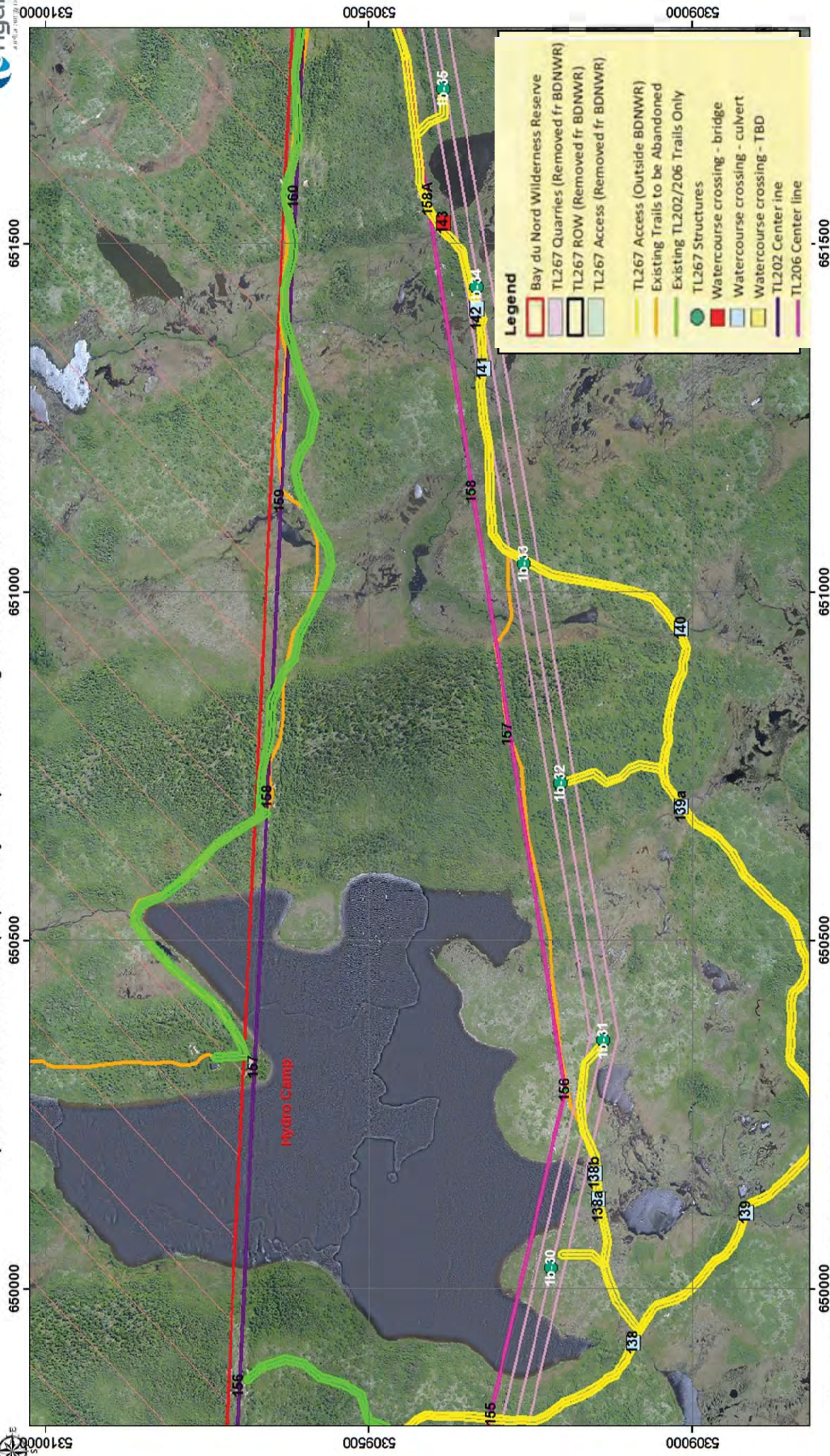
UTM Zone 21 NAD 83

1:5,000

Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

Figure 10

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



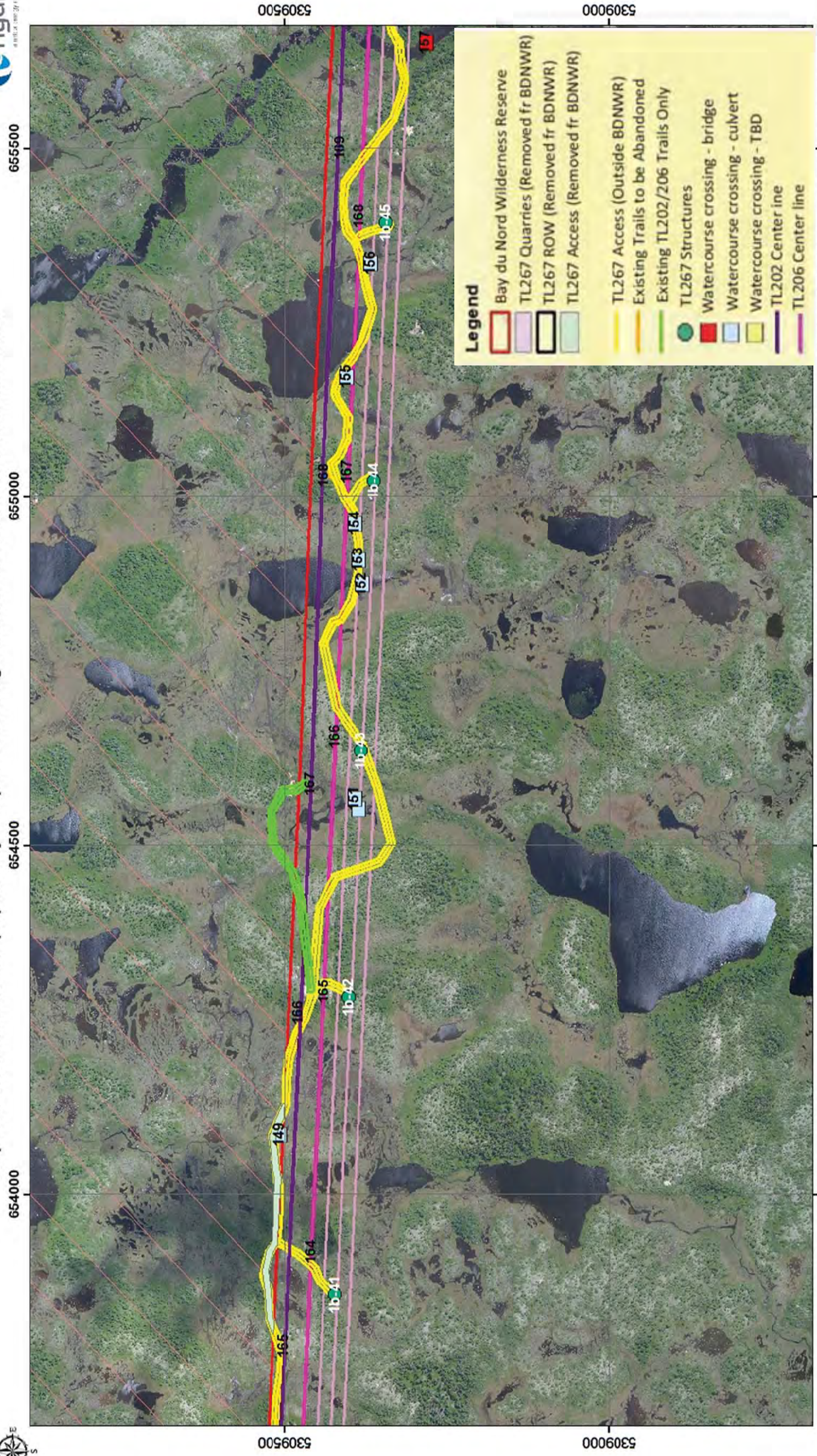
Maps created by W.Lidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 11

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line

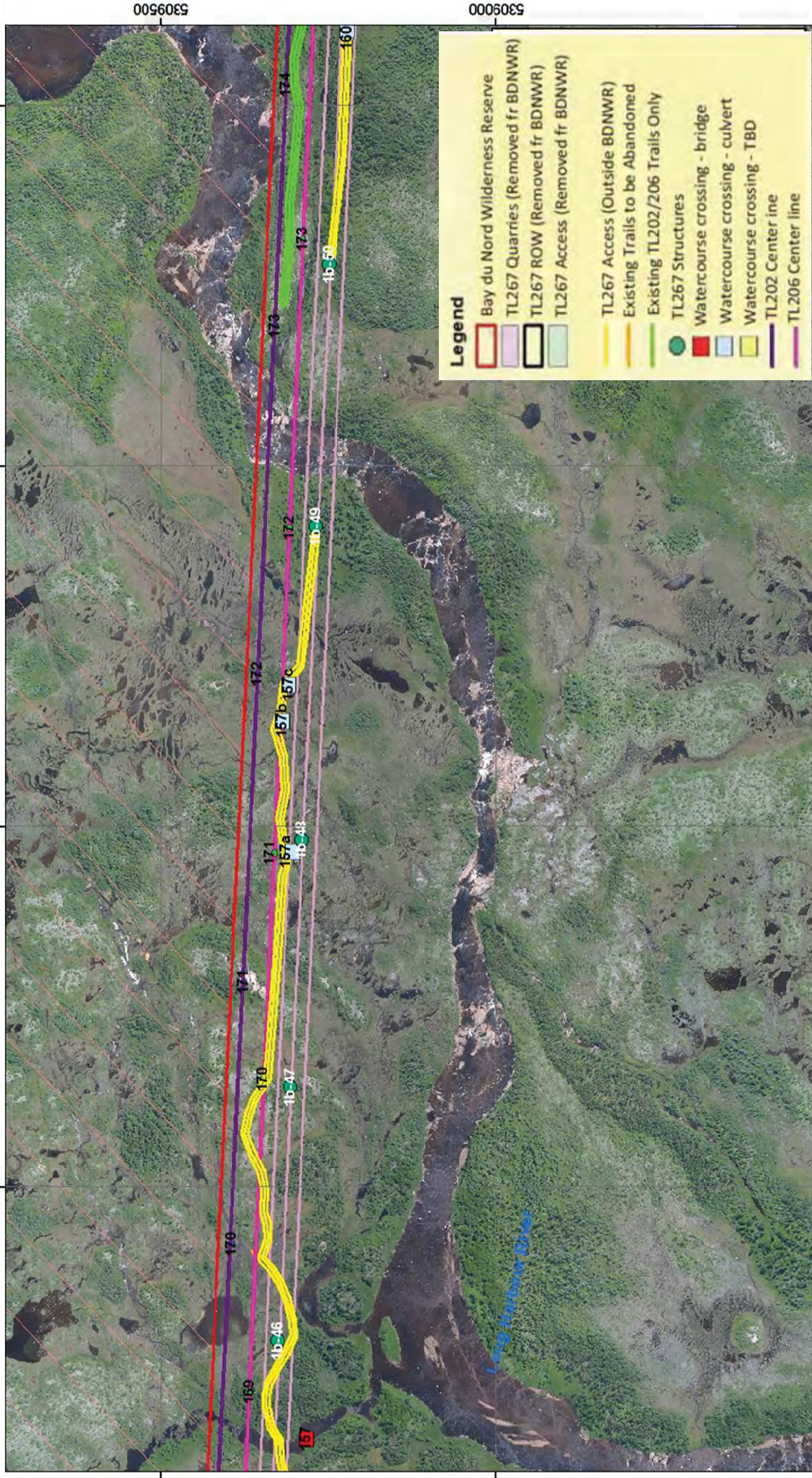
Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 13

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



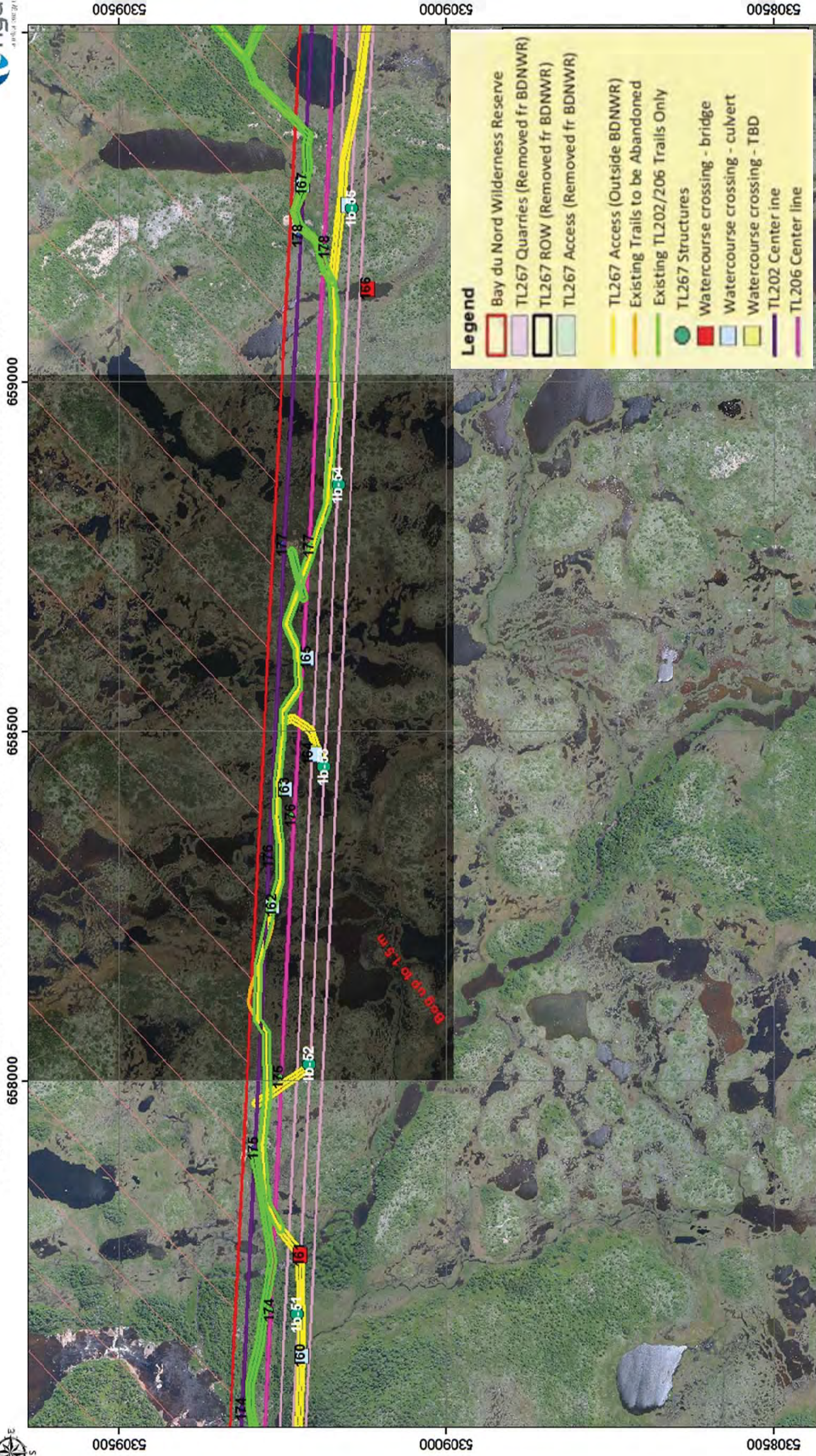
Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 14

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

-  Bay du Nord Wilderness Reserve
-  TL267 Quarries (Removed fr BDNWR)
-  TL267 ROW (Removed fr BDNWR)
-  TL267 Access (Removed fr BDNWR)
-  TL267 Access (Outside BDNWR)
-  Existing Trails to be Abandoned
-  Existing TL202/206 Trails Only
-  TL267 Structures
-  Watercourse crossing - bridge
-  Watercourse crossing - culvert
-  Watercourse crossing - TBD
-  TL202 Center line
-  TL206 Center line

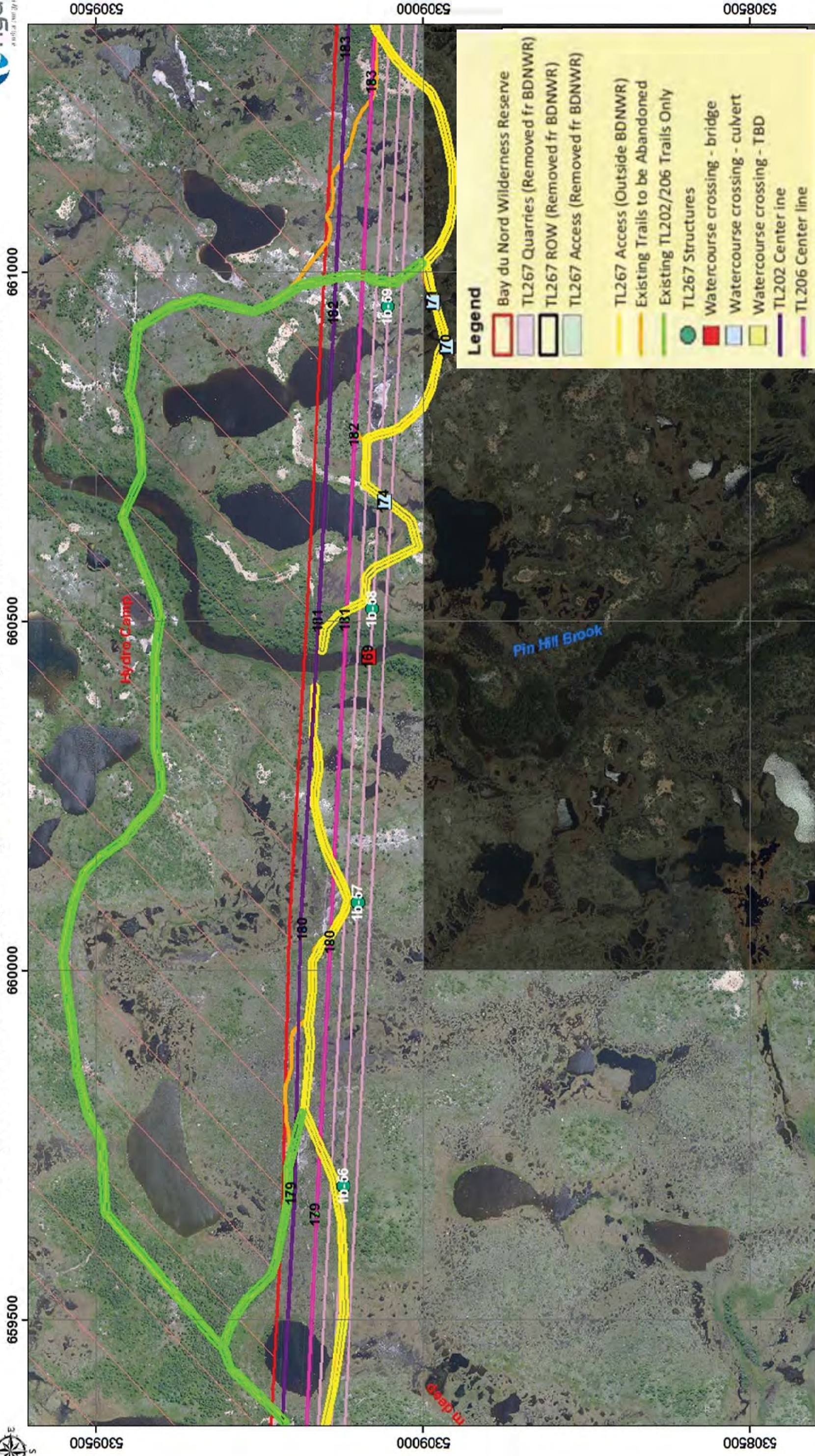
Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 15

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line

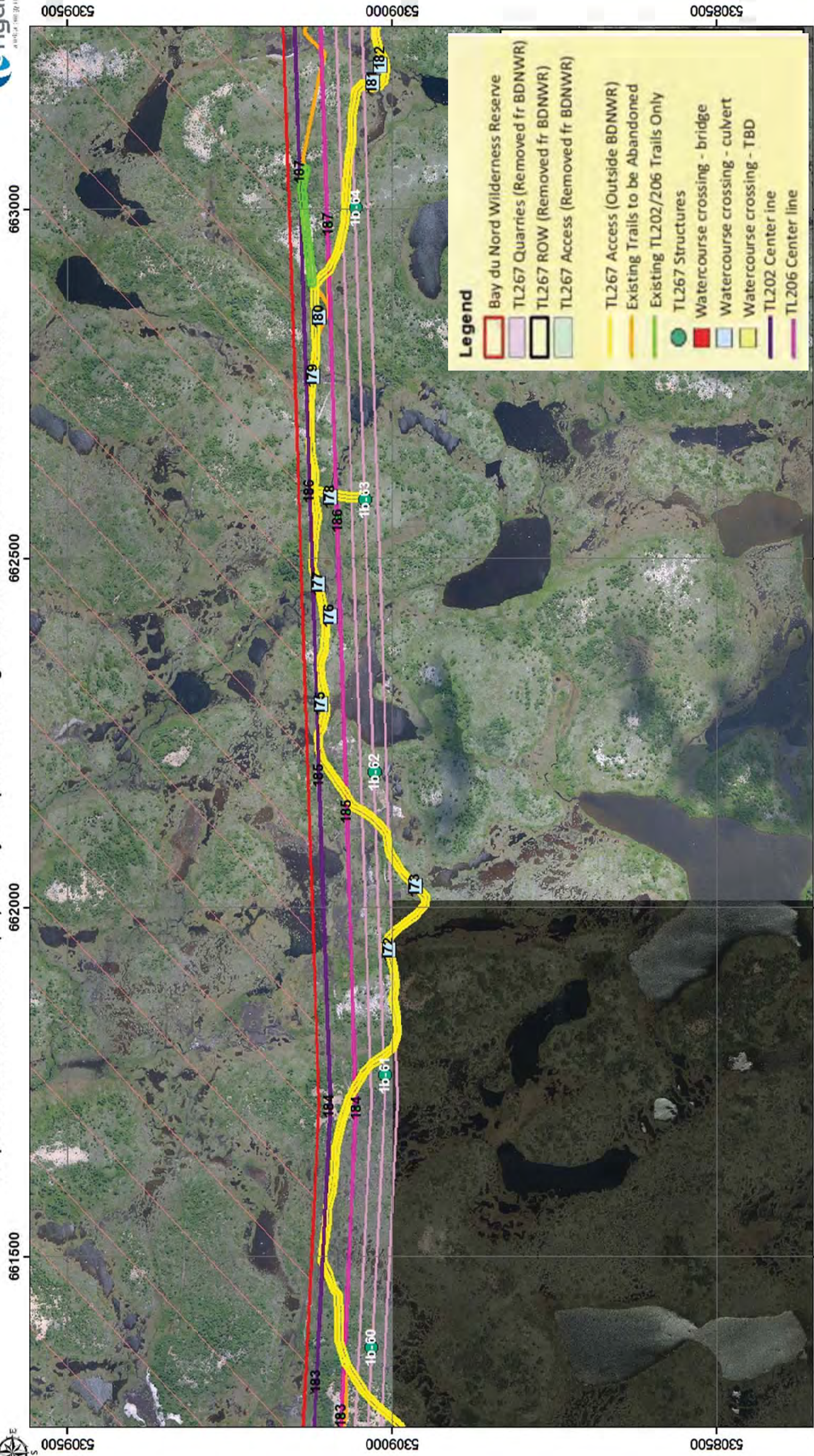
Maps created by W.Lidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 16

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



Legend

- Bay du Nord Wilderness Reserve
- TL267 Quarries (Removed fr BDNWR)
- TL267 ROW (Removed fr BDNWR)
- TL267 Access (Removed fr BDNWR)
- TL267 Access (Outside BDNWR)
- Existing Trails to be Abandoned
- Existing TL202/206 Trails Only
- TL267 Structures
- Watercourse crossing - bridge
- Watercourse crossing - culvert
- Watercourse crossing - TBD
- TL202 Center line
- TL206 Center line

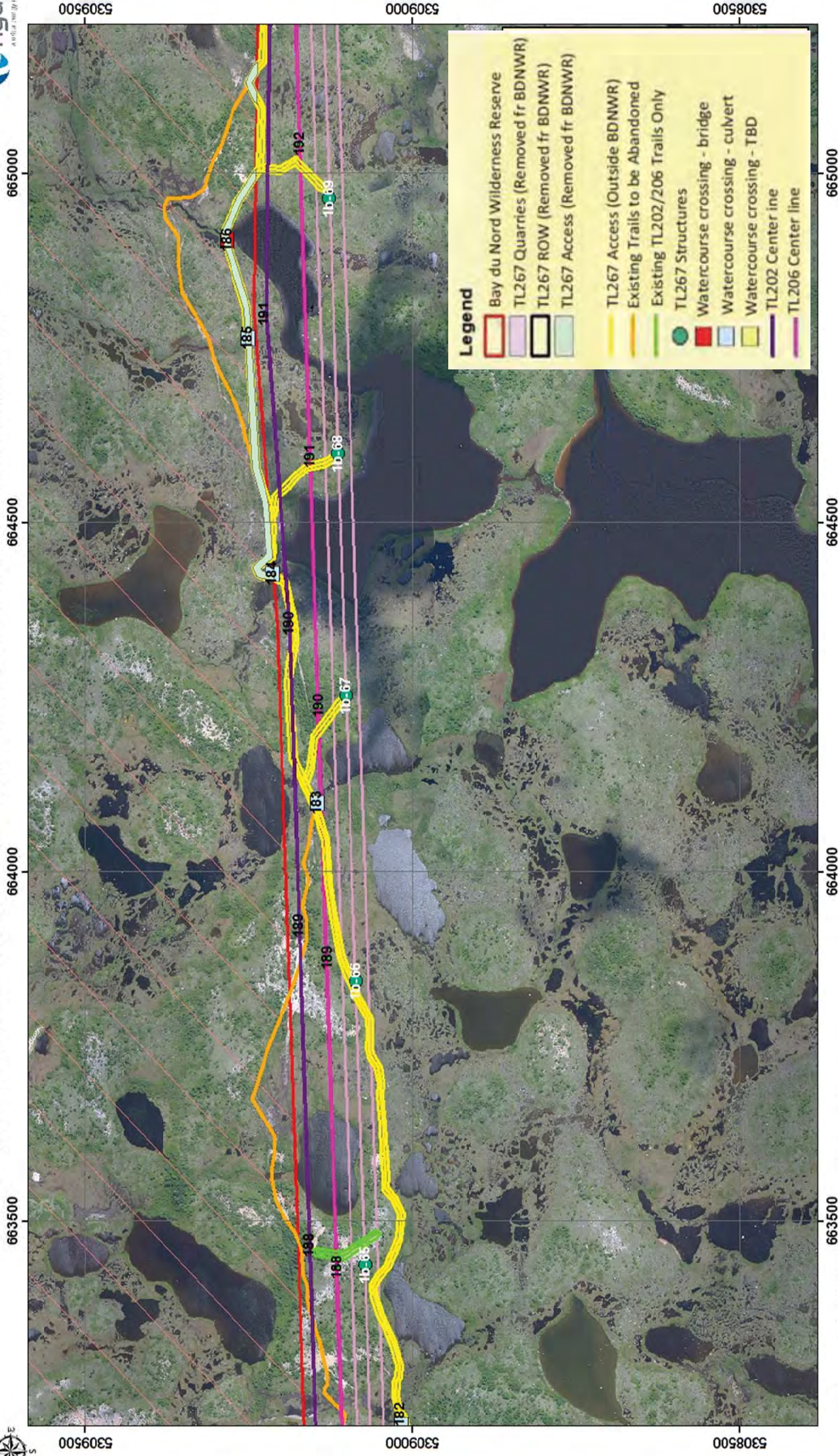
661500
 Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

662000
UTM Zone 21 NAD 83

663000
1:5,000

Figure 17

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



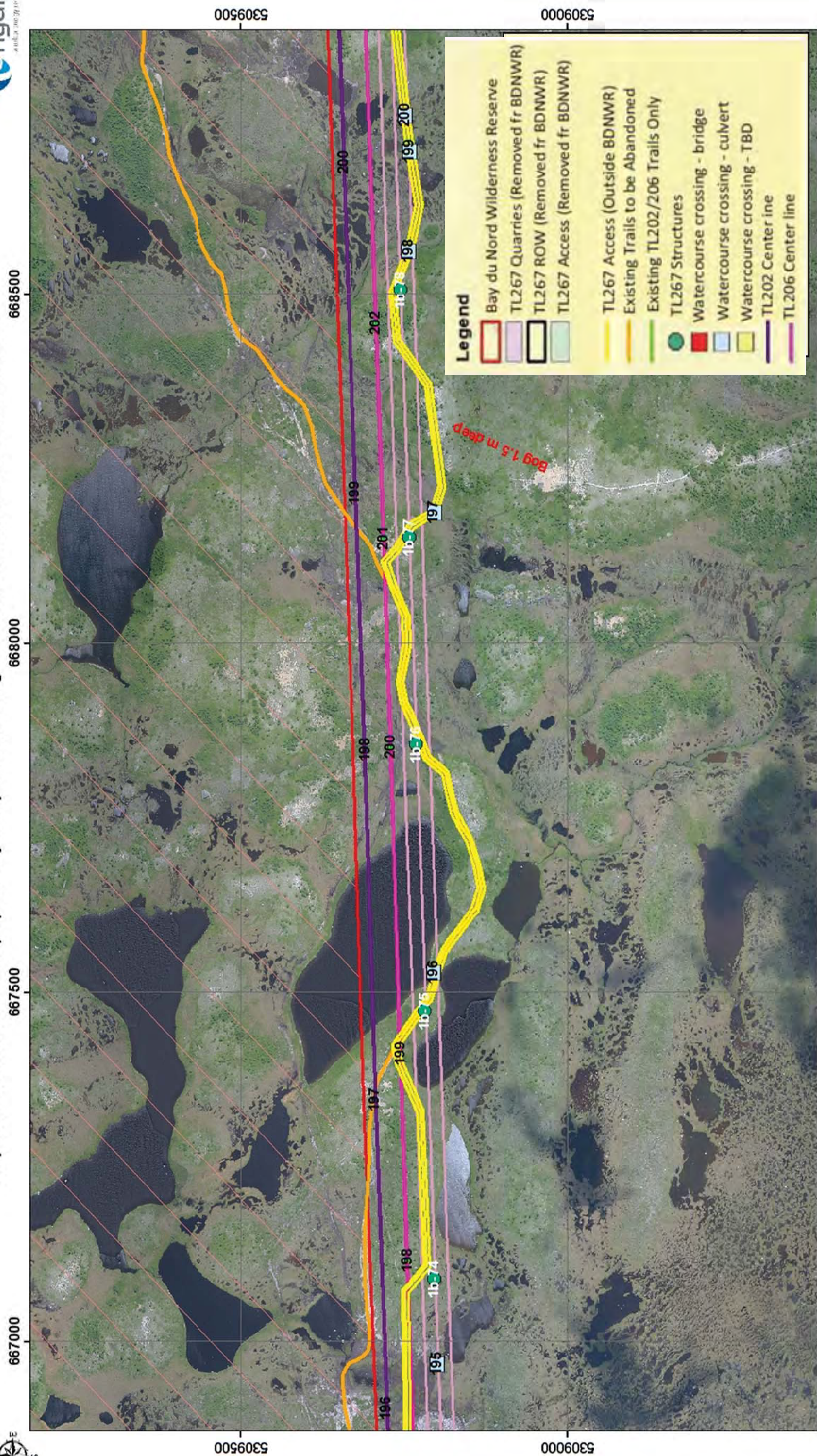
Maps created by W.Lidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 18

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



668500

668000

667500

667000

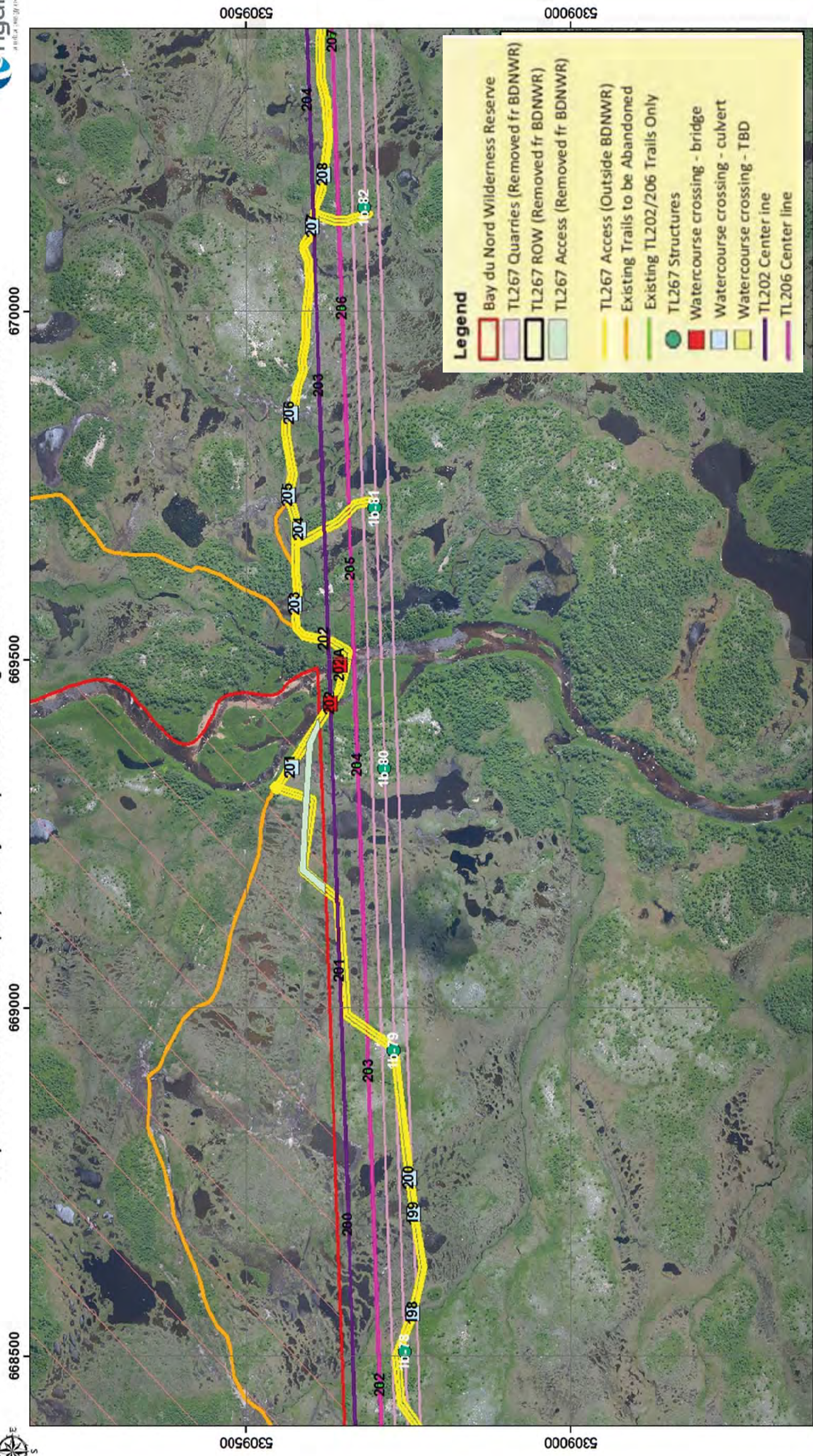
Maps created by WLidster Environmental Services Department
For Hydro and Forbes Brothers Use Only
Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 20

Proposed Transmission Line (TL) 267 Bay D'Espoir Generating Station to Western Avalon Terminal Station



668500 669000 669500 670000
 Maps created by WLidster Environmental Services Department
 For Hydro and Forbes Brothers Use Only
 Do not replicate without Permission

UTM Zone 21 NAD 83

1:5,000

Figure 21

9.0 TIMELINE

9.1 Asset Decommissioning

The decommissioning of project assets is dependent upon the accuracy of the construction schedule and is subject to change depending on delays in construction which can occur due to unforeseen and unpredictable circumstances. With this in mind, the tentative timeline commitments for assets to be decommissioned as part of this Project are as follows:

- Bridges: All bridges will be removed in approximately late December 2017 following completion of construction of the Project.
- Culverts: All culverts will be removed by approximately late December 2017 following completion of construction of the Project.
- Access Trails: All access trails deemed necessary for decommissioning are presented in Figures 2-21.
- Quarries and Borrow Areas: Quarries and Borrow areas will be decommissioned progressively throughout the construction phase of the Project as they are no longer needed in their respective areas. All quarry and borrow areas will be decommissioned as of late December 2017 following the completion of construction on the Project.

9.2 Actions To Discourage Illegal Public Access

Hydro has various plans for discouraging and monitoring illegal public access to the Bay du Nord Wilderness Reserve during and following construction of the Project for the purpose of protecting the Bay du Nord Wilderness Reserve and sensitive wildlife values. These plans have been detailed in sections 6.0 and 10.0 of this plan respectively. These measures will begin to be implemented as soon as possible (i.e., fall 2016) and will continue post construction.

10.0 REHABILITATION MEASURES

The primary concern with environmental rehabilitation is site stabilization and erosion prevention. This is particularly pertinent to temporary structures such as roads, quarries, and watercourse crossings.

10.1 General Rehabilitation Measures

- a) Rehabilitation will be required for all temporary works, including roads, stream crossings, camps, marshalling areas and quarry and borrow areas;
- b) No temporary buildings or structures associated with the work will be left on Site upon completion of the work;
- c) All solid waste, including petroleum, oil and lubricant containers will be removed from Site;
- d) Pre/Post occupation inspections will be completed by the OSEM for all stream crossings and quarries. These reports will be provided to Parks and Natural Areas Division. Hydro will provide support for site visits by Parks and Natural Areas Division and Wilderness and Ecological Reserves Advisory Council representatives. All such site visits are to be coordinated with Brent Sellars, Manager – Capital/EA with Hydro by the sponsored independent monitor. Hydro will then coordinate all such visits with the on-site staff.
- e) The OSEM will prepare a report for all sites documenting Site conditions prior to disturbance and upon Site abandonment and rehabilitation specifically for watercourse crossings and quarries. These reports will be provided to Parks and Natural Areas Division, Wildlife Division, and Environmental Assessment Division along with other relevant regulators. Each report will include a description of the condition of vegetation and other aspects of the natural environment.
- e) Annual reports containing updates on construction progress and the anticipated completion date will be provided to Parks and Natural Areas Division and Wilderness and Ecological Reserves Advisory Council representatives.

10.2 Quarry/Borrow Area Rehabilitation Measures

The following measures are specific to quarry and borrow areas and will be considered in rehabilitation plans for those areas:

- a) Hydro will comply with all conditions of permits associated with quarry approvals
 - b) Any organic material or overburden removed during development of the borrow pits and quarries will be stockpiled near the pit or quarry area for future use during rehabilitation of the borrow pit or quarry. Overburden (and non-PAG rock) that is not
-

suitable for rehabilitation purposes will be stockpiled for temporary use or permanent disposal. Stockpiling will be in stable configurations and contoured to match the surrounding landscape. Temporary stockpiles it will be returned to the borrow pit or quarry opening once extraction from the pit or quarry is complete. All stumps, organic material and topsoil (including the rusty-coloured and iron-stained layer) shall be stripped and stockpiled at least 5 metres from uncleared areas and 10 metres from active quarry or stockpile areas. Hydro will ensure that the quality of the topsoil is not affected by dilution with other materials. Arrangements will be made with the representatives of the Department of Natural Resources for an inspection to be conducted prior to abandonment of the site;

- c) All equipment and material will be removed from the site;
- d) All pit and quarry slopes will be graded to slopes less than 20 degrees, or to a slope conforming to that existing prior to quarrying;
- e) Excess overburden may be used for sloping but topsoil or organic material may not be used for sloping. Following sloping, topsoil or organic material may be spread over the entire quarry area to promote re-vegetation and will not include seeding; and
- f) Quarry conditions, including slope on rock walls, will be determined through a rehabilitation plan. Each quarry will be evaluated on a site-specific basis to determine if cliff faces should be converted to rubble slopes.

10.3 Roads/Trails and Culverts/Bridges Rehabilitation Measures

The following measures are specific to road and culvert/bridge rehabilitation and will be considered in rehabilitation plans for those areas:

- a) The Contractor will submit a plan for controlling erosion during rehabilitation activities. This plan would address construction activities that have the potential for stream sedimentation;
 - b) When working in a stream or waterbody, fill will be removed around pipes before water bypass installation and pipe removal;
 - c) Fill material that requires temporary storage will be placed in stable areas outside of stream channels and flood plains;
 - d) Channel banks will be armoured with large rock, woody debris and vegetation where needed;
 - e) Channel and vegetation rehabilitation will be required if there are disturbances upstream and downstream of the stream crossing site;
 - f) Stream channels will be restored to natural grades and dimensions;
-

- g) All culverts will be removed as discussed above. Water Resources Management Division and Fisheries and Oceans Canada will be consulted regarding the removal of culverts. Approaches to channels will be stabilized so they may be used as ford sites for future maintenance and inspections.
- h) Temporary bridges in all areas of the site will be removed; and
- i) Removed culverts and other structural materials will be properly disposed of.
- j) Crossing structures installed will be removed from site and associated fill material will be removed from and regraded outside the stream buffer
- k) All waste, silt fencing, filter fabric, wood debris, damaged culverts, etc. will be removed from site and disposed of.
- l) The bed, banks and floodplains of watercourses affected by construction activities will be adequately protected from erosion using one of the methods described in Appendix A.
- m) Areas adversely affected by construction activities will be restored to a state that resembles local natural conditions.

11.0 ENVIRONMENTAL MONITORING PROCEDURES - POST CONSTRUCTION

Following completion of the Project, Hydro will implement various environmental monitoring procedures. These procedures are designed to deter illegal access by the public from accessing the Bay du Nord Wilderness Reserve as well as to evaluate the effectiveness of the measures taken during the decommissioning of the Project to discourage such access. The environmental monitoring procedures to be implemented during construction and following the completion of the Project are as follows:

- a) Hydro will fund two temporary conservation staff positions to patrol areas within and adjacent to the Bay du Nord Wilderness Reserve for a minimum of two years post-construction. These positions will assist with the monitoring of public access into the Reserve as well as activity in the ROW.
 - b) Hydro will provide and install cameras to be installed at strategic locations along the main access routes in areas adjacent to the Bay du Nord Wilderness Reserve, in consultation with the Department of Environment and Climate Change, to monitor public access and activity levels. Cameras will be installed at strategic points prior to the start of construction. Any activities recorded will be submitted to ENCC, and summaries of activities will be reported to ENCC annually. Hydro will also work with Parks and Natural Areas Division to develop policies for the use of cameras before installation to ensure adherence with the 2015 guidance of the Office of the Information and Privacy Commissioner. The cameras will be installed during construction, and will remain until
-

two years post-construction at which time the data collected will be analyzed and the value assessed for continued implementation. As there is no baseline data for this area, the number of people accessing the Reserve as indicated by the camera data will be compared with the number of permits that are obtained from Parks and Natural Areas Division to enter the Reserve.

- c) Hydro will provide funding for signage and will post the signage in areas adjacent to the Bay du Nord Wilderness Reserve during construction that will remain post-construction. The phrasing of the signage will be decided upon in consultation with the Parks and Natural Areas Division. Signs will indicate that cameras are being used and that bridges and water crossings will be removed after construction is complete. Reserve boundary signs will also be installed.

12.0 CLEAN – UP AND RECLAMATION

Clean-up and reclamation will be conducted after the construction infrastructure has been decommissioned. Reclamation and clean-up will include activities such as removing refuse, grading disturbed areas and contouring disturbed slopes to a stable profile. Reclamation will include site-specific measures to promote the natural revegetation of disturbed areas. Disturbed areas will be stabilized, as necessary, to prevent soil erosion.

Hydro will provide funding for site visits including during cleanup and reclamation. All such site visits are to be coordinate with Brent Sellars, Manager – Capital/EA with Hydro by the sponsored independent monitor.

13.0 REFERENCES

13.1 INTERNAL REFERENCES

January 2016	Additional Project Description to Support the Environmental Assessment Registration (July 2015) Registration 1803
July 2015	Environmental Assessment Registration Pursuant to the <i>Newfoundland and Labrador Environmental Protection Act</i>
June 2016	TL 267 EPP

APPENDIX A - EROSION PREVENTION

The primary way to control erosion is to prevent activities that can contribute to it. However, specific erosion control measures may be required to be designed for the site to minimize the effects of construction activities on the environment. Options for erosion prevention are discussed in the following sections.

1.1.1.1 Discussion of Erosion Control Options

Slope Treatments

Several slope treatments can be used to reduce erosion. Slope treatments are used prior to seeding for vegetation growth. Roughening a slope with horizontal depressions helps control erosion by creating safe seeding sites, therefore increasing vegetation, reducing runoff velocity, and increasing infiltration. The depressions also trap sediment on the face of the slope. The amount of roughening required depends on the steepness of the slope and the type of soil. Stable, sloping rocky faces may not require roughening or stabilization, while erodible slopes require special surface roughening. Roughening methods include stair-step grading, grooving, and tracking. All three (3) methods are shown in Figures A-1 to A-3



Figure A-1 - Photograph of Grooving Slope Treatment Method

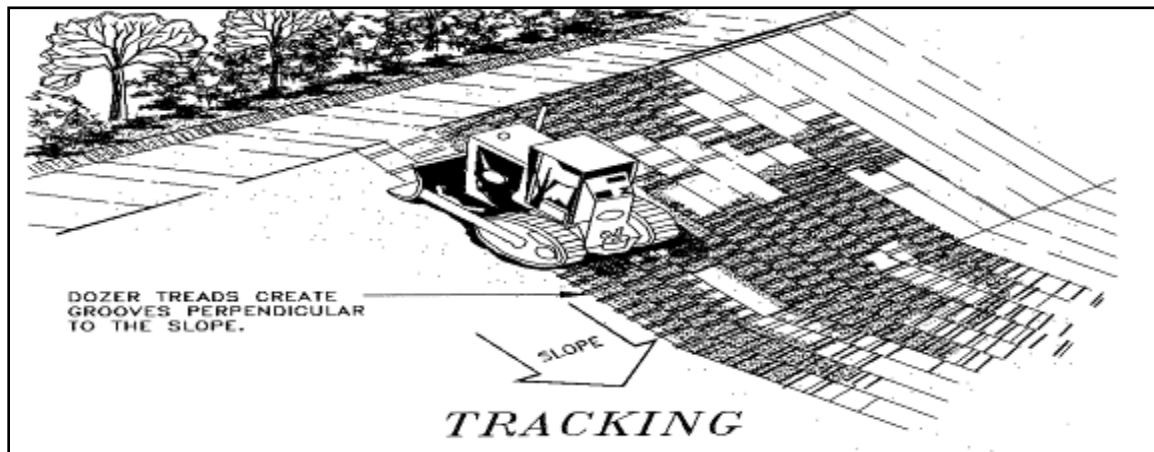


Figure A-2- Illustration of Tracking Slope Treatment Method

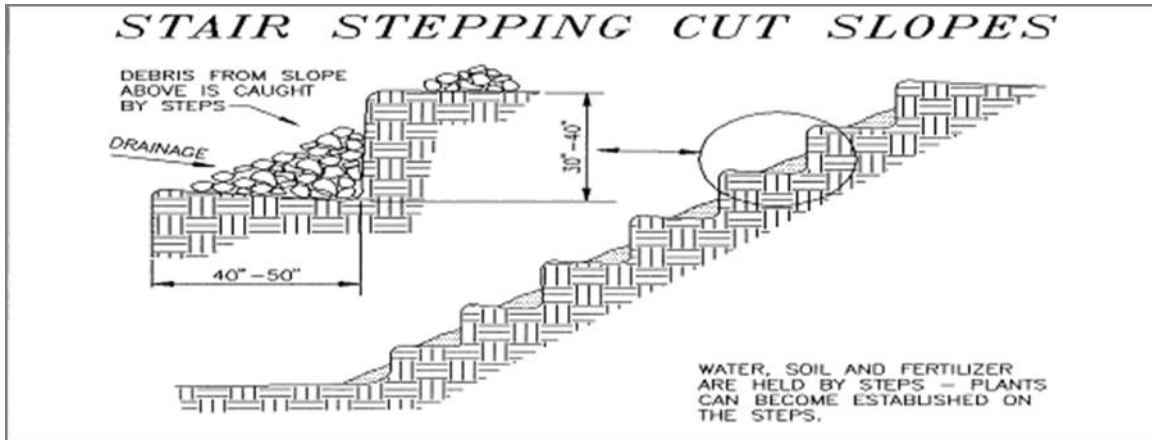


Figure A-3 - Illustration of Stair Stepping Slope Treatment Method

Erosion Control Nets/Mats/Blankets/Fibrous Rolls

Erosion control blankets are temporary protective barriers laid on top of bare soil vulnerable to erosion, commonly made of mulch, wood fibre, straw or synthetics. They are typically used on short steep slopes where there is a high erosion potential and slow vegetation establishment. Rolled erosion control products (recps) are manufactured mulch blankets (see Figure A-4) that protect soil from erosion and turf reinforcement mats (trms) are used to help establish vegetation in channels.



Figure A-4 - Photograph of Erosion Control Blanket used on a Slope

Erosion control nets are typically synthetic textiles or nets that degrade over time. The nets are woven to permit plants to take root through the holes in them. They also act as a medium to retain water for longer period of time. Different grade of nets are used based on the topography of the ground. The more closely knit nets can be used to curtail erosion in steep areas, while the more loosely knit nets can be used in flatter terrain. Installation of erosion control mats and blankets shall take into consideration the criteria listed in Section, “Design criteria and installation procedures for Erosion Control Measures”.

Fibre rolls serve as barriers between up-gradient construction and down-gradient waterbodies. Fibre rolls are installed on slopes in line with one another with one at the base of the slope. The space between each row of fibre roll is dependent on the steepness of the slope. The steeper the slope, the more rows of evenly spaced horizontal rolls is required. Fibre rolls are fastened to the ground with wooden stakes. Figures A-5 and A-6 show some of the methods of erosion control.



Figure A-5- Photograph of Fibre Rolls used to Stabilize



Figure A-6 - Photograph Shows Erosion Control Blanket on Slope And Erosion Control Mat in Channel

Rip Rap

Rip rap can be used as an erosion-resistant ground cover and when installed properly it reduces runoff velocity and increases infiltration. Rip rap typically works well on river banks and/or bottoms, roadside ditches and tops of slopes. A non-woven geo-textile liner should be used at the top of the channel to prevent migration of fines. Rip rap placement shall follow criteria listed in Section, “Design criteria and installation procedures for Erosion Control Measures” and applicable construction specifications and drawings. Figure A-7 shows properly placed rip rap while Figure A-8 shows poorly placed rip rap with geotextile exposed.



Figure A-7- Photograph of Rip Rap Placed Along a Slope



Figure A-8 - Photograph of failed Rip Rap Protection a Slope

Check Dams and Dikes

Check dams and dikes are temporary barriers that are typically constructed of rocks, gravel bags, sandbags or fibre rolls that are installed across a constructed swale or drainage ditch to reduce water velocity. They are placed in areas where runoff erosion has occurred or where runoff needs to be diverted or channelled. They are not designed to stop the water, but to slow it down. Check dam and dyke installation shall follow the criteria listed in Section, “Design criteria and installation procedures for Erosion Control Measures” and applicable construction specifications and drawings.

Check dams shall be maintained and inspected periodically, as well as unscheduled inspections prior to, and after, a significant rainfall event, anticipated heavy precipitation or runoff event (e.g. snowmelt). Removal of sediment from check dams shall be conducted as required, in order to ensure that the dam continues to perform its design function of reducing the amount of sediment present in the runoff. Photographs of rock constructed check dams are shown below in Figures A-9 and A-10.



Figure A-9 - Photograph of Rock Constructed Check Dam



Figure A-10 - Photograph of a Rock Constructed Dike

Energy Dissipaters

Energy dissipaters (or outlet protection devices) are devices that are installed on the downstream end of a culvert or outlet and are used to reduce the velocity of the water flow. Energy dissipaters are typically made of rocks (rip rap apron); however they can be man-made devices such as concrete blocks or metal prongs. Energy dissipaters required for fish bearing waters shall be of natural means (not man-made). Energy dissipaters require engineering design to accommodate the velocity and volume of flow and shall follow the criteria listed in Section, "Design criteria and installation procedures for Erosion Control Measures" and applicable construction specifications and drawings. Figure A-11 shows properly constructed or placed energy dissipaters while Figure A-12 shows improperly placed rocks as energy dissipaters.



Figure A-11 - Correct Construction of Rock Energy Dissipaters



Figure A-12 - Incorrect Construction of Rock Energy Dissipaters

1.1.1.2 Design Criteria and Installation Procedures for Erosion Control Measures

Design criteria and installation procedures for applicable options discussed above are listed below. Reference shall be made to these criteria if either of these options is deemed suitable for site-specific conditions.

Straw Mats

Design criteria and installation procedures for applicable options discussed above are listed below. Reference shall be made to these criteria if either of these options is deemed suitable for site-specific conditions.

Straw Mats

- a) Straw mats shall be applied at a rate of 3000 to 8000 lb/acre;
 - b) Soil shall be visible through the straw mat (not too heavily applied);
 - c) Straw shall be applied by blower or by hand; and
-

- d) Straw shall be anchored to prevent it from blowing away.

Wood Fibre Mulch

- a) Preferable on steep cut slopes of 2H:1V or steeper; and
- b) Wood fibre mulch shall be applied at a rate of at least 1000 lb/acre (increasing the rate of application shall increase effectiveness).

Rolled Erosion Control Products (RECPs)

- a) May be used for gradients of 2.5H:1V or steeper;
- b) Shall be installed on unfrozen ground;
- c) Slopes shall be top soiled and seeded prior to placing RECP;
- d) Blankets shall be in full contact with the soil by properly grading soil, removing rocks or deleterious materials, prior to placing blanket;
- e) In channels, blankets shall extend above the anticipated flow height, with a minimum 0.5 m of freeboard;
- f) For Turf Reinforcement Mat (TRM), blanket shall be placed immediately after top soiling;
- g) Blanket shall be anchored by using wire staples, metal geotextile stake pins, or triangular wooden stakes; and
- h) Blankets shall be placed parallel to direction of flow, with fabric not stretched but maintaining contact with underlying soil.

Rolled Erosion Control Products (RECPs) on Slopes

General installation methods for RECPs on slopes are listed below however all installation shall be designed on a site-specific basis and products shall be installed according to manufacturer's procedures.

- a) Prepare surface and place topsoil and seed (surface should be smooth and free of rocks, debris, or other deleterious materials);
 - b) Blanket shall be anchored at top of slope in a minimum 0.15 m by 0.15 m trench for the entire width of the blanket;
 - c) The blanket shall be rolled out downslope;
 - d) Where the blanket roll is not long enough to cover the entire length of the slope, a minimum 0.15 m by 0.15 m check slot shall be excavated at the location of the lap, and the downslope segment of blanket anchored in the check slot, similar to the method used for the top of the slope, or when blankets, must be spliced down the slope, place blanket end over end (shingle style) with approximately 0.10 m overlap. Staple through overlapped area at 0.3 m intervals;
 - e) The upslope portion of blanket shall overlap the downslope portion of blanket, shingle style, at least 0.15 m with staple anchors placed a maximum 0.3 m apart;
-

- f) Adjacent rolls of blanket shall overlap a minimum 0.1 m;
- g) Anchors shall be placed along central portion of blanket spaced at $4/m^2$ minimum (0.5 m spacing) for slopes steeper than 2H:1V and $1/m^2$ (1 m spacing) for slopes flatter than 2H:1V; and
- h) Anchors along splices between adjacent rolls shall be placed 0.9 m apart.

Rolled Erosion Control Products (RECPs) in Channels

General Installation Methods for RECPs in channels are listed below however all installation shall be designed on a site-specific basis and products shall be installed according to manufacturer's procedures.

- a) Prepare surface and place topsoil and seed (surface should be smooth and free of large rocks, debris, or other deleterious materials);
 - b) Excavate a minimum 0.15 m deep and 0.15 m wide trench at the upstream end of channel and place end of RECP into trench;
 - c) Use a double row of staggered anchors approximately 0.1 m apart (i.e. 0.2 m linear spacing) to secure RECP to soil in base of trench;
 - d) Backfill and compact soil over RECP in trench;
 - e) Roll centre RECP in direction of water flow on base of channel;
 - f) Place RECP end over end (shingle style) with a minimum 0.15 m overlap downgrade;
 - g) Use a double row of staggered anchors approximately 0.1 m apart to secure RECP to soil;
 - h) Full length edge of RECP at top of side slopes shall be anchored in a minimum 0.15 m deep and 0.15 m wide trench;
 - i) Use a double row of staggered staple anchors a maximum of 0.1 m apart (i.e. 0.2 m linear spacing) to secure RECP to soil in base of trench;
 - j) Backfill and compact soil over RECP in trench;
 - k) Overlap RECP on side slopes (shingle style down channel) a minimum of 0.1 m over the centre RECP and secure RECP to soil with anchors spaced a maximum of 0.2 m apart;
 - l) In high flow channels, a check slot across the width of the channel is recommended at a maximum spacing of 10 m to anchor the ends of the RECP to the underlying soil;
 - m) Use a double row of staggered staple anchors a maximum of 0.1 m apart (0.2 m linear spacing) to secure RECP to soil in base of check slot; and
 - n) Backfill and compact soil over RECP in check slot.
-

Rip Rap

The following criteria shall be considered when installing rip rap:

- a) Used for grades 5-15%;
- b) It shall be constructed of durable, large, loose stone;
- c) A non-woven geo-textile liner shall be used at the top of the channel to prevent migration of fines;
- d) Side slopes of rip rap must be a slope of 3H:IV or less;
- e) Rip rap shall be of angular stone;
- f) Rip rap depth shall be at least 300 mm and 1.5x the maximum stone diameter; and
- g) Rip rap should be clean and free of substances deleterious to fish and fish habitat.

Check Dams and Dikes

The following criteria are to be considered when installing a check dam:

- a) Check dams shall not be used in live streams or in channels with extended base flows, as this may have a detrimental effect on fish or fish habitats;
 - b) The check dam sediment trap shall consist of rockfill with filter fabric on the upstream face held in place with small shot rock;
 - c) Accumulated sediment shall be cleaned out of the filter fabric at regular intervals as required and the material shall be disposed of so that it cannot subsequently run into any waterbodies containing fish;
 - d) Any damaged section(s) of filter fabric as well as any undercut or end flow areas where water flows freely around the filter fabrics shall be repaired or replaced, as soon as practical;
 - e) Drainage area shall be less than 4 ha;
 - f) The filter fabric shall be of a weight of at least 200 g/m²;
 - g) The rockfill shall be clean rock, with rock fragments sized between 100 and 150 mm;
 - h) The small shot rock shall be clean rock, with fragments no larger than 120 mm;
 - i) When used in series, the top of the downstream check dam shall be level with the bottom of the next dam upstream;
 - j) The check dam shall extend beyond the top of the ditch banks and the centerline elevation shall be low enough that flow does not go around the structure; and
 - k) Check dams shall be maintained and inspected periodically as well as unscheduled inspections prior to, and after, a significant rainfall event, anticipated heavy precipitation or runoff event (e.g. snowmelt). The following maintenance shall be completed, as required:
-

- i. Remove any accumulations of sediment; and
- ii. Add or remove rock as necessary to maintain design height, cross-section and flow through characteristics.

Energy Dissipaters

The following criteria are to be considered when installing energy dissipaters:

- a) Energy dissipaters are preferably constructed on level grade for a distance which is related to the outlet flow rate and the tailwater level;
- b) The sill or transition to the natural channel shall be level with and at the same slope as the receiving channel;
- c) Energy dissipaters are applicable for small and medium size culverts of any cross-section where the depth of flow at the outlet is less than the culvert height;
- d) For rip rap aprons, the apron width at the pipe end shall be 3x the pipe diameter;
- e) Energy dissipaters shall drain by gravity when not in operation; and
- f) Energy dissipaters shall be self cleaning and require minimum maintenance.

1.1.1.3 Silt Fences/Sediment Barriers

Sedimentation Prevention

Sediment barriers are temporary sediment control devices that are used to protect water quality of down gradient rivers, streams and other waterbodies from sediment in water runoff. The most common barriers are silt fences; however other options include straw or hay bales or a berm of erosion control mix. Silt fences are typically used in combination with other site water control measures, including sediment traps and basins. Engineering requirements may vary depending on the locations of the silt fence and shall take such factors into consideration as drainage/surface area of exposed soils and time of year the silt fence is employed.

Silt fences typically consist of a piece of synthetic filter fabric stretched between a series of wooden stakes. The stakes are installed on the downhill side of the fence, and the bottom edge of the fabric is trenched into the soil and backfilled on the uphill side. The storm water passes through the fence and sediment is deposited on the uphill side of the fence.

Silt fences are suitable for sheet runoff from exposed areas of soil with grades less than 5% as a result of construction activities. Figures A-13 to A-15 show proper construction of silt fences and Figures A-16 and A-17 show poorly constructed silt fences that have failed and allowed silt or silty water to pass through. The following criteria shall be taken into consideration when installing silt fences:

- a) The silt fence shall consist of a filter fabric fence held in place by posts;
 - b) The woven filter fabric shall be of a weight of at least 200 g/m²;
 - c) No single run of silt fence shall exceed 100 m in length;
 - d) The drainage area behind the silt fence shall not exceed 0.1 ha per 30 meters of fence;
-

- e) Silt fences shall not be installed on a slope, and be located no nearer than 1 m from the toe of slope;
- f) Silt fences shall not be used when the overland flow exceeds 0.03 m³/sec;
- g) The fabric shall be at least 900 mm wide/high;
- h) The fence posts shall be of sufficient length to support the fabric, be sturdy and be of dimensions of at least 50 mm square;
- i) The staples shall be sufficiently sturdy to support the fabric for the required life of the fence;
- j) The posts shall be secured at 3 m intervals on the immediate down slope side of the trench;
- k) The filter fabric shall be taken from a continuous roll, and cut to the required length. The maximum length of the filter fabric shall be stapled to the upstream side of the stakes, with 200 mm of fabric extending into the trench and spread over the trench bottom;
- l) When installing a silt fence in frozen earth or rock, metals posts shall be used and wire ties shall be used to attach the filter fabric (Figure A-13);
- m) When a fence is installed in frozen earth it shall be checked and potentially replaced during spring melt as the posts may have shifted with the melting earth;
- n) Silt fences shall be removed when the site has been stabilized, or re-vegetated;
- o) Silt fences shall be inspected and maintained on a regular basis as well as before any anticipated heavy precipitation or runoff event (e.g. snowmelt). Accumulation of sediment shall be periodically removed and disposed of in an area where it shall not re-enter any waterbody; and
- p) Also, repairs and replacement of damaged silt fences shall be addressed immediately.



Figure A-13 - A Well Constructed Silt Fence

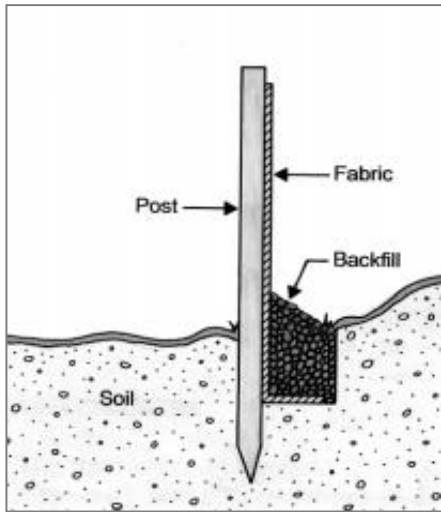


Figure A-14 - Properly Constructed Silt Fence
(Downhill Side on Left, Uphill Side on Right)

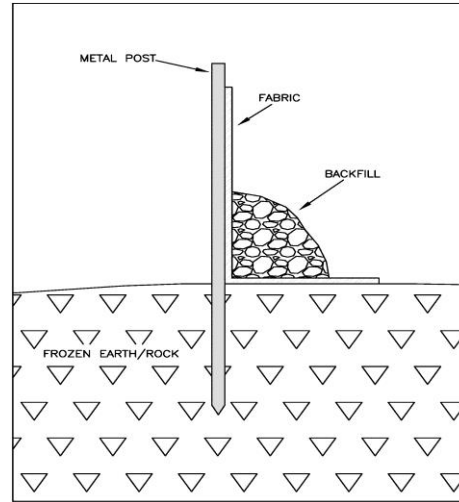


Figure A-15 - Properly Constructed Silt Fence for
Frozen Earth or Rock



Figure A-16 - Examples of Poorly Installed Silt Fences



Figure A-17 - Examples of Poorly Installed Silt Fences