ONTARIO MINISTRY OF TRANSPORTATION

Highway 11/17 Four-Laning from 1.3 Km West of Highway 582 To Coughlin Road

DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

DESIGN AND CONSTRUCTION REPORT

G.W.P. 137-90-00

FINAL

December 2021

wsp

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Signatures

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HIGHWAY 11/17 FOUR-LANING
FROM 1.3 KM WEST OF HIGHWAY 582 TO COUGHLIN ROAD

Unincorporated Townships of Stirling and Lyon, within the unorganized District of Thunder Bay

Design and Construction Report
December 2021

Prepared for the Ministry of Transportation by:

WSP

Prepared by:

Behnaz Bakhit

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Consultant Senior Environmental Planner

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Consultant Senior Project Manager

STATEMENT OF LIMITATION

WSP prepared this report solely for the use of the intended recipient, Ontario Ministry of Transportation, in accordance with the professional services agreement between the parties. The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

WSP disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP makes no other representations whatsoever concerning the legal significance of its findings.

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In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

Benchmark and elevations used in this report are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Design recommendations given in this report are applicable only to the project and areas as described in the text and then only if constructed in accordance with the details stated in this report. The comments made in this report on potential construction issues and possible methods are intended only for the guidance of the designer. The number of testing and/or sampling locations may not be sufficient to determine all the factors that may affect construction methods and costs. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time. This limitations statement is considered an integral part of this report.

The Public Record

A copy of this document has been submitted to the following office of the Ministry of the Environment, Conservation and Parks to fulfill the requirements of the Ministry of Transportation's *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Ministry of the Environment, Conservation and Parks
Thunder Bay Regional Office
435 James Street South, Suite 331
Thunder Bay, Ontario P7E 6S7

This Design and Construction Report is available for a 45-day comment period from **December 14**, **2021** to **January 28**, **2022** on the project website at **www.hwy11-17-hwy582tocoughlin.com.** Due to the on-going pandemic, this report will only be available for online review. Persons requiring accommodation to review these materials are encouraged to contact the Project Managers below to discuss accessibility requirements.

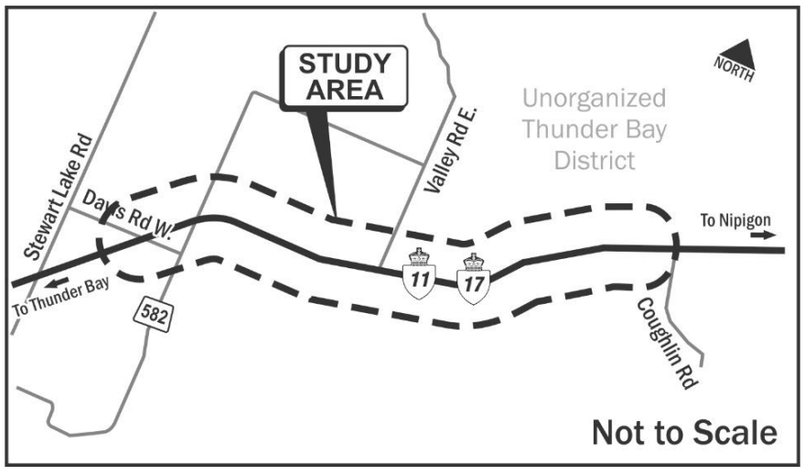
Ce document hautement spécialisé n'est disponsible qu'en anglais en vertue du règlement 411/97, qui en exempte l'application de la Loi sur les services en français. Pour de l'aide en français, veuillez communiquer avec le 905-829-6262.

Notice of Completion - Design and Construction Report

Highway 11/17 Four-Laning from West of Highway 582 to Coughlin Road
Detail Design and Class Environmental Assessment Study

THE STUDY

WSP Canada Inc, on behalf of the Ontario **Ministry of the Transportation (MTO)** has completed the Detail Design and Class Environmental Assessment (EA) Study for the four-lane expansion of Highway 11/17 for 8 km from 1.3 km west of Highway 582 to Coughlin Road as shown in the key plan.



The EA Approved Plan within the study limits includes:

- Expansion of Highway 11/17 to four lanes by twinning on the existing alignment;
- Increase in right-of-way width from 45 m to 55 m in areas of twinning;
- Improvements / modifications to select intersecting side-roads; and
- Highway improvements (e.g. Partial Illumination).

In 1997, an Environmental Study Report was prepared to document the proposed plan for the four-laning this portion of Highway 11/17. The project was approved and subsequently designated (protected) in 2003.

BACKGROUND

During the Detail Design phase, a Public Information Centre (PIC) was held on November 15, 2017 to present changes to the 1997 approved plan including minor alignment revisions, a shift in the Valley Road east alignment, and an increase in the previously designated right-of-way width in areas of twinning. The proposed changes were documented in an Addendum to the 1997 ESR, which was filed for public review on April 3, 2018. MTO received EA approval to proceed with these changes in May 2018. A final PIC was held on May 10, 2021 to present the Detail Design Plan.

THE PROCESS

This study was completed in accordance with the Class Environmental Assessment for Provincial Transportation Facilities (2000) as a Group 'B' project and is now complete. As per the Class EA, a Design and Construction Report (DCR) is prepared at the end of the study to document the Detail Design and Class EA process. The DCR describes the preferred design, documents the public and agency consultation and outlines the environmental mitigation measures and provisions that will be in place during construction. Construction timing is subject to funding and approvals.

The DCR will be available for a public review period between **December 14, 2021 to January 28, 2022** on the project website at **www.hwy11-17-hwy582tocoughlin.com**. Due to the on-going pandemic, this report will only be available for online review. Persons requiring accommodation to review these materials are encouraged to contact the Project Managers below to discuss accessibility requirements.

COMMENTS

Interested persons may provide written comments to our project team by **January 28, 2022**. All comments or concerns should be sent directly to:

Karen M. Zan, P.Eng.
Senior Project Manager
WSP Canada Inc.
610 Chartwell Road, Suite 300
Oakville, ON L6J 4A5
Tel: 1-877-562-7947 or 289-835-2643
e-mail: karen.zan@wsp.com

Kevin Saunders
Senior Project Manager
Ministry of Transportation
615 James Street South
Thunder Bay, ON P7E 6P6
Tel: 1-800-465-5034 or 807-630-4114
e-mail: kevin.saunders@ontario.ca

In addition, a request may be made to the MECP for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to both of the following MECP contacts, copying the Project Team as outlined above:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Comments and information are being collected to assist the MTO in meeting the requirements of the *Ontario Environmental Assessment Act*. Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. All comments will be maintained on file for use during the study and, with the exception of personal information, may be included in study documentation and become part of the public record.

Ontario

TABLE OF CONTENTS

EXHIBITS

APPENDICES

GLOSSARY

CALA -	Canadian Association for Laboratory Accreditation
CHER -	Cultural Heritage Evaluation Report
DCR -	Design and Construction Report
DFO -	Department of Fisheries and Oceans, Canada
EA -	Environmental Assessment
EASR -	Environmental Activity Sector Registry
EMP -	Earth Management Plan
ESR -	Environmental Study Report
ESC -	Erosion and Sediment Control
ESA -	Environmentally Sensitive Area
EWPW -	Eastern Whip-poor-will
G.W.P. -	Group Work Project
LIO -	Land Information Ontario
MBCA -	Migratory Birds Convention Act
MECP -	Ministry of Environment, Conservation and Parks
MHSTCI -	Ministry of Heritage, Sport, Tourism, and Culture Industries
MNRF -	Ministry of Natural Resources and Forestry
MTO -	Ontario Ministry of Transportation
NHIC -	Natural Heritage Information Centre
NSA -	Noise Sensitive Areas
OBBA -	Ontario Breeding Bird Atlas
OWRA -	Ontario Water Resources Act
PIC -	Public Information Centre
PTTW -	Permit-to-Take-Water
ROW -	Right-of-Way
SAR -	Species at Risk
SCC -	Species of Conservation Concern
TSS -	Total Suspended Solids

1 PROJECT OVERVIEW

1.1 Summary Description of the Undertaking

In 1997, the Ontario Ministry of Transportation (MTO) completed a Planning and Preliminary Design Study for the four-laning of Highway 11/17 from 8 km west of Ouimet easterly 36 km to the west boundary of Red Rock Township, which included the section from 1.3 km west of Highway 582 to 800 m west of Coughlin Road in the unincorporated Townships of Stirling and Lyon, within the Unorganized Thunder Bay District. An Environmental Study Report (ESR) was filed in January 1997 and received environmental clearance for Right-of-Way (ROW) Designation. The study was identified as a Group 'B' project and complied with the requirement of the *Provincial Highway Class Environmental Assessment* (1992).

The 1997 ESR documented the following:

- Description of the project, project justification and its purpose;
- Environmentally significant aspects of the planning, design, and construction of the four-laning within the study limits;
- Description of the alternatives evaluated at the time;
- External agency and public consultation; and
- Anticipated environmental effects, proposed mitigation measures, and monitoring.

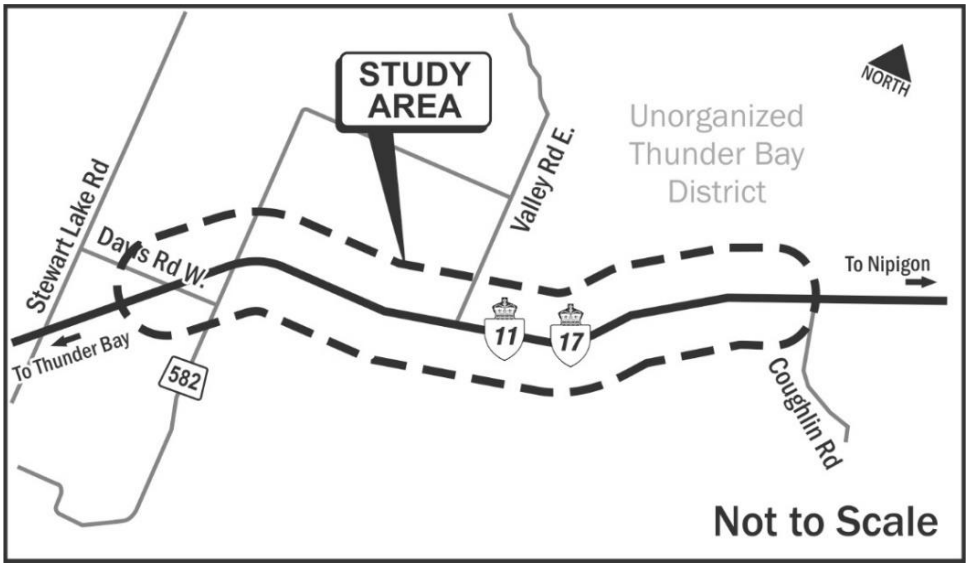
The key design features recommended in the 1997 ESR for the section of Highway 11/17 from 1.3 km west of the Highway 582 to Coughlin Road, included:

- Expansion of Highway 11/17 to four lanes by twinning the existing alignment; and
- Improvements/modifications to select intersecting side-roads.

The proposed new four-lane divided highway was designated as a four-lane facility and registered as a controlled access highway in 2003.

In April 2017, MTO retained WSP Canada Inc. to undertake the Detail Design and Class Environmental Assessment (EA) Study for the four-laning of Highway 11/17 from 1.3 km west of Highway 582 to Coughlin Road. The project location is shown below in **Exhibit 1-1**.

Exhibit 1-1: Project Location



The initial design phase included an update to the current environmental conditions, and a review of the proposed changes to the original design decisions that had occurred since the submission of the original 1997 ESR. An Addendum to the ESR was necessary to document any significant revisions to the original design as part of the requirements of the MTO *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

The proposed changes to the 1997 EA Approved Plan (documented in the 1997 ESR) for the study area include:

- A slight realignment of Highway 11/17 in the vicinity of Valley Creek to increase the proposed radius of curvature to meet current highway design standards;
- Widening the proposed right-of-way from 45 m (minimum) to 55 m (minimum) on the north (twinned) side of the highway; and
- A minor realignment of Valley Road East – approximately 12.5 m to the east.

1.2 Environmental Assessment Act Process

1.2.1 Ontario Environmental Assessment Act

The MTO *Class Environmental Assessment of Provincial Transportation Facilities* (Class EA) was approved under the Ontario *Environmental Assessment Act* in the Fall of 1999 and amended in 2000. The Class EA defines the group of projects and activities, and the environmental assessment processes that MTO has committed to follow to plan, design, and implement these types of projects. Provided that this process is followed, projects and activities included under the Class EA do not require formal review and approval under the Ontario *Environmental Assessment Act*. Further details on the Class EA

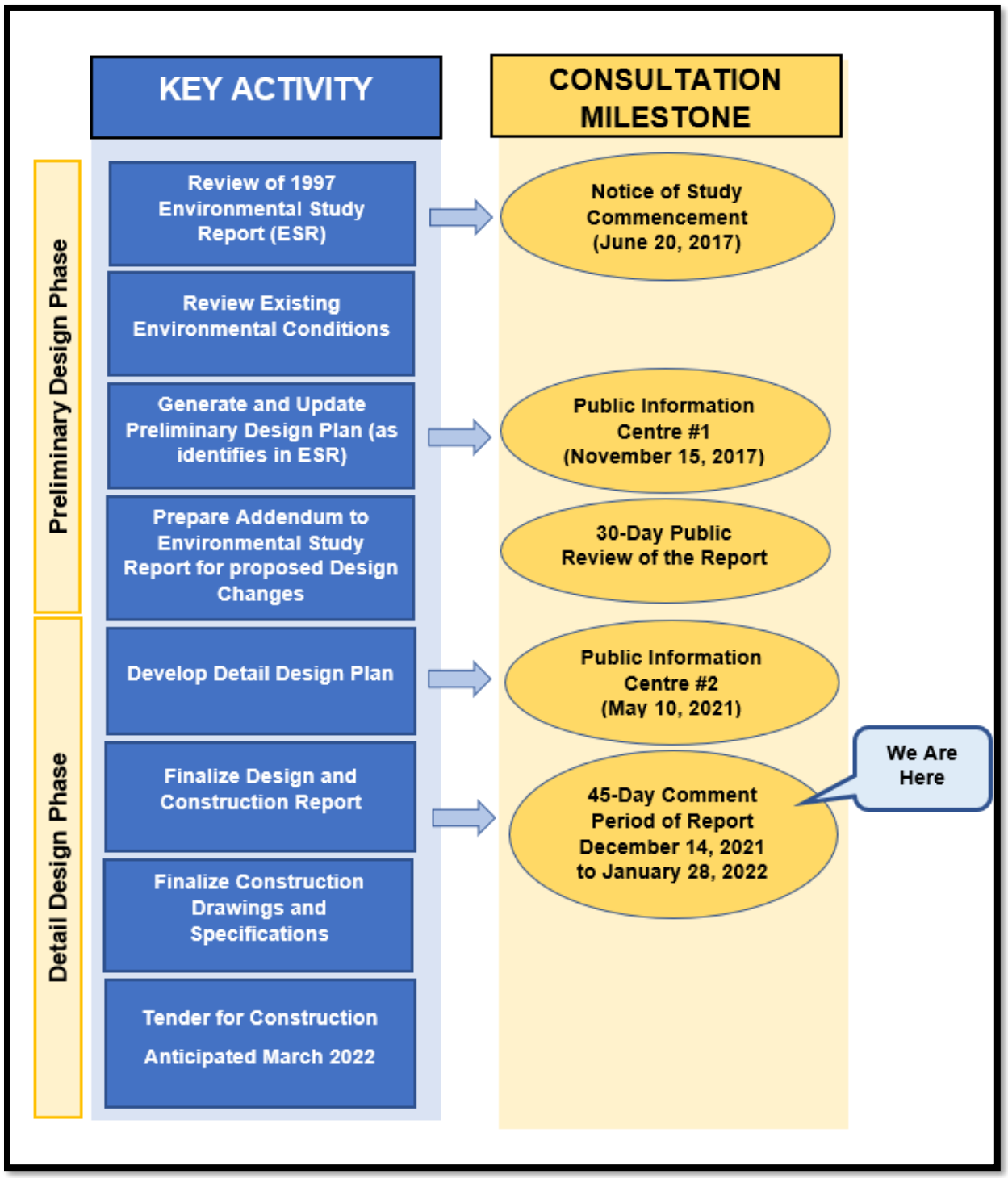
process for Group ‘B’ projects are contained in the *Class Environmental Assessment for Provincial Transportation Facilities* (2000). Readers interested in these matters are encouraged to refer to this document.

This study followed the MTO Class EA process for Group ‘B’ projects, which generally include realignments and widening of existing interchanges and freeways over land and water, new interchanges or modifications to existing interchanges, and/or new highway service facilities. Group ‘B’ projects are generally similar in nature, recur frequently, and have generally predictable range of environmental effects for which standard mitigation can be used. The study’s overall EA planning process approach and key study tasks are illustrated in **Exhibit 1-2**.

As noted in **Section 1.1**, an Addendum to the 1997 ESR was prepared as part of this study, and filed for a 30-day review period and subsequently received clearance for ROW Designation to proceed.

This Design and Construction Report (DCR) documents how the commitments outlined in the 1997 ESR, as well as the 2018 Addendum to the ESR are being addressed. Design features and refined environmental impact mitigation measurements are also being described in this report.

Exhibit 1-2: Overall Environmental Assessment Planning Process and Key Milestones



1.3 Impact Assessment Act 2019

The *Impact Assessment Act,* 2019 (IAA 2019) and associated regulations came into effect on August 28, 2019. Under IAA 2019, a federal environmental assessment is required for "designated projects." A designated project is one that includes one or more physical activities that are set out in the regulations under IAA 2019 or by order of the Federal Minister of the Environment and Climate Change.

This Detail Design and Class Environmental Assessment Study was reviewed by the Project Team against the Federal Regulations Designating Physical Activities, and the Project Team determined that the study is not "designated" and therefore does not require a federal environmental assessment.

More information about the *Impact Assessment Act* (2019) is available at the following link: https://www.canada.ca/en/impact-assessment-agency.html.

1.4 Purpose of the Design and Construction Report

This Design and Construction Report (DCR) has been prepared to:

- Describe the improvements to be implemented;
- Identify any refinements to the project described in the 1997 ESR and the 2018 ESR Addendum that have been incorporated during the development of the design details;
- Describe specific environmental impacts associated with the project and proposed mitigation;
- Identify measures that have been incorporated into the design and contract drawings;
- Address any commitments to future work identified in the 1997 ESR and 2018 ESR Addendum; and
- Summarize the consultation undertaken, including at Public Information Centre #2, with external agencies, impacted/adjacent property owners and interested members of the public during Detail Design.

The DCR is being made available to the public, other interested parties and external agencies for a 45-day review period as required under the MTO Class EA. A Notice of DCR submission was posted on the project website (www.hwy11-17-hwy582tocoughlin.com), published in local newspapers (i.e. Thunder Bay Chronicle-Journal and Nipigon Red Rock Gazette), and sent to external government agencies, Indigenous Communities, local municipalities, utilities, impacted property owners, local stakeholder groups, and members of the public on the project mailing list.

The Design and Construction Report (DCR) is available for a 45-day public and external agency comment period from **December 14, 2021** to **January 28, 2022** on the project website at **www.hwy11-17-hwy582tocoughlin.com**. Any concerns raised by members of the public, interested groups or technical and external agencies during this review period should be discussed with MTO or their consultants identified below.

Additional information is also available by contacting the key Project Team members involved in this project, as follows:

Kevin Saunders
Senior Project Manager
Ministry of Transportation
615 James Street South
Thunder Bay, ON P7E 6P6
Tel: 1-800-465-5034 or 807-630-4114
E-mail: kevin.saunders@ontario.ca

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610 Chartwell Road, Suite 300
Oakville, ON L6J 4A5
Tel: (289) 835-2643
Toll Free: 1-877-562-7947
E-mail: Karen.Zan@wsp.com

In addition, a request may be made to the MECP for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

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Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

2 STAKEHOLDER ENGAGEMENT

An extensive stakeholder engagement program was completed throughout the study process. A study mailing list was developed at the onset of the Detail Design phase and updated throughout the study. Local members of parliament and members of provincial parliament, external government agencies, local municipalities, local emergency service providers, local school boards, utilities, Indigenous communities, adjacent property owners, potentially impact property owners, the Ministry of Municipal Affairs and Housing (responsible for future land-use planning for unincorporated Townships of Stirling and Lyon, within the unorganized district of Thunder Bay), as well as other potentially interested stakeholders were included on the study mailing list.

The contacts on the study mailing list were engaged through direct contact with the Project Team via mail, email, phone, or fax; a project website (www.hwy11-17-hwy582tocoughlin.com); local newspaper advertisements (i.e. *Nipigon Red Rock Gazette* and *Thunder Bay Chronical Journal*) at key consultation milestones.

Two Public Information Centres (PIC) were held for the study and a summary of the two consultation events is provided in **Section 2.4**.

2.1 External Agency Consultation

The following external agencies, including Federal and Provincial government agencies and Indigenous communities were consulted as part of this study:

Federal & Provincial Government Agencies

- Canadian National Railway
- Canadian Pacific Railway
- Department of Fisheries and Oceans Canada
- Transport Canada
- Infrastructure Ontario
- Ministry of Agriculture, Food, and Rural Affairs (*formerly Ministry of Agriculture and Food & Ministry of Rural Affairs*)
- Ministry of Community Safety and Correctional Services
- Ministry of the Environment, Conservation and Parks (*formerly Ministry of the Environment and Climate Change*)
- Ministry of Heritage, Sport, Tourism and Culture Industries(*formerly Ministry of Tourism, Culture and Sport*)
- Ministry of Indigenous Affairs (*formerly Ministry of Indigenous Relations and Reconciliation*)
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources and Forestry

- Ministry of Energy, Northern Development and Mines (*formerly Ministry of Northern Development and Mines*)

Municipal/Emergency Services, and District School Boards

- Ministry of Municipal Affairs and Housing, Manager of Community Planning and Development (North – Thunder Bay)
- Ontario Provincial Police
- Nipigon Fire Department
- Red Rock Fire Department
- Superior North Emergency Medical Service
- Superior North Catholic District School Board
- Superior Greenstone District School Board
- Conseil scolaire de district catholique des Aurores boreales
- Conseil Scolaire de District Du Grand Nord
- East of Thunder Bay Transportation Consortium

Utilities

- Bell Canada
- Hydro One Networks Inc.
- Union Gas Limited
- TC Energy
- Shaw Communications
- TbayTel

Stakeholders/Interest Groups

- Ontario Trucking Association
- Ontario Federation of Snowmobile Clubs
- Thunder Bay Field Naturalists
- Thunder Bay District Fish and Game Association
- North Shore Steelhead Association

A summary of all communication with external agency participants during the Detail Design phase is included in **Exhibit 2-1**. Copies of all agency correspondence are included in **Appendix B**

Exhibit 2-1: Summary of External Agency Participation

Agency	Comments Received	WSP Response / Action
Kimberley McNaughton Northern Development, Mines, Natural Resources and Forestry (formerly MNRF)	**Comment received via email on April 27, 2018 noted the following:** MNRF has completed review of the addendum to the ESR and provide comments. The majority of the MNRF comments submitted via email in 2017 and need to be addressed per the previous comment/response email.	**Response sent by WSP on June 30, 2021 indicated the following:** WSP have reviewed the comments provided on May 31, 2021 and mentioned as it seems WSP had inadvertently not responded to previous comments provided by MNRF in 2018. Summary of both sets of comments and WSP's responses sent to MNRF on June 30, 2021.
Jeff Elkow Heritage Planner Ministry of Heritage, Sport, Tourism and Culture Industries (formerly MTCS)	**Comment received via email on May 2, 2018 noted the following:** Archeological Assessment: The Addendum to the ESR noted that Stage 1 archaeological assessment will be carried out in Spring 2018 to determine if there are any areas with archaeological potential and that all areas recommended for the Stage 2 archaeological assessment. All Archaeological Assessment should be undertaken during EA process as their results may impact the detail design work.	**Response sent by WSP on May 2, 2018 indicated the following:** WSP acknowledged the receipt of their comments.

Agency	Comments Received	WSP Response / Action
	Built Heritage and Cultural Heritage Landscapes: As the Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) are not required for this study, it is recommended to complete the MTCS Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes. Environmental Assessment Reporting: All technical heritage studies and their recommendations are to be addressed and incorporated into EA report or file.	
Hydro One Networks Inc. Cheryl Renelli LCSC, Northern Region FBC	**Comment received on May 5, 2021 following PIC #2 indicated the following:** Confirmed no conflicts with regards to the Environmental Assessment identified. Hydro One has provided the Class C cost estimate and mark up of MTO plans and the MTO is aware of the conflict with Hydro One existing pole locations.	**Comment noted. No action required.**

Agency	Comments Received	WSP Response / Action
Hydro One Networks Inc SecondaryLandUse@HydroOne.com	**Comment received on June 10, 2021 noted:** Hydro One confirmed that Hydro one has existing high voltage Transmission facilities within the Study area. They requested to be informed of any design changes. Hydro One noted, in addition to the existing infrastructure mentioned, the applicable transmission corridor may have provisions for future lines or already contain secondary land uses (e.g., pipelines, watermains, parking). Requested for further Environmental Assessment (EA) if the project result in a Hydro One station expansion or transmission line replacement and/or relocation. They advised that any changes to lot grading or drainage within, or in proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.	**Response sent by Karen M. Zan on June 11, 2021 and indicated the following:** Throughout the duration of this project, WSP has been working closely with Hydro One to provide all relevant information with respect to infrastructure and land use concerns. All communication to date has been through Daniel King-Costa (Real Estate Coordinator). There are no direct impacts to Hydro One infrastructure as a result of this highway expansion project. WSP will continue to keep Hydro One apprised of any changes as the project continues, though we do not anticipate any significant design revisions at this point.
James Bennitt Raymond Tyhuis Northern Development, Mines, Natural Resources and Forestry (formerly MNRF) &	**MTO provided MNRF comments to WSP via email on May 31, 2021 noted the following:** See Appendix B for the summary of MNRF and MTO correspondence.	**Response sent by WSP on June 30, 2021 indicated the following:** WSP have reviewed the comments provided to MTO by email on May 31, 2021. Summary of comments

Agency	Comments Received	WSP Response / Action
Kevin Saunders MTO		and WSP's responses sent to MNRF on June 30, 2021.
	General Comments received in 2018:	
	Unnamed Creek CSP Culvert (located ~695m west of HWY 582: near Davis Road): • Thermal classification incorrect; coldwater creek. • WSP confirmed fish use at this location. • Rainbow trout captured via MNRF electro-fishing downstream of crossing in 2016. Reach of Little Valley Creek (located ~460m east of HWY 582): • Missing identification and HWY 11/17 crossing location. • Coldwater creek with known brook trout presence; potential spawning and nursery habitat in immediate vicinity.	The thermal classification at Unnamed Creek CSP Culvert (located ~695m west of HWY 582; near Davis Road) and additional Little Valley Creek crossing located 460 m east of Highway 582 have been noted by the project team and will be corrected in future documentation.
	Future renditions of the detailed designs should include clear delineations of all the water segments and crossings on the preferred plan figures. This will aid in the determination of potential environmental impacts	This has been noted by the project team.
	General Comments received in 2021:	
	MNRF has noted that there are numerous culverts proposed to travel diagonally rather than perpendicular to	The goal of the skewed culverts was to maintain the general flow direction and avoid tight meanders into and

Agency	Comments Received	WSP Response / Action
	the highway, this lengthens pipes and further complicates fish passage. A number of these situations the streams are proposed to be taken outside of their present corridor. Given this then why not align them to the shortest length possible when going under the road?	out of culverts that would exacerbate erosion concerns and further complicate fish passage. Culverts on a skew to the highway alignment were selected in some cases to minimize the amount of channel alteration for the system. The skewed culverts allow for certain channel locations and transitions to be retained and avoid 90-degree bends in the channels at the culvert ends, minimizing the need for hard armouring of the outside bends. Although this has resulted in slightly longer culverts, WSP has confirmed that velocities within the culvert will not impact fish passage. WSP has also provided median pools and “day lighting” between the longer culverts to aid in fish passage concerns.
	The highway project proposes over 100 m of the creek being put into a culvert, plus another 25m culvert for the access road. • The length of culverts and small stream size will decrease / impede fish migration in sections of the streams • The extensive culvert length will cause a decrease in winter in-stream temperatures and thus loss of fish migration due to freezing of stream.	**Tributary A** The size of the watercourse was taken into consideration when the culverts were being sized (proposed sizes spans the bankfull width of the channel). WSP has ensured that the velocities inside the culverts will not impede fish passage for this watercourse and the target species for Tributary A (Brook Trout). The increase in the number of culverts

Agency	Comments Received	WSP Response / Action
		was required to allow for some day lighting between enclosed sections and to avoid overly long culvert lengths. Although there is some increased shading of the channel associated with the culverts, the median pools and open connects should help with day-lighting of the channel and thermal concerns such that migration patterns can be maintained.
	Ditching associated with road construction and maintenance will drop groundwater flow in the area to bottom of ditches and reduces shallow groundwater discharge points in project area. This also increases in-stream summer temperatures with exposed flowing water in ditches.	WSP has designed the skewed culverts and connections to maintain as much of the existing channel as possible, thereby also maintaining the shallow groundwater influxes as much as possible as well. Any groundwater intercepted by the roadside ditches will be in the ditches for a short length of time such that their thermal impacts will still be felt in the receiving watercourses. There are no long sections of ditch line where WSP anticipated groundwater would be captured and heated before it outlets to any of the receiving watercourses.
	There is also the contributing decrease water in area due to higher evaporation rate resulting from exposed water in ditches, no longer maintaining stream	See response above. There are no long stretches of flat ditch line where water would be sitting, heating and evaporating. The ditches have been

Agency	Comments Received	WSP Response / Action
	flow in a thermally protected condition that exists in its current state.	designed to drain quickly to the receiving watercourses.
	A recent (May 21, 2021) site visit by MNRF confirmed that the: • Site of access road is in a cedar/ash wetland, contributing to maintaining stream temperature (cold in summer, warm in winter). • Stream section is on clay over bedrock, with shallow soils and multiple points of shallow groundwater discharge points in area of project area. • Ditch construction will / may need to be below current groundwater discharge in the wetland adjacent to the stream.	Noted.
	Comment received in 2018 regarding the Unnamed Creek (located ~ 695 m west of Hwy 582; between Davis and Stewart Lake Roads: Concerns in regard to access point road created between Stuart Lake and Davis Roads. Concern is that it overprints a wetland feature containing a coldwater trout stream. The access road and highway combine to cross the stream multiple times and it is assumed ditches will be required. These are assumed to be low enough to drain the wetland	The realignment of the sideroads in this area, including Stewart Lake Road Connection and Highway 582 was part of the 1997 EA Approved Plan. All the water that is presently received by the watercourse from the wetland will still be directed to the watercourse via the roadside ditches. These ditch sections are of very short length such that the thermal conditions of the inputs will be maintained. The ditch grades will ensure that water is not trapped in the ditches where it would heat/evaporate. WSP has designed

Agency	Comments Received	WSP Response / Action
	feature it crosses which feeds the streams	the crossing locations and ditch lines to maintain inputs to each of the watercourses being crossed, with no flows being directed away from the receiving watercourses.
	Comment received in 2018 regarding the **Valley Creek Tributary:** The perched culvert on the Valley Creek Tributary should be either reinstalled with the proper embedment or removed to allow the fish migration. *Note*: Although MNRF and MTO did a site visit and MTO did a further study on the creek in September 2018. MNRF is not clear on the conclusions as it may be ephemeral, and conclusions based on poor conditions during the visit. Most ephemeral streams utilized by coldwater fish would be during the spring. Something to consider that seems to be missing when describing the importance of ephemeral streams in regards to brook trout.	The perched culvert on the tributary to Valley Creek, located at Station 14+500 (Tributary E), is being replaced to maintain water flow into Valley Creek only. WSP did not identify fish use within the reaches assessed during their field investigations, and TBTE identified fish use only in the ponds 1.5 km upstream of the highway crossing during their follow up surveys. The habitat immediately upstream of the existing culvert does not provide habitat conditions to life cycle functions for fish (no critical or specialized habitat features). The ephemeral nature of the system suggests that water levels in the feature are flashy and not sustained. Therefore, it was determined that providing fish passage through this crossing was not a requirement as there would be no direction of fish to any habitat of importance upstream of the crossing. However, the culvert is being replaced to ensure that the

Agency	Comments Received	WSP Response / Action
		ephemeral flows from this feature are directed to Valley Creek to maintain that input.
	Comments received in 2018 regarding the Valley Creek Realignment:	
	The MNRF is concerned with the section of Valley Creek depicted to run through the median. This section of Valley Creek consists of a series of riffles, gravel/cobble bars and pools. This aquatic habitat is recognized as significant spawning and nursery habitat for both rainbow and brook trout. The MNRF strongly believes that the current habitat characteristics of this location would be extremely changeling to emulate in a realigned segment of this creek	WSP and MTO agree, which is why this habitat is being maintained in the median, versus realigning the channel outside of the highway median. The median width has been significantly increased (from 30m to >70m) at this location to ensure maintenance of the more critical habitat features. The section of the channel requiring realignment to accommodate the new westbound lanes displays flat morphology / homogenous habitat with fine substrates. This habitat is likely used for migration, foraging and refuge habitat, but provides very little in the way of spawning or rearing habitat. Therefore, with the widened median footprint here WSP was able to maintain the more critical spawning habitat functions in current form and function.
	Detailed design alternatives alignment should also consider the widening of the median in the area of the sensitive fish habitat. This may be accomplished by	See comment above, the proposed median was increased in width at this location to avoid impacts to the more critical habitat elements. The

Agency	Comments Received	WSP Response / Action
	increasing (buffering) the distance between the creek and the proposed Eastbound lanes. A wider separation between the highway surface and water could potentially mitigate water quality impacts from highway runoff and reduce the amount of required riparian vegetation removal.	proposed Eastbound lanes are in line with the existing highway; shifting them to the south would have significant impacts to privately owned properties.
	Vegetation removal within this section of the median should be avoided to maintain current buffering capacity. Should wildlife collision (i.e. line of sight) concerns arise from such vegetation, then fencing through the corridor should be considered to allow mitigation along the creek margins	Noted. Vegetation removals will be kept to a minimum and slope stability measures will be reviewed to help stabilize the existing banks. Minimum sightlines requirements for driver safety will be met and obstacles/vegetation removed accordingly.
	Comments received in 2021:	
	Valley creek crossing was originally a poor choice as the highway parallels the creek for over 300 m, a new location for the Eastbound lanes would have been a better solution. Further impacts are proposed with realignments and overprinting of the creek. As the creek banks and substrate are generally unstable along this section, its not clear what is proposed to stabilize these banks for the long term, while maintaining the coldwater thermal properties (not	WSP notes that the location of the channel downstream of the existing eastbound lane crossing is of concern. The habitat is similar in structure and function to the more sensitive habitat within the median upstream. It supports rearing and likely spawning habitat throughout the reach, although the active re-sorting of sediment in the channel bed may impact spawning success (burying of redds). WSP did capture

Agency	Comments Received	WSP Response / Action
	exposing more of this section to the sun). It will also be important to direct road runoff from directly entering the stream, but it only appears that more “grading” will remove vegetation and offer less protection to the creek through this section	YOY and juveniles in this reach. However, for public safety reasons the highway requires adjustments to address a sag curve in the alignment. That combined with the very steep existing road embankment requires that this portion of the channel be realigned to accommodate the improvements on the highway. The vertical bedrock valley slope south of the highway limits the amount of land available to accommodate the channel realignment, however WSP has used natural channel design principles to replicate the habitat being impacted to the extent possible in the area available. Geotechnical recommendations to improve concerns for existing embankment instability adjacent to the existing highway (future EBL) will be reviewed and incorporated accordingly.
	It has also been brought forward by MNRF to MTO that there is a confirmed brook trout spawning upwelling located less than 50 m from the proposed “grading” for the highway improvements. MNRF would like this new information to be considered in the design as the	To be discussed. WSP respectfully requests MNRF share any additional information that may have been gathered (e.g. clarity on the exact location of the upwelling, other findings, etc.)

Agency	Comments Received	WSP Response / Action
	proximity to the highway alterations, which seem to be that there will be grading in the corridor and may have the potential to affect groundwater, which on the surface appears to be originating from the base of the current highway corridor.	
	MNRF has also noted that there is proposed re-alignment of the creek for the Westbound lanes as well as the upstream end of the Eastbound lane, but no proposed realignment of creek (water not shown) along the south side of the Eastbound lane, although “grading” proposed overprints the creek for about 100 m (shaded green on detailed design plan). There should be an indication of what is going on with this section of the creek and the widening of the road.	See comment above regarding the impacts for Valley Creek. The vertical bedrock valley slope south of the highway limits the amount of land available to accommodate the channel realignment, however WSP has used natural channel design principles to replicate the habitat being impacted to the extent possible in the area available (highway ditchline).
	The MNRF has reviewed the enclosed draft Crown Land Plan, P-2560-36 with the understanding that MTO requires Jurisdiction and Control over these Crown Lands to increase the Service Road right-of-way width from 20m to 30m, and that this is needed to accommodate grading for the Stewart Lake Road Connection and for the north leg of Highway 582. Please note that should these areas need to be cleared prior to MTO’s P-plan	Comments related to the harvest of lumber on Crown Land will be addressed separately by Kevin Saunders, Kevin.Saunders@ontario.ca

Agency	Comments Received	WSP Response / Action
	being regulated, the MNRF will need to be informed of the quantity of merchantable timber within these area as a Harvest Licence under the Crown Forest Sustainability Act and a Overlapping Agreement with the Sustainable Forest Licence holder may be required to clear the timber.	

2.2 Northern Development, Mines, Natural Resources and Forestry (Formerly MNRF) Consultation

On September 13, 2021, the Project Team met with the Northern Development, Mines, Natural Resources and Forestry (formerly MNRF) to further review and discuss the comments received during the Detail Design phase. Summary of comments and WSP's responses sent to NDMNRF (formerly MNRF) on June 30, 2021.

2.3 Utilities

Letters notifying of potentially impacted utilities were sent to utility companies on July 5, 2017 to introduce the project scope and request information on existing and proposed utility plan within the study area. Utility conflicts with Bell Canada, Hydro One and TC Energy were identified. Utility relocations are anticipated to be completed in advance of construction. Utility companies are responsible for identifying and obtaining any environmental permits or approval that may be required to undertake their work. Copies of all letters correspondence are included in **Appendix B**.

2.4 Public Consultation

A Notice of Study Commencement was posted on the project website (www.hwy11-17-hwy582tocoughlin.com) and published in the *Thunder Bay Chronicle-Journal* and *Nipigon-Red Rock Gazette* on June 20, 2017. The notice included an overview of the study, a map showing the project limits, and Project Team contact details. Adjacent property owners were notified of the study commencement by letter or email on June 16, 2017. In addition, a copy of the notice was sent via Canada Post unaddressed mailing (i.e. bulk mail) to approximately 1235 property owners within the vicinity of the study area. A copy of the notice is included in **Appendix A** while all relevant correspondence can be found in **Appendix B**.

Public Information Centres (PICs) are informal meetings at which area residents, interested stakeholders, agencies and Indigenous Communities are provided an opportunity to review planning and project information, identify concerns and provide input to the Project Team. PICs served as an important function in providing an opportunity for direct, two-way communication with stakeholders on specific local conditions, issues and concerns regarding the study. Two Public Information Centres (PICs) were held during the Preliminary Design, Detail Design and Class Environmental Assessment Study. The PICs were an important part of the overall consultation program for this project and were designed to identify concerns and provide opportunities for input regarding the project.

As part of the Preliminary Design phase, the first PIC was held on November 15, 2017, at the Hurkett Community Centre. The purpose of the PIC was to provide an opportunity for interested parties to review existing environmental conditions and to comment on the proposed changes to the preliminary design that was identified in the 1997 ESR. Further details of PIC #1 and how comments received throughout the Preliminary Design phase were incorporated into the proposed design changes to the EA approved plan are provided in the Addendum to the Environmental Study Report (ESR) (https://hwy11-17-hwy582tocoughlin.com/wp-content/uploads/2016/07/137-90-00-Hwy-11-17-Four-Laning-Coughlin-West-ESR-Addendum-For-Website.pdf).

As part of the Detail Design phase, a second PIC was held virtually via the project website at www.hwy11-17-hwy582tocoughlin.com due to the on-going global pandemic. The PIC display panels were published on the project website beginning on May 10, 2021 to present the detail design plan, anticipated environmental impacts and recommended mitigation measures, and next steps in the study. Further details of PIC #2 are provided in **Section 2.4.1 and 2.4.2**.

2.4.1 Public Information Centre #2

The PIC #2 display panels were published on the project website beginning on May 10, 2021. The virtual engagement allowed stakeholders to review information presented at their own time and leisure and submit comments via either the online comment form available on the project website or by contacting the MTO Project Manager, Kevin Saunders, or the WSP Project Manager, Karen M. Zan. Comments were requested by May 21, 2021. The Notice included information that if anyone was unable to access the internet and/or required special accommodations to review the PIC #2 presentation materials it was noted to contact one of the Project Team members. There were a few requests for hardcopies of the displays, and these were mailed out to those who requested a copy.

The purpose of PIC #2 was to provide interested stakeholders, Indigenous Communities and the public an opportunity to review the Detail Design plan. Information presented at PIC #2 included a summary of key comments received from PIC #1 and MTO's response / action taken, existing environmental conditions, summary of the Detail Design plan, potential environmental effects and proposed mitigation measures, and next steps. A copy of the displays presented at PIC #2 is included in **Appendix C**.

Notification letters were distributed by direct mail and emailed to contacts on the project mailing list on April 28, 2021, including federal and provincial government agencies, Indigenous Communities, the Ministry of Municipal Affairs and Housing, emergency service providers, district school boards, and other potentially interested stakeholder groups. Individuals and groups that expressed interest in the project following the first PIC were either confirmed to be on or added to the project mailing list and were notified of PIC #2. Letters advertising PIC #2 were also sent on April 29, 2021 to property owners identified as having their property impacted or property access modified

following the completion of construction. In addition, a copy of the PIC #2 notice was sent via Canada Post unaddressed mailing (i.e. bulk mail) on April 30, 2021 to property owners within the vicinity of the study area. PIC #2 was also advertised in the *Nipigon Red Rock Gazette* and *Thunder Bay Chronicle-Journal* on May 4, 2021 and May 8, 2021, respectively. A copy of the Notice of PIC #2 is included in **Appendix A**.
There were 5 comments submitted before May 21, 2021. Two (2) additional comments were received following this date. All comments were responded to and there are no outstanding concerns. All the comments and correspondence gathered throughout the study are included in **Appendix B**.

Exhibit 2-2 highlights the key concerns and comments provided by the public and how they were addressed.

2.4.2 Impacted Property Owners

Ministry Property representatives from the Project Team contacted and met with the affected and adjacent property owners on an individual basis as required to discuss the property impacted. All properties have been acquired for this project.

Exhibit 2-2: Summary of Key Comments from PIC #2

Summary of Key Comments Received from PIC #2	MTO'S Response / Action Taken	MTO Commitment for Future Work to Address Comment
Property owner requested to be added in the project mailing list	The Project Team added this contact to the project mailing list.	No action required.
Impacted Property owner inquired to have any information about the project.	MTO will continue working with affected property owners and compensate those owners whose private property is physically impacted by the proposed improvements on a one-on-one basis.	The Ministry has acquired all required properties.
Inquiries about the project schedule and clarification on the project timing and requested set of plans/boards hard copies.	A copy of Public Information Centre #2 displays was mailed to him on the week of May 11th, 2021. The Project Team added him to the project mailing list.	No action required.
Interested to visit the culvert sites with a Director of North Shore Steelhead Association (NSSA) and asked if there are any sites that would warrant special attention during their visit. Noted downstream from the new highway there is a culvert that passes under an abandoned railway line and township road. It's outlet is perched and will not allow fish to migrate between the Lake and the stream where they spawn. It is a problem more readily observed in culverts where freezing occurs earlier than in the	Comment noted by WSP. The information and photos passed along to the fisheries biologists.	No action required.

Summary of Key Comments Received from PIC #2	MTO'S Response / Action Taken	MTO Commitment for Future Work to Address Comment
open stream, in the late fall and thawing occurs later in the spring, blocking the culverts. The new highway, with increased flash runoff and earlier thawing, dramatically changes the flow timing, temperature and volumes (up and down) of these small streams reducing the time periods available for fish migration.		

2.5 INDIGENOUS COMMUNITIES

Indigenous Communities and Organizations and government agencies were contacted by the Project Team at key engagement milestones throughout the study process. The Ministry of Indigenous Affairs (*formerly Ministry of Indigenous Relations and Reconciliation*) were sent letters to identify any Indigenous Communities that may have an interest in the study.

The following Indigenous Communities and Organizations were notified at project engagement milestones, including the Study Commencement in June 9, 2017, the Notice of PIC #1 in November 3, 2017, and the notice of PIC #2 in April 29, 2021:

- Fort William First Nation
- Nishnawbe Aski Nation (NAN)
- Anishinabek Nation / Union of Ontario Indians
- Red Rock Indian Band
- Pays Plat First Nation
- Animbiigoo Zaagi'igan Anishinaabek
- Métis Nation of Ontario Head Office
- Thunder Bay Métis Council
- Biinjitiwaabik Zaaging Anishinaabek First Nation
- Bingwi Neyaashi Anishinaabek
- Pic Mobert First Nation
- Ojibways of the Pic River First Nation
- Michipicoten First Nation
- Long Lake #58 First Nation
- Kiashke Zaaging Anishinaabek

One of objectives of Indigenous consultation is to identify any concerns that communities may have about the project and ensure any potential impacts on treaty rights are respectfully considered and mitigated as necessary and appropriate. Although no specific project related concerns were identified during design, Indigenous communities are generally interested in construction opportunities. MTO supports increasing Indigenous participation in MTO construction work and will consider opportunities to promote the inclusion of Indigenous businesses and communities in this project.

3 DETAILED DESCRIPTION OF THE RECOMMENDED PLAN

3.1 Major Features of the Proposed Work

This section addresses the main features of the proposed works of the recommended plan.

As outlined in **Section 1.1**, the key design features of the Detail Design for the four-laning of Highway 11/17 from 1.3 km west of Highway 582 to Coughlin Road include:

- Expansion of Highway 11/17 to four lanes by twinning (to the north) on the existing alignment;
- Improvements and modifications to select intersecting side-roads, including: Stewart Lake Road Connection and Valley Road East;
- New structural culverts under the new Highway 11/17 eastbound and westbound lanes at Valley Creek;
- Existing Highway 582 and Davis Road will be cul-de-sac'd, and connection will be provided via the new Stewart Lake Road Connection;
- Highway 582 will be realigned and connected to new Stewart Lake Road Connection;
- Partial illumination at the Highway 582 and Valley Road East intersections; and
- Temporary illumination at the east and west end transitions from 4 lanes to 2 lanes.

The detail design plan and typical section for the Highway 11/17 four-laning alignment is provided **in Exhibit 3-1a-e, 3-2** and **3-3**.

3.2 Construction Staging and Traffic Management

Construction duration for the four-laning of Highway 11/17 from 1.3 km west of Highway 582 to Coughlin Road is anticipated to take 2-3 years. During construction, one lane of traffic in each direction on Highway 11/17 will be maintained at all times (i.e. full mainline closures are not anticipated). Localized single lane, two-way traffic operation under flagging along Highway 11/17 may be required at the tie-ins at the east and west project limits from time to time.

Access to side roads will be maintained for the majority of construction, and short-term closures (e.g. 1-2 days) may be required to tie-in realigned side roads to existing roads. Any impacted property owners will be notified prior to these closures.

3.3 Utilities

Bell Canada, Hydro One and TC Energy have infrastructure that is in conflict with the design and are anticipated to be relocated as required, in advance of construction. TC

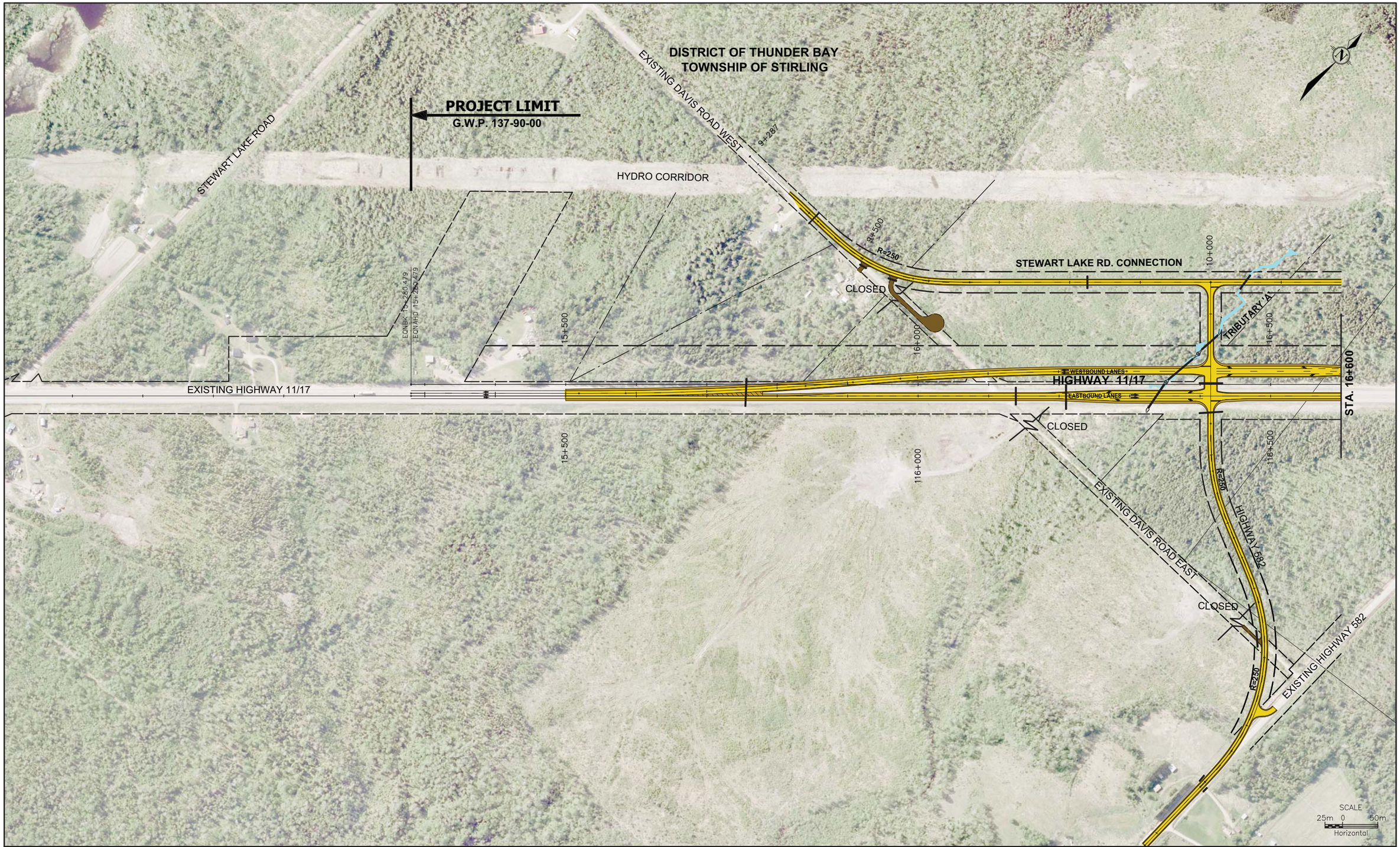
Energy relocation work will likely be required during construction and the Contractor will be required to co-ordinate work accordingly

3.4 Illumination

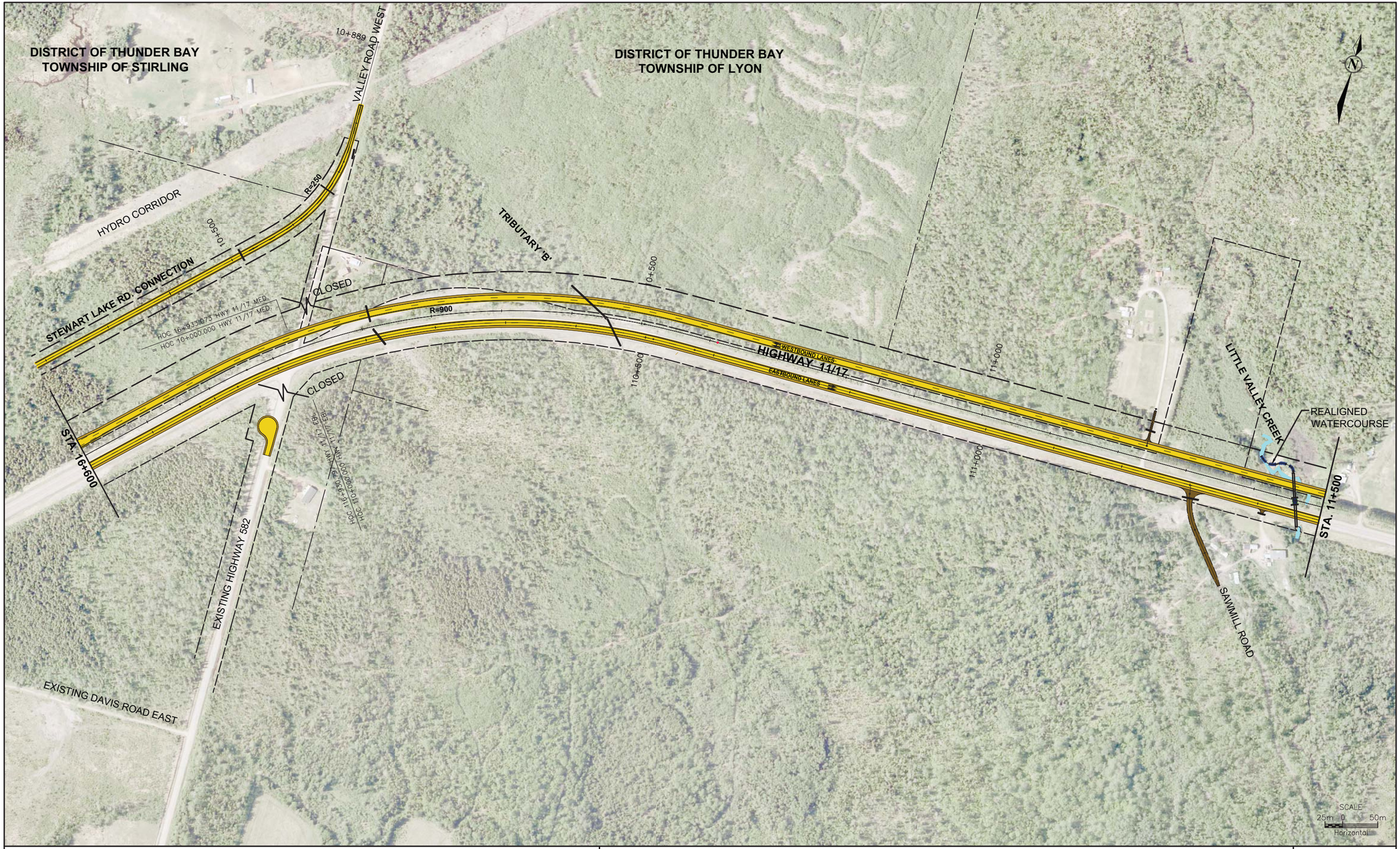
New partial illumination will be installed at the Highway 582 and Valley Road East intersections. Temporary illumination will be installed at the east and west end transitions from 4 lanes to 2 lanes.

3.5 Property Requirements

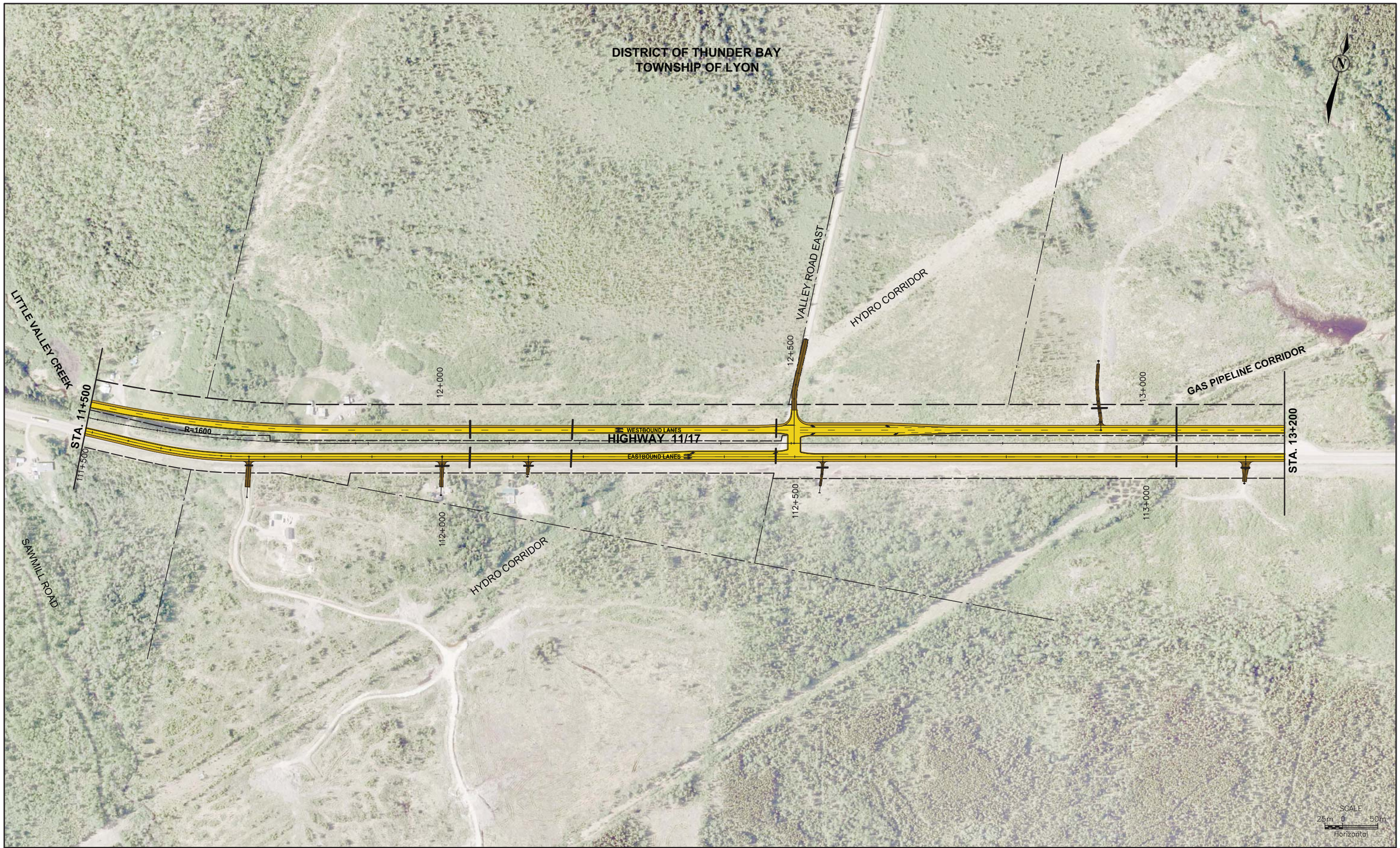
Property acquisition was required to facilitate the proposed design. Property acquisition has occurred between the property owners and the Ontario Ministry of Transportation (MTO). No further property required for utility relocations.



W.P. 137-90-00 **HIGHWAY 11/17 FOUR-LANING** **From West of Highway 582 to Coughlin Road** **Design and Construction Report**	**DETAILED DESIGN PLAN - (Part 1 of 5)**	**EXHIBIT** **3-1a**



W.P. 137-90-00 **HIGHWAY 11/17 FOUR-LANING** **From West of Highway 582 to Coughlin Road** **Design and Construction Report**	**DETAILED DESIGN PLAN - (Part 2 of 5)**	**EXHIBIT** **3-1b**



W.P. 137-90-00
HIGHWAY 11/17 FOUR-LANING
From West of Highway 582 to Coughlin Road
Design and Construction Report

DETAILED DESIGN PLAN - (Part 3 of 5)

EXHIBIT

3-1c

DISTRICT OF THUNDER BAY
TOWNSHIP OF LYON

GAS PIPELINE CORRIDOR

STA. 13+200

HOT 13+864.671 HWY 11/17 MED
=WOS 13+564.821 HWY 11/17 WBL

313+500

313+000

TRIBUTARY 'D'

R=750

WESTBOUND LANES

HIGHWAY 11/17
VALLEY CREEK

EASTBOUND LANES

113+500

114+000

REALIGNED WATERCOURSE

TRIBUTARY 'E'

314+500

HOT 13+532.670 HWY 11/17 WBL
=HOT 14+543.966 HWY 11/17 MED

R=750

114+500

REALIGNED WATERCOURSE

STA. 14+90

N

SCALE
25m 0 50m
Horizontal

W.P. 137-90-00 **HIGHWAY 11/17 FOUR-LANING** **From West of Highway 582 to Coughlin Road** **Design and Construction Report**	**DETAILED DESIGN PLAN - (Part 4 of 5)**	**EXHIBIT** **3-1d**

DISTRICT OF THUNDER BAY
TOWNSHIP OF LYON

GAS PIPELINE CORRIDOR

LOFTY DAVIES ROAD

STA. 14+900

15+000

15+500

16+000

16+500

115+000

115+500

116+000

WESTBOUND LANES
HIGHWAY 11/17
EASTBOUND LANES

R=900

R=1600

PROJECT LIMIT
G.W.P. 137-90-00

EXISTING HIGHWAY 11/17

COUGHLIN ROAD

SCALE
25m 0 50m
Horizontal

W.P. 137-90-00
HIGHWAY 11/17 FOUR-LANING
From West of Highway 582 to Coughlin Road
Design and Construction Report

DETAILED DESIGN PLAN - (Part 5 of 5)

EXHIBIT

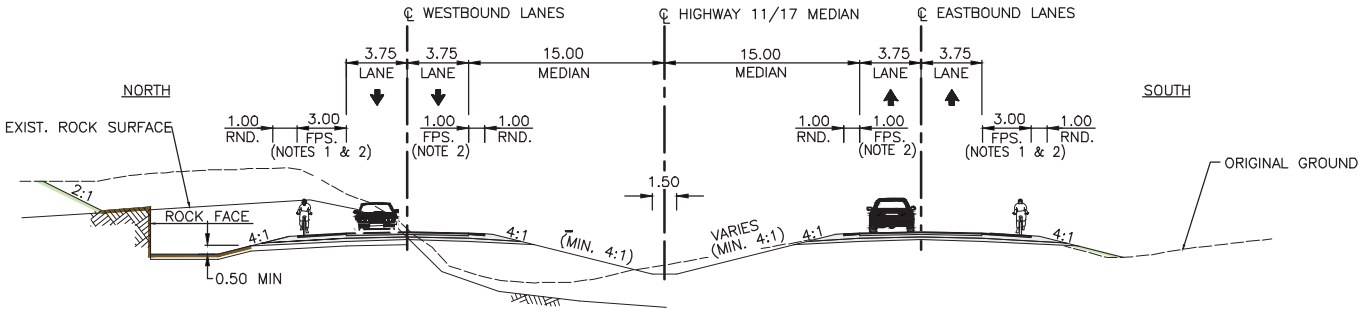
3-1e

W.P. 137-90-00
HIGHWAY 11/17 FOUR-LANING
From West of Highway 582 to Coughlin Road
Design and Construction Report

VALLEY ROAD EAST RELOCATION

EXHIBIT

3-2



TYPICAL SECTION - HIGHWAY 11/17

N.T.S.

NOTES:

1. A 3.0m FULLY PAVED RIGHT SHOULDER WILL BE PROVIDED ALONG EASTBOUND AND WESTBOUND HIGHWAY 11/17 WITHIN THE STUDY AREA TO ACCOMMODATE CYCLISTS.

2. RUMBLE STRIPS WILL BE INSTALLED ON THE OUTER AND MEDIAN SHOULDERS.

W.P. 137-90-00 **HIGHWAY 11/17 FOUR-LANING** **From West of Highway 582 to Coughlin Road** **Design and Construction Report**	**TYPICAL SECTION**	**EXHIBIT** **3-3**

4 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK

This section outlines the direct and indirect potential effects associated with the project, and the mitigation measures and the commitments to future work that will be implemented to minimize effects and ensure compliance with legislated requirements. A summary of mitigation measures and commitments to future work is presented later in **Exhibit 4-4**.

4.1 Natural Environment

This section focuses on the direct and indirect potential environmental effects to the existing natural environmental features and sensitivities in the study area. **Exhibit 4-1** illustrates the existing natural environmental conditions within the study area.

4.1.1 Terrestrial Ecosystem

Background information was collected to characterize the natural features and their general connectivity within the surrounding landscape and to refine the constraints and sensitivities analyses. In addition to checking for updated aerial photography and base mapping, the Management Biologist at Nipigon District MNRF was directly consulted to identify and discuss any information regarding potentially sensitive features (e.g. species, including Species at Risk (SAR), specialized habitats and other functions) in the vicinity of the study area, with a specific enquiry into the requirement for Eastern Whip-poor-will (EWPW) surveys. MNRF provided written confirmation through email on May 18, 2018 that targeted surveys for EWPW within the study limits were not required. The Natural Heritage Information Centre (NHIC), Ontario Breeding Bird Atlas (OBBA), Ontario Reptile and Amphibian Atlas, Ontario Butterfly Atlas, Ontario Moth Atlas, iNaturalist and Land Information Ontario (LIO) databases were also queried to uncover any documented information on designated and significant natural features, habitats and species of conservation concern in the general vicinity of the project in 2017 and updated in 2021.

WSP undertook preliminary field work generally along the Highway 11/17 corridor and in the vicinity of Valley Creek between September 25 to 27, 2017. Additional detailed field work was completed within the study area on May 22, 2018; June 12-15, 2018; May 27, 2019; and October 25-27, 2020. This work was conducted to document and further the Project Team’s understanding of existing environmental conditions (i.e. vegetation, wildlife, species of conservation concern) and involved an appropriate level of field work to provide seasonal constraints within the limits of the study area. A summary of the findings is provided in the sections below and depicted in **Exhibit 4-1**.

WSP completed an evaluation of the suitability of four (4) candidates Excess material Management Areas (EMMAs) to document vegetation communities, incidental wildlife observations, and to identify potential habitat for SAR known to occur in the area. Based on information gathered during investigations for the highway works, there is potential habitat for Little Brown Myotis and Northern Myotis in areas with larger trees. Canada Warbler, which breeds in a range of deciduous and coniferous forests with dense shrub layer may be utilizing the forested candidate EMMA site areas; however, given the extensive presence of similar habitat in the immediate area, there are no adverse impacts to the species anticipated. Eastern Wood Pee-wee, which nests in the mid-canopy layer of mixed forest clearings and edges may be present, however similar to Canada Warbler, there is abundant similar habitat in the immediate area and no adverse impacts to the species are anticipated. The majority of wildlife species known to the area are associated with Lake Superior or other larger waterbodies, mature forest communities, and wetlands that do not occur in the candidate EMMA areas.

There are no records of Species at Risk within or adjacent to the candidate EMMA sites, and MNRF Nipigon did not indicate any species of conservation concern in the vicinity of the broader project area. A specific request was made to MNRF regarding the potential for presence of Eastern Whip-poor-will (*Antrostomus vociferus*) and associated habitat for the section of highway extending from Highway 582 to Red Rock Road #9 (Pers. Comm. – Nicholas Braithwaite, 2017). MNRF indicated that there where no records of terrestrial species at risk and there was no potential habitat for Eastern Whip-poor-will within the project area.

LEGEND

- Creek / Watercourse
- Direction of Flow
- CW — Coldwater Thermal Classification
- WW — Warmwater Thermal Classification
- Direct Fish Use
- Utility Corridor

TRIBUTARY A (TRIBUTARY TO LAKE SUPERIOR) CSP CULVERT LOOKING NORTH

LITTLE VALLEY CREEK

VALLEY CREEK

VALLEY CREEK BOX CULVERT - NORTH SIDE

VALLEY CREEK TRIBUTARY E CSP CULVERT - SOUTH SIDE

VALLEY CREEK TRIBUTARY E CSP CULVERT NORTH SIDE

WEST LIMIT OF GWP 137-90-00

EAST LIMIT OF GWP 137-90-00

STEWART LAKE ROAD

Township of Stirling

VALLEY ROAD WEST

HYDRO CORRIDOR

TRIBUTARY B

CW

WW

LITTLE VALLEY CREEK

CW

To Thunder Bay

DAVIS ROAD W.

HIGHWAY 582

SAWMILL ROAD

Township of Lyon

VALLEY ROAD EAST

HYDRO CORRIDOR

VALLEY CREEK

CW

CW

LOFTY DAVIES RD.

GAS PIPELINE CORRIDOR

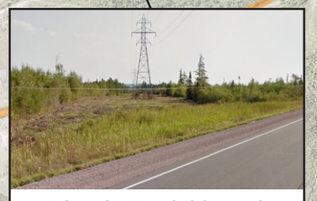
To Nipigon

COUGHLIN ROAD

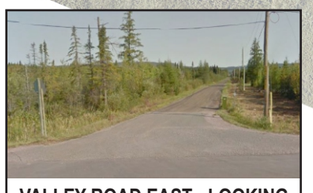
HIGHWAY 582 - LOOKING NORTH

LITTLE VALLEY CREEK CULVERT- SOUTH SIDE

LITTLE VALLEY CREEK CULVERT - NORTH SIDE

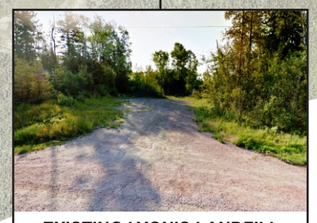


EXISTING HYDRO CORRIDOR



VALLEY ROAD EAST - LOOKING NORTH

EXISTING SNOWPLOW TURNAROUND



EXISTING LYON'S LANDFILL ENTRANCE

DEEP ROCK CUT - STA. 15+020 TO 15+220

W.P. 137-90-00
HIGHWAY 11/17 FOUR-LANING
From West of Highway 582 to Coughlin Road
Design and Construction Report

Existing Environmental Conditions

EXHIBIT

4-1

4.1.1.1 Vegetation

Overall the existing highway corridor is located in highly impacted areas. Extensive timber harvesting has resulted in mostly second growth forest communities and residential and commercial development is prevalent along the existing highway corridor. The soil characteristics throughout the study area result in a lot of standing water and moist vegetation community conditions along the preferred alignment. Conifer swamp, hardwood swamp and swamp thicket are abundant throughout the study area and cattail marsh and graminoid marsh occupy the existing cleared highway right-of-way (ROW). In total, fourteen (14) vegetation units with individual communities were classified within and adjacent to the ROW.

The expanded highway corridor will require removal of both upland and lowland vegetation communities including Aspen – Birch Hardwood Mixedwood (B104), Meadow (B94), Shrub (B96), Spruce – Fir Conifer (B101), Anthropogenic (ANTH) and Cultural Meadow (CUM). These removals are mostly close to the existing highway, along a narrow alignment to accommodate the two-lane twinning, and consist of a mixture of second growth, mature and edge influenced vegetation. Areas of the Mineral Meadow Marsh (B142) located in ditches and under the utility lines will be removed. All of the impacted forest communities consist of common community types and habitat characteristics that are generally well represented across the landscape. The majority of the vegetation removed by the highway works is culturally influenced as a result of its location the highway or other anthropogenic activities such as logging. Removals involve existing edges and will not fragment any intact, continuous forest communities.

Significant natural environmental features were considered during detail design and direct impacts to the natural environment were minimized to the extent possible. With the implementation of the mitigation measures outlined below and later in **Exhibit 4-4**, impacts to vegetation communities and their associated habitat functions will be minimized:

- Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction.
- Routinely inspect sediment and erosion control structures, including after storms, and repairs as required.
- Exposed surfaces will be re-stabilized as soon as possible using gravel sheeting due to high erosion potential and areas not requiring gravel sheeting will be re-vegetated using standard seed mix.
- Conduct vegetation removal and protection measures (Tree Clearing and Tree Protection).
- Felled trees to be removed into the highway ROW (and away from watercourse) to avoid disturbance to vegetation outside the ROW (or to an aquatic habitats).
- Restrict tree clearing to the required activity zone and limit timing of grubbing in high risk erosion potential areas.
- Avoid unnecessary traffic, and dumping and storage of materials over tree roots.

- In dust-sensitive areas, control dust using water or approved chemical suppressants, in accordance with MTO's general conditions.
- Carry out vehicle maintenance and fueling at the defined maintenance areas in the works yards (contained and well removed from any natural areas) or at commercial garages whenever possible.
- Vegetation requirements include minimal removal of existing vegetation and what is being remove will be hand-clearing and deferred grubbing within 30m of the banks.
- The Contractor will retain an Environmental Inspector to inspect and ensure proper implementation and maintenance of the mitigation measures.
- The Fisheries Contract Specialist shall inspect and confirm that:
    - Required vegetative buffers around Tributaries A-D, as specified elsewhere in the contract documents, are clearly marked and easily recognizable by operators and
    - Vegetative buffers are in place upon completion of clearing operations within the specified areas

4.1.1.2 Wildlife and Wildlife Habitat

Based on background information, agency correspondence, and field investigations, all of the wildlife species observed and likely to be present within the study limits are common and typical of the area and habitats in which they were noted.

Fifteen (15) bird species were observed along or in the vicinity of the expanded ROW during the field surveys between 2017 and 2020: American Crow (*Corvus brachyrhynchos*), American Robin (*Trudus migratorius*), White-throated Sparrow (*Zonotrichia albicollis*), Eastern Phoebe (*Sayornis phoebe*), Red-eye Vireo (*Vireo olivaceus*), Veery (*Catharus fuscescens*), Chestnut-sided Warbler (*Dendroica pensylvanica*), Blue Jay (*Cyanocitta cristata*), Canada Goose (*Branta canadensis*) in flight, Black-capped Chickadee (*Poecile atricapillus*), Northern Flicker (*Colaptes auratus*), American Redstart (*Setophaga ruticilla*), Song Sparrow (*Melospiza melodia*), Pileated Woodpecker (*Dryocopus pileatus*) and Cedar Waxwing (*Bombycilla cedrorum*). A variety of other birds typical of the area are anticipated to use the various habitat along and near the preferred corridor given the nature of the habitat mosaic. Records of Eastern Whip-poor-will are known for areas to the west of the study area. Follow-up contact with the MNRF indicated that their habitat potential was not likely within the study area and that targeted surveys were not required. No active nesting was noted along or adjacent to the ROW. Due to the wide variety of vegetation communities and generally intact habitat extending beyond the ROW, there is a good probability that some migratory bird nesting activity will occur in areas along and adjacent to the ROW.

Direct sightings of mammals, or indications thereof, during site visits include White-tailed Deer (*Obocoileus virginianus*), Moose (*Alces alces*), Snowshoe Hare (*Lepus americanus*), Chipmunk (*Tamis striatus*), and Red Squirrel (*Tamiasciurus hudsonicus*). Habitats along and in the vicinity of the study limits provide suitable conditions for the

range of mammals that are typical of northern forests, forest edges and wetlands. There are a wide variety of terrain and vegetation communities present along the project limits and generally good connectivity with vast tracts of forest that extend beyond the study limits to the north.

No observations of amphibians or reptiles were made during site investigations. Ditches, watercourses and wetlands in the study area likely provide habitat for a number of amphibian species. No reptile or amphibian Species of Conservation Concern were recorded during site investigations and none are recorded in MNRF databases in the broader area that encompasses the proposed ROW.

Vegetation and associated habitat removals are along the existing highway, this vegetation is typically impacted edges of forest communities compromising of a mixture of upland deciduous and conifer communities along with wetland and cultural communities. The habitat types are well represented in the area generally, which supports vast intact tracts of habitat. Wildlife using the edge areas along the existing highway is expected to be generally tolerant of highway related effects, and therefore is not anticipated that sensitive or rare species are using these edge areas. The existing highway has already generally modified and impacted wildlife movement patterns, particularly those of small, slow moving animals, and results in associated mortality. While some increased road mortality of wildlife is expected since animals now have to cross four lanes of traffic, this may in part be offset by better visibility and potential deterrence of some species to cross the widened open ROW. As discussed later in **Section 4.1.1.3**, a mineral lick was observed during site investigations in the roadside ditch to the north of the existing highway in the vicinity of the Valley Road West. This mineral lick feature will be filled in during the westbound lane construction to help reduce the potential for elevated mortality risk in the immediate area, as it is adjacent to the highway and there is already an increased source of wildlife attraction due to salt from highway maintenance activities.

An outline of potential impacts to species where suitable habitat exists is provided below:

- There are areas of more mature trees that are large in size; communities with these trees are scattered along the proposed corridor. Larger sized trees provide potential habitat for a variety of species that include woodland bats. Although some of this habitats will be removed/impacted, impacts to the species are generally not anticipated as extensive tracts of much higher quality, intact habitat are available beyond the immediate vicinity of the highway alignment.
- Wetland communities along the proposed alignment provide potential habitat for amphibians. A number of wetland communities require removal for construction of the highway, which will remove these habitats and potentially impact animals directly depending on the timing of removals.

The mitigation measures outlined in **Section 4.1.1.1** to minimize effects to vegetation and protect adjacent vegetation areas will in turn protect the associated wildlife habitat functions. However, it is also necessary to ensure the protection of breeding birds, as well as wildlife generally that may nest or otherwise use areas where construction is proposed. Specifically, nesting migratory birds are protected under the *Migratory Birds Convention Act* (MBCA 1994). No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of birds, of species protected under the MBCA and/or Regulations under that Act.

Species of Conservation Concern / Species at Risk

While there were no Species of Conservation Concern (SCC) confirmed within the study area, and presence is generally considered unlikely in the vicinity of the preferred highway four-laning alignment, there is some potential for SAR to be using or moving through some areas impacted by the highway works. Based on information gathering in the background review, there is potential for a number of SCC to be in the general area of the study, including: American White Pelican (*Pelecanus erythrorhynchos*), Bald Eagle (*Haliaeetus leucocephalus*), Barn Swallow (*Hirundo rustica*), Canada Warbler (*Cardellina canadensis*), Eastern Whip-poor-will (*Caprimulgus vociferous*), Monarch (*Danaus plexippus*), Yellow-banded Bumblebee (*Bombus terricola*), Little Brown Myotis (*Myotis lucifugus*), and Northern Myotis (*Myotis septentrionalis*). Although none of these species were found during the site investigations, potential habitat for Little Brown Myotis and Northern Myotis is consistent with areas with larger trees. Given the vegetation and habitat conditions within the study area, there is limited potential for the remaining species to be present.

Standard mitigation measures to protect wildlife, wildlife habitat and species of conservation concern will be implemented during construction including:

- The mitigation measures outlined in Section 4.1.1.1 and above to minimize effects to vegetation and protect adjacent vegetation areas will in turn protect the associated wildlife habitat functions.
- Active nests (nests with eggs or young birds) of protected migratory birds will not be destroyed during construction, including SAR protected under the provincial Endangered Species Act (ESA 2007).
- If a nesting migratory bird (including a SAR protected under ESA 2007) is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the Migratory Birds Convention Act, or ESA (2007), the Contractor will cease all activities that could harm the bird and will notify the Contractor Administrator immediately.
- In the event that an animal is encountered during construction do not move from the construction zone, the Contract Administrator will be notified.
- To prevent impacts to migratory birds, clearing should be avoided between September 1st and April 20th. If clearing must occur between this window the

Contractor shall visually inspect the area prior to clearing to confirm there is no nesting activity.

In relation to the protection of SAR:

- Vegetation clearing should only be from September 1st to April 20th of any year to protect SAR woodland bats and birds that might be using this habitat. No clearing should be completed from April 21st to August 31st of any given year.

4.1.1.3 Designated Natural Areas and Significant Wildlife Habitat

Designated Natural Areas includes evaluated wetlands (including both Locally Significant (LSW) and Provincially Significant Wetlands (PSW)), Environmentally Sensitive Areas (ESA), Provincial Parks, Conservation Reserves and Areas of Natural and Scientific Interest (ANSI). Designated Natural Areas identified in the various background information sources are outlined below:

- No significant ecological areas are known to exist within the study area.
- There are no PSWs identified in the study area.
- The silty, often saturated soil materials are anticipated to be sensitive to disturbance (and are typically associated with wetland communities), however as noted in **Section 4.1.1.1** many of these communities have been disturbed through timber harvesting, highway construction, and residential private land developments.

Areas that could potentially function as concentrated habitat features (e.g. mineral licks), and wildlife movement patterns were visually assessed by noting wildlife tracks and trails at the crossing of the existing highway during site investigations. A single mineral lick was located north of the existing highway in the vicinity of Valley Road West. This mineral lick consists of a depression within roadside drainage with abundance White-tailed Deer and Moose activity. It is assuFmed that salt laden runoff from the highway sits in this location, which attracts Deer and Moose. No other specialized or unusual wildlife habitat features were noted, as expected given the general disturbance of the study area, nor was any evidence of concentrated wildlife movement noted within or along the proposed four-laning corridor. However, wildlife is expected to move through the area generally as there are more intact habitat area located beyond the study area.

4.1.2 Fish and Fish Habitat

A Fish and Fish Habitat Existing Conditions and Impact Assessment was completed in support of this study, and the findings are summarized in this section. Background information was collected and field investigations were completed to characterize the existing fish and fish habitat conditions in the reaches of the assessed watercourses impacted by the highway works. Within the study area, six watercourses that have the potential to support fish are crossed by the proposed four-laning of the highway

including a tributary of Lake Superior, as well as Little Valley Creek (Tributary A, Tributary B,and Tributary C), Valley Creek (Tributary D) and three of their tributaries. All watercourses have been identified by MNRF Nipigon District as having a coldwater thermal regime, with a permissible construction timing window of June 16 to August 31 (i.e. no in-water works permitted between September 1 and June 15 of any given year). Field surveys were conducted by WSP ecologists within the existing and proposed Highway 11/17 alignment on September 28, 2017 (Tributary D, E and F), June 12, 2018 (Tributary A, B, C) and October 26, 2020 (Tributary A).

SAR approvals are not anticipated to be required during the Detail Design and construction phases of this project.

Tributary A (Tributary to Lake Superior), B (Tributary to Little Valley Creek), C (Little Valley Creek), and D (Valley Creek) is classified as having a permanent flow, coldwater thermal regime and serve as direct fish habitat. Tributary C serves as significant fish habitat for Brook Trout spawning and nursery. Tributary D serves as significant fish habitat for Brook Trout and Rainbow Trout spawning and nursery. Tributary E is classified as having intermittent flow, unknown/coldwater thermal regime and serves as indirect fish habitat.

The Detail Design plan will require construction works adjacent to, or within watercourses identified as supporting fish habitat, either directly or indirectly as mentioned above. The proposed works include: installation of culverts along the new ROW and channel realignment crossings. A summary of the potential direct or indirect impacts of the proposed works at each tributary is outlined in **Exhibit 4-2**.

Exhibit 4-2: Potential Direct of Indirect Impacts of the Proposed Works at Watercourses within the Study Area

Watercourse	Potential Impacts
Tributary A – Tributary to Lake Superior	• Approximately 275 m of habitat will be created for the diversion channels. • Existing culvert – 25.6 m Proposed culverts total lengths – 139 m, net result is additional enclosure of 113.4 m of channel. • Existing channel length – 230 m Proposed channel length after realignment – 169.8, net result is a loss of 60.2 m of channel length.
Tributary B – Tributary to Little Valley Creek	• Approximately 94.2 m of habitat will be created for the diversion channels. • Existing culvert – 25.2 m Proposed culverts total lengths – 105m, net result is an additional enclosure of 79.4 m of channel. • 4.5 m length of channel will be altered to form a median pool, net result is an alteration of habitat for the pool and the culvert, no net channel loss of channel length.

Watercourse	Potential Impacts
Tributary C – Little Valley Creek	• Approximately 100 m of habitat will be created for the diversion channels. • Existing culvert 26.9 m Proposed culverts total lengths – 67 m, net result is a 40.1 m increase in channel enclosure. • Existing channel length – 145 m, new channel length – 70m, net loss of 75 m of channel length.
Tributary D – Valley Creek	• Approximately 114 m of habitat will be created for the diversion channels. • Existing culvert length 24.7 m Proposed culvert total lengths – 108.9 m, net result is 84.2 m of additional channel enclosure. • Existing channel length – 285 m, proposed channel length
Tributaries E and F	• Additional enclosure of approximately 59.4 m of Tributary E (44 m new eastbound lane culvert – 25.6 m of existing + 41 m for new westbound lane) and the enclosure of 39.6 m of Tributary F will result in the loss of associated nutrients and allochtanous inputs to Tributary D immediately downstream. These impacts are not expected to negatively impact Tributary D or its resident fish populations.

The works associated with the two tributaries that support only indirect functions within the highway corridor (Tributary E and F) can be mitigated with standard construction-related mitigation measures such that direct impacts to fish and fish habitat can be avoided. Although there will be a permanent loss of habitat in all four watercourses (Tributary A, B, C, and D), and the permanent enclosure of some of the altered habitat within the new culverts, anticipated impacts on the resident populations in each of the watercourses is expected to be minimal as there is an abundance of similar habitat available in the remainder of the watercourses. The new channel sections will be designed using natural channel design principles to replace/create similar habitat being impacted. Fish will still be able to access and use the new channel sections and culvert locations. Therefore, the alteration of this habitat is not anticipated to result in severe negative impacts on the resident population overall. It is recommended that the works associated with each tributary supporting fish can continue with proposed mitigation measures outlined below.

The following mitigation measures are being recommended for implementation for the entire Highway 11/17 corridor within the study area to address the potential impacts on fish and fish habitat.

Construction Design

- A coldwater permissible in-water construction timing window of June 16 to August 31 of any given year will be implemented for all in and near-water works associated with the Highway 11/17 four-laning. No in-water works will be permitted between September 1 and June 15 of any given year.

- Any temporary stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g. within silt fencing) in areas separated at least 30 m from the watercourses. All construction materials, excess materials and debris should be removed and appropiately disposed of following construction.
- For dewatering, appropriate energy dissipation and settling/filtration measures will be used for discharge of dewatering water to ensure no erosion or sediment release occurs in the watercourses.
- Four (4) EMMA's have been approved and are considered suitable locations for the Management of Excess Materials. Materials are stockpiled to be re-used or held for disposal at a certified waste disposal site. Stockpiles of natural wood, manufactured wood, debris from open fires, and swamp material may only be located a minimum of 2 m above th level of ground water, a minimum of 30 m from waterbodies, a minimum of 100m from any water wells and residences.
- The Contractor will have Environmental Inspectors on board who are responsible to monitoring, installation, effectiveness and condition of Erosion Sediment Control (ESC) measures. Contractor is responsible for Temporary ESC measures in designated high risk erosion potential areas. Appropriate contingency and response plans will be in place and implemented if required.

Sediment and Erosion Control Measures

- The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be managed by the Contractor and his Environmental Inspector.
- Temporary erosion control measures in high-risk potential erosion areas will be specified in the contract, and monitored by the FCS.
- All excess materials in and around the watercourses and drainage features shall be managed.
- All erosion and sediment control measures and prevent/control potential for erosion and sedimentation caused by their construction methods and operations will follow all legislative requirements, to prevent entry of sediments into all watercourses/drainage features, and to prevent damage to features and property inside or outside of the ROW.

Shoreline/Bank/Vegetation Stabilization

- Removal of riparian vegetation in and around the watercourses will be limited to only what is required.
- Hand clearing and deferred grubbing within 30m of sensitive watercourse banks will be required.
- Vegetation protection and rehabilitation will be managed.
- The construction access, work areas and associated requirements for removal of riparian vegetation will be minimized to the extent required for the construction activities, and these areas then delineated in the field using properly installed

protective silt fencing. All temporarily disturbed areas will be re-stabilized following construction using appropriate Means.

Operational and Machinery

- Use of equipment in and around the watercourses and associated drainage features will be restricted in sensitive areas.
- All construction-related activities will require control so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the drainage feature.

The following design and site-specific mitigation measures will also be implemented for construction of the new culvert crossing and channel realignments for the four tributaries (Tributaries A, B, C, and D) supporting fish directly within the study area.

- Diversion channels will be constructed to maintain flow and fish passage (as required). Diversion channels will be lined with non erodible materials with the banks protected against erosion. New and replacement culverts will be constructed “in the dry” behind suitable containment measures. Following construction flows will be transferred to the permanent channel locations and the temporary channels backfilled. All disturbed areas will be restored following construction.
- The FCS will be responsible for the fish salvage as specified in the contract in accordance with OPSS 182, and under a Licence to Collect Fish issued by MNRF. This is applicable at Tributary A, Tributary B, Tributary C (Little Valley Creek), and D (Valley Creek).
- Containment measures will be appropriately designed by the Contractor for each of the watercourse and drainage feature locations to best suit site conditions and meet the requirements for the works. These protection systems will remain in place throughout construction until flow is transferred to the new or final culvert/channel locations.
- The FCS will be responsible for the inspection and monitoring of scour protection, culvert embedment, waterbody aggregate installation, channel realignments and diversion channel installation, new culvert installation and tie ins as specified elsewhere in the contract documents.
- The FCS shall inspect and confirm that the site is stabilized upon completion of the works.
- .

4.1.3 Erosion and Sediment Control

There is potential for erosion and sediment during grading and excavation activities, especially within the vicinity of water and waterbodies, however, with the implementation of appropriate mitigation measures for erosion and sediment control, impacts to watercourses within the project area will be avoided. The recommended mitigation measures to protect fish and fish habitat summarized in **Section 4.1.2**, along

with the measures outlined below and in **Exhibit 4-4** will minimize the effects of erosion and sediments to the waterbodies within the study area by implementing the following measures:

- The Fisheries Contract Specialist (FCS) will meet with the MTO Environmental Planner who will provide a description of the project and the specific contract provisions including the expectations for oversight requirements including (but not limited to) dewatering works, temporary ESC measures, Temporary Erosion Control Areas (specifically associated with Tributary C- Little Valley Creek and Tributary D – Valley Creek), and in-water works associated with fish habitat elements (I.e. pools, riffles, etc) as specified in the contract documents.
- The Contractor must comply with the Permit to Take Water (PTTW) for monitoring of ESC.

4.1.4 Groundwater and Surface Water

A hydrogeological assessment was undertaken and it was determined that dewatering is required to manage groundwater and accumulated runoff water in excavations during the channel re-alignment for Valley Creek and installation / rehabilitation of culverts. As per Ontario Regulation (O. Reg.) 387/04, a Permit-To-Take-Water (PTTW) is required from the Ministry of the Environment, Conservation and Parks (MECP) for water takings in excess of 50,000 litres per day (L/day). Specific types of dewatering activities are not authorized and monitored under the MECP environmental activity and sector registry (EASR) process. Under O. Reg. 63/16, an EASR is an online registry that has replaced the requirement to obtain a PTTW for construction dewatering (and other) purposes if certain criteria are met, including situations where the groundwater dewatering rate is greater than 50,000 L/day and less than 400,000 L/day under normal conditions (i.e., excluding heavy rain events). For this project, a PTTW Category 3 will be obtained from the MECP.

According the MECP Water Well Records, there are a total of twenty-five (25) water well records with twenty-two (22) records for water supply wells in the study area. The study area is rural and property owners may be relying on private wells for water supply purposes. WSP will investigate the presence of wells and reliance on groundwater in locations where groundwater management is required for the project, as part of the PTTW Category 3 work. Mitigation measures to protect water supply wells will be outlined, as required.

The installation of asphalt roadway surfaces during construction requires working with environmentally-hazardous, petroleum-based materials. Runoff can flow to nearby watercourses or adjacent areas, where infiltration into the aquifer system may result in groundwater contamination if these materials are not managed in an environmentally-responsible manner. As such, designated concrete washout pits need to be established, and refueling of vehicles and equipment shall not be done adjacent to watercourses or environmentally sensitive areas. Road construction activities have the potential to adversely impact soil and groundwater quality by disturbing contaminated soils,

particularly by improper handling and management practices (e.g. spills of fuel, lubricants, etc.), thus introducing contaminants that could enter the groundwater system and impact nearby water wells. A suitable erosion and sedimentation control (ESC) plan will be developed and implemented by the Contractor in accordance with regulatory requirements and guidelines. The summary of mitigation measures outlined in **Exhibit 4-4**.

4.1.5 Contamination

Eight (8) Phase One Environmental Site Assessments (ESAs) were completed to assess for environmental due diligence purposes in support of property acquisition. Three (3) of the eight (8) Phase One ESAs recommended further assessment (i.e. Phase Two ESAs).

Based on the findings for each of the Phase Two ESAs, concentration levels of vanadium at fifteen soil sampling locations were found to exceed the applicable MECP Site Condition Standards (SCS). Elevated levels of vanadium in the soil in the Thunder Bay area is known to be naturally occurring as a result of the weathered bedrock. Any vanadium impacted soils that are excavated will be managed and disposed of appropriately with due regard to environmental and health and safety regulations. The remaining contamination of the properties are potentially resulting from the extraneous debris including metal and wood debris, household appliances, paint cans, and a full tank located on the property. All contaminated soils in areas that were identified during the detailed contamination investigations that are impacted by construction will be managed, and disposed of off-site at a MECP licensed landfill and treatment facility, as required. The summary of mitigation measures outlined in **Exhibit 4-4**.

4.1.6 Rock Blasting

To construct the new Highway 11/17, rock blasting is required to remove bedrock and produce roadway fill material and/or aggregate materials. Holes will be drilled in the rock and filled with explosives and detonated to fracture the rock. The smaller rock fragments can then be managed with heavy equipment. During a blast, energy in the form of shock waves and pressure gas is released that create both ground and air vibrations. The energy is confined in the rock and exerts pressure to fracture the bedrock. The ground vibrates sending shock waves out in all directions that decrease as the distance from the source increases. The actual strength of a vibration is dependent on a wide range of factors at the time of the blast (e.g. amount of explosives detonated at one time, distance from the blast site, local subsurface conditions, weather conditions, etc.). Blasters are able to control and minimize vibrations by setting off the explosives in sequence, with delays of a few thousandths of a second. Weather and atmospheric conditions including the close proximity to large bodies of water play a role in vibration magnitudes. These factors can influence the air concussions by reflecting them back to the ground causing a higher level of air blast than would normally be experienced. This

may cause the blast to be perceived by surrounding residents to be much larger than the actual blast. Rock-blasting will not be required within 500 m of any properties. Prior to blasting rock blasting completed for MTO highway construction contracts follow strict limits for noise and vibration produced from blasting which are set and regulated by the Ministry of Labour and the Ministry of the Environment, Conservation and Parks. Prior to blasting, the Contractor must prepare and submit a detailed rock blast plan that will address a wide range of requirements (e.g. pre-blast surveys for buildings, means to control fly rock, blast vibration monitoring, etc.). If required, the Contract Administrator will monitor wells if blasting is within the zone of influence.

4.1.7 Mineral Aggregates

Mineral aggregates, such as good quality sand and gravel, are a vital construction material required for Ministry of Transportation undertakings. The *Aggregate Resources Act* ensures that environmental concerns associated with aggregate extraction operations are addressed. MTO Standards are developed for aggregate quality and to protect against environmental impacts.

4.1.8 Emergency Spill Response

Direct responsibility for containment and clean-up of spills and abandoned materials on MTO highway facilities rests with the owner of the material and person in control of the material at the time of the spill or abandonment. Where spills or abandoned materials occur on MTO highway facilities, MTO may assist where persons legally responsible cannot be located or not able to respond. MTO assistance may include notification of authorities, provision of equipment and materials, and traffic management. In the event of a spill or MTO material by MTO staff, MTO will undertake all notification, containment and cleanup responsibilities required by provincial and federal legislation. Spill prevention and spill management requirements are included in the contract. The contractor is responsible to minimize the likelihood of any adverse effects to groundwater during construction. This is a standard requirement in all contracts and is included in the General Conditions of contract.

4.2 Social Environmental

4.2.1 Management of Excess Materials

Excess Material Management will be completed in accordance with applicable legislation and MTO's standard construction practices. The Contractor will be restricted from placing excess materials in environmentally sensitive areas. The excess materials are being managed in the right-of-way (slope flattening), and in the Excess Material Management Area (EMMAs).

An MTO and Ministry of Environment, Conservation and Parks (MECP) protocol identifies material-by-material management options both inside and outside the

construction area, which includes the right-of-way and property with a boundary contiguous to the right-of-way. All excess materials may be reused or recycled. The project designates four Excess Material Management Area (EMMA) within which the Contractor is to dispose of excess earth, generated from excavation operations. Maximum footprints, side slopes and heights are specified in the Contract and minimum distances from property lines and watercourses are specified. As well, inside the right-of-way, materials such as asphalt, concrete, swamp material, wood, earth and rock may be reused as a construction material or managed as fill. Materials also may be temporarily stockpiled in preparation for these uses. Management of excess materials outside the right-of-way, stockpiling and wood management depends on local circumstances. Where specified, all harvestable wood shall be cut and stockpiled on private properties in accordance with property agreements between MTO and the property owner.

Site protection is provided by the imposition of constraints and for the protection of water and air quality adapted from existing legislation. The constraint on the management of these materials also involves discussions and written agreements with property owners, and may involve consultation with MECP and other authorities. Where an excess material management option cannot meet constraints, another option must be pursued, or the material must be disposed of as waste.

The Earth Management Plan (EMP) is being completed in accordance with Ontario Regulation (O. Reg.) 406/19 (On-Site and Excess Soil Management) made under the *Environmental Protection Act*, R.S.O. 1990, c. E. 19 and Rules for Soil Management and Excess Soil Quality Standards (Soil Rules). The EMP identifies environmental constraints and special provisions during the removal, management, tracking and/or disposal of any excess material for the replacement of the three structural culverts. The plan includes recommendations for the management of excess materials, designation of the materials, mitigation measures (if required) and proper storage (stockpiling) and re-use/disposal options based on material designation.

WSP completed the soil contaminant investigation with the study limits with RPM Environmental, a licensed driller from Thunder Bay, Ontario, in May 2019. Soil samples were collected from ten (10) boreholes along the Highway 11/17 westbound lane right-of-way in Red Rock, Ontario. The soil samples were analyzed for metals and inorganics, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and total xylenes (BTEX).

The results of the analyses indicated that vanadium concentrations exceeded the applicable MECP Table 2 ICC SCS at all sampling locations across the Site. Elevated levels of vanadium in soil in the Thunder Bay and Red Rock area is known to be naturally occurring (not anthropogenic) resulting from weathered bedrock (parent material). Sodium adsorption ration (SAR) concentrations exceeded the MECP Table 2 ICC SCS at four (4) borehole locations, and Electrical Conductivity (EC) exceedance at one (1) borehole. The elevated values of SAR and EC are attributed to the application

of road salt on the right-of-way (ROW) for de-icing purposes in the winter. Under O. Reg. 153/04, Section 48, Paragraph 3, impacts related to salt use for de-icing purposes on highways is not considered as contamination. All other parameters met the MECP Table ICC SCS. The summary of mitigation measures outlined in **Exhibit 4-4**.

4.2.2 Land Use

The Ministry is maintaining municipal road connections at the new Stewart Lake Road Connection / realigned Highway 582 and Valley Road East from Highway 11/17. The existing Highway 582 and Davis Road will be cul-de-sac'd, and a connection will be provided via the new Stewart Lake Road Connection. Due to the introduced median between the eastbound and westbound highway lanes, property accesses become limited to right-in / right-out movements to and from private driveways. The recommended four-lane plan does not preclude the Ministry of Municipal Affairs and Housing (responsible for future land-use planning for unincorporated Townships of Stirling and Lyon, within the unorganized district of Thunder Bay) from improving the internal network in support of potential future development.

4.2.3 Noise

A noise assessment was completed to review potential noise impacts at adjacent Noise Sensitive Areas (NSAs) and to determine whether the review of noise mitigation measures is warranted in accordance with the Ontario Ministry of Transportation's (MTO) *Environmental Guide for Noise* and in accordance with MECP standards. The land uses in the vicinity of the Highway 11/17 corridor include scattered residential and natural green spaces on both sides of the corridor. Residential uses adjacent to the Highway 11/17 corridor were the main focus of the study. Eighteen (18) receptors were selected to represent the NSAs within the study area. The noise levels predicted at the receptors experience an increase in sound levels less than 5 dBA and absolute noise levels less than 65 dBA. The review of noise mitigation is therefore not warranted based on the criteria outlined in the MTO *Environmental Guide for Noise*.

General construction measures, setbacks from Noise Sensitive Areas (NSAs), timing constraints, or specific scheduling of construction activities where required and where practical, must be included in the Contract Documents. During construction, the Contractor will be required to abide by MTO's standard construction mitigation for noise, such as keeping idling of construction equipment to a minimum, and to maintain equipment in good working order to reduce noise from construction activities. Construction may occur outside of normal working hours and on weekends for certain activities along Highway 11/17, and equipment shall be maintained to prevent unnecessary noise. If complaints regarding construction noise arise during construction, they will be investigated according to the provisions of the MTO Noise Guide (October 2006).

4.2.4 Air Quality and Dust

Short-term effects to air quality include dust created by construction activities. Dust control shall be completed during construction to ensure construction work does not affect traffic, enter surface waters, or cause a nuisance to residents, or utilities. The mitigation measures are outlined in **Exhibit 4-4**.

4.3 Cultural Heritage

4.3.1 Archaeological Resource

A Stage 1-2 Archaeological Assessment was completed in support of this study and no archaeological materials were observed. Therefore, no further assessment is recommended.

All archaeological assessments were completed in conformity with the MTCS' 2011 Standards and Guidelines. Archaeological recommendations have been made based on the background historic research, locations of known or registered archaeological sites, previous archaeological assessments, property inspections (where Permission to Enter was acquired), and indicators of archaeological potential as outlined in 2011 S&Gs. The Contractor is bound by the General Conditions of the Contract related to Archaeology.

4.3.2 Cultural Heritage Resources

No built heritage resources or cultural heritage landscapes were identified during the study, as such, no cultural heritage mitigation measures are required.

4.4 Engineering / Technical Considerations

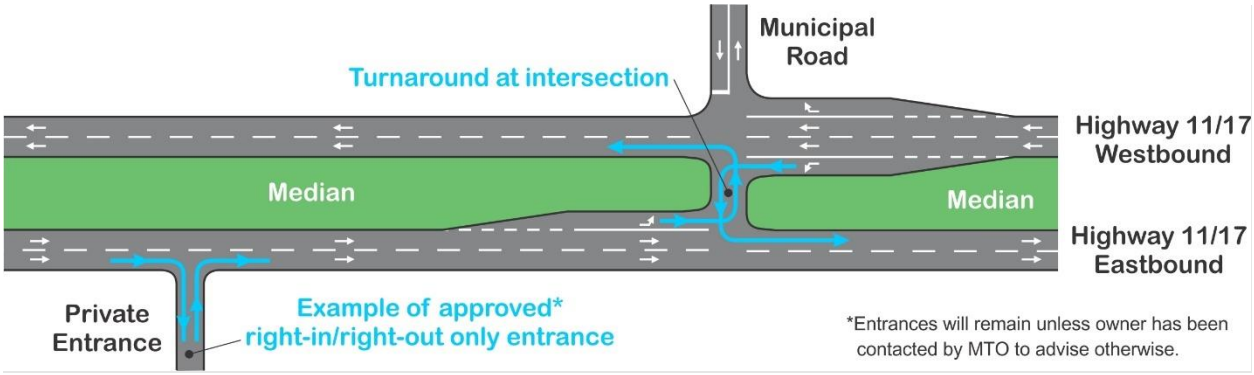
4.4.1 Construction Staging

Start of construction is dependent upon securing environmental approvals and availability of funding, and is anticipated to begin as early as Summer 2022. The duration of construction is anticipated to be 2-3 years. During this time, full mainline closures are not anticipated (i.e. one lane of traffic in each direction on Highway 11/17 will be maintained at all times during construction). Localized single lane, two-way traffic operation under flagging along Highway 11/17 may be required at the tie-ins at the east and west project limits from time to time. Access to side roads will be maintained for the majority of construction, and short-term closures (e.g. 1-2 days) may be required to tie-in realigned side roads to existing roads. Detours using alternate routes will be signed in advance of localized closures. The Contractor will notify impacted property owners or stakeholders of any temporary road closures in advance of the closure.

4.4.2 Property Access Modifications

Due to the introduced median between the eastbound and westbound highway lanes, property accesses become limited to right-in / right-out movements to and from the driveway, as shown below in **Exhibit 4-3** and on the Detail Design plan (**Exhibit 3-1**). At all times during construction, access to all entrances will remain available. Where necessary, temporary extensions of entrances to the operating lanes during staging will be provided. Some (permanent) minor entrance modifications may be required at select properties; those impacted property owners have been notified.

Exhibit 4-3: Example of Property Access Modification due to the Highway 11/17 Four-Laning Preferred Plan



4.4.3 Emergency Access

Local municipalities, medical services, and the Ontario Provincial Police will be notified of the final construction staging plan, start of construction, temporary road closures, etc. to minimize delay in emergency response times during and after construction.

4.4.4 Utilities

Utility conflicts to Hydro One, Bell Canada and TC Energy facilities were identified. Utility relocations are anticipated to be completed in advance of construction.

4.4.5 Property Requirements

The Ministry of Transportation (MTO) has completed negotiations with individual property owners in accordance with standard MTO procedures. All property required for construction of this project has been acquired.

4.5 Summary of Environmental Effects and Recommended Mitigation Measures

Exhibit 4-4 summarizes the potential environmental impacts and proposed mitigation measures to follow during construction.

Exhibit 4-4: Summary of Environmental Concerns and Commitments Table

LEGEND	
MTO: Ministry of Transportation	MHSTCI: Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF: Ministry of Natural Resources and Forestry	MMAH: Ministry of Municipal Affairs and Housing
MECP: Ministry of the Environment, Conservation and Parks	UTIL: Utilities
DFO: Department of Fisheries and Oceans, Canada	ES: Emergency Service Providers

ID #	Issues/Concerns Potential Effects	Concerned Agencies	ID #	Mitigation/Protection/Monitoring
1.0	**Terrestrial Ecosystem**	MECP MNRF	**Vegetation**	
			1.1	• Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction.
			1.2	• Routinely inspect sediment and erosion control structures, including after storms, and maintain and repair as required.
			1.3	• Exposed surfaces will be re-stabilized as soon as possible using gravel sheeting due to high erosion potential and areas not requiring gravel sheeting will be re-vegetated using standard seed mix.
			1.4	• Conduct vegetation removal and protection measures (Tree Clearing and Tree Protection).
			1.5	• Felled trees to be removed into the highway ROW (and away from watercourse) to avoid disturbance to vegetation outside the ROW (or to an aquatic habitats).
			1.6	• Restrict tree clearing to the required activity zone and limit timing of grubbing in high risk erosion potential areas.
			1.7	• Avoid unnecessary traffic, and dumping and storage of materials over tree roots.

			1.8	• In dust-sensitive areas, control dust using water or approved chemical suppressants, in accordance with MTO's general conditions.
			1.9	• Carry out vehicle maintenance and fueling at the defined maintenance areas in the works yards (contained and well removed from any natural areas) or at commercial garages whenever possible.
			1.10	• Vegetation requirements include minimal removal of existing vegetation and what is being remove will be hand-clearing and deferred grubbing within 30m of the banks.
			1.11	• The Contractor will retain an Environmental Inspector to inspect and ensure proper implementation and maintenance of the mitigation measures.
			1.12	• The Fisheries Contract Specialist shall inspect and confirm that: ○ Required vegetative buffers around Tributaries A-D, as specified elsewhere in the contract documents, are clearly marked and easily recognizable by operators and ○ Vegetative buffers are in place upon completion of clearing operations within the specified areas
			Wildlife and Wildlife Habitat	
			1.13	• The mitigation measures outlined in Section 4.1.1.1 and above to minimize effects to vegetation and protect adjacent vegetation areas will in turn protect the associated wildlife habitat functions.
			1.14	• The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the provincial *Endangered Species Act* (ESA 2007).
			1.15	• If a nesting migratory bird (including a SAR protected under the provincial *Endangered Species Act* (2007)) is identified

				within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the *Migratory Birds Convention Act* (1994), or *Endangered Species Act* (1997), the Contractor will cease all activities that could harm the bird and will notify the Contractor Administrator immediately.
			1.16	• In the event that an animal is encountered during construction do not move from the construction zone, the Contract Administrator will be notified. • To prevent impacts to migratory birds, clearing should be avoided between September 1st and April 20th . If clearing must occur between this window the Contractor shall visually inspect the area prior to clearing to confirm there is no nesting activity.
			Species of Conservation Concern / Species at Risk	
			1.17	• Vegetation clearing should only be from Septemberr 1st to April 20th of any year to protect birds that might be using this habitat. No clearing should be completed from April 21st to August 31stt of any given year.
2.0	**Fish and Fish Habitat**	MNRF DFO	2.1	• A coldwater permissible in-water construction timing window of June 16 to August 31 of any given year will be implemented for all in and near-water works associated with the Highway 11/17 four-laning. No in-water works will be permitted between September 1 and June 15 of any given year.
			2.2	• Any temporary stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g. within silt fencing) in areas separated at least 30 m from the watercourses. All construction materials, excess materials and debris should be removed and appropriately disposed of following construction.
			2.3	• For dewatering, appropriate energy dissipation and settling/filtration measures will be used for discharge of

				dewatering water to ensure no erosion or sediment release occurs in the watercourses.
			2.4	• Four (4) EMMA's have been approved and are considered suitable locations for the Management of Excess Materials. Materials are stockpiled to be re-used or held for disposal at a certified waste disposal site. Stockpiles of natural wood, manufactured wood, debris from open fires, and swamp material may only be located a minimum of 2 m above the level of ground water, a minimum of 30 m from waterbodies, a minimum of 100m from any water wells and residences.
			2.5	• The Contractor will have Environmental Inspectors on board who are responsible to monitoring, installation, effectiveness and condition of Erosion Sediment Control (ESC) measures. Contractor is responsible for Temporary ESC measures in designated high risk erosion potential areas. Appropriate contingency and response plans will be in place and implemented if required.
			2.6	• The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be managed by the Contractor and his Environmental Inspector.
			2.7	• Temporary erosion control measures in high risk potential erosion areas will be specified in the contract, and monitored by the FCS.
			2.8	• All excess materials in and around the watercourses and drainage features shall be managed.
			2.9	• All erosion and sediment control measures and prevent/control potential for erosion and sedimentation caused by their construction methods and operations will follow all legislative requirements, to prevent entry of sediments into all watercourses/drainage features, and to prevent damage to features and property inside or outside of the ROW.

			2.10	• Removal of riparian vegetation in and around the watercourses will be limited to only what is required.
			2.11	• Hand clearing and deferred grubbing within 30m of sensitive watercourse banks will be required.
			2.12	• Vegetation protection and rehabilitation shall be managed.
			2.13	• The construction access, work areas and associated requirements for removal of riparian vegetation will be minimized to the extent required for the construction activities, and these areas then delineated in the field using properly installed protective silt fencing. All temporarily disturbed areas will be re-stabilized following construction using appropriate means.
			2.14	• Use of equipment in and around the watercourses and associated drainage features will be restricted in sensitive areas.
			2.15	• All construction-related activities will require control so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the drainage feature.
			2.16	• Diversion channels will be constructed to maintain flow and fish passage (as required) • Diversion channels will be lined with non erodible materials with the banks protected against erosion • New and replacement culverts will be constructed “in the dry” behind suitable containment measures • Following construction flows will be transferred to the permanent channel locations and the temporary channels backfilled. • All disturbed areas will be restored following construction.
			2.17	• The FCS will be responsible for the fish salvage as specified in the contract in accordance with OPSS 182, and under a

				Licence to Collect Fish issued by MNRF. This is applicable at Tributary A, Tributary B, Tributary C (Little Valley Creek), and D (Valley Creek).
			2.18	• Containment measures will be appropriately designed by the Contractor for each of the watercourse and drainage feature locations to best suit site conditions and meet the requirements for the works. These protection systems will remain in place throughout construction until flow is transferred to the new or final culvert/channel locations.
			2.19	• The FCS will be responsible for the inspection and monitoring of scour protection, i culvert embedment, waterbody aggregate installation, channel realignments and diversion channel installation, new culvert installation and tie ins as specified elsewhere in the contract documents. • The FCS shall inspect and confirm that the site is stabilized upon completion of the works.
3.0	**Erosion and Sediment Control**	MECP MNRF	3.1	• The Fisheries Contract Specialist (FCS) will meet with the MTO Environmental Planner who will provide a description of the project and the specific contract provisions including the expectations for oversight requirements including (but not limited to) dewatering works, temporary ESC measures, Temporary Erosion Control Areas (specifically associated with Tributary C- Little Valley Creek and Tributary D – Valley Creek), and in-water works associated with fish habitat elements (I.e. pools, riffles, etc) as specified in the contract documents
			3.2	The Contractor must comply with the Permit to Take Water (PTTW) for monitoring of ESC.
4.0	**Groundwater and Surface Water**	MECP	4.1	• Work within or immediately adjacent to any body of water or regulated area, including construction dewatering and sediment and erosion controls, will occur in accordance with a PTTW Category 3 for dewatering activities. activities for this project.

			4.2	• Construction dewatering rates will be documented on a daily basis on all days when pumping of water or any type of dewatering will choose a methodology (using a meter or calculation method) and associated equipment, to monitor dewatering discharge rates: a) Flow meter measurements are to be checked and recorded twice daily. The flow meters are to be calibrated prior to use, and checked regularly. b) It is recommended to install an in-line mesh upstream of the flow meter to prevent sediment of granular material from obstructing the flow-meter impeller. This will minimize flow meter break-downs.
			4.3	• **Daily** inspection of the discharge system will be carried out at the discharge location to verify the dewatering discharge system is functioning as designed.
			4.4	• Construction dewatering for groundwater shall occur in accordance with O. Reg. 63/16.
			4.5	• With the exception of dewatering for surface water taking-and-returns, **construction dewatering water shall be released on the ground-surface wherever possible** and at least thirty meters from a watercourse, with appropriate sediment and erosion controls and energy dissipation measures.
			4.6	• Water samples must also be collected for laboratory analyses in the event of a visible sheen or odour, suggesting impacted water quality. Water samples should be analyzed for concentrations of general inorganics, metals, Volatile Organic Compounds, and Petroleum Hydrocarbons, on a rush turnaround basis.
			4.7	• Construction dewatering discharge water, following any on-site treatment, will be released to surface water only if applicable water quality regulatory criteria are met, as indicated in Item below.

			4.8	• Any groundwater/surface water interference complaints or incidents (water quality or quantity) will be promptly investigated. Nearby residents will be provided with a responsible contact, to which any water related complaints may be reported, throughout the construction period.
			4.9	• Dewatering activities shall conform to Ontario Provincial Standard Specifications and will be bound by the PTTW Category 3 requirements.
			4.10	• The Contractor shall possess a plan demonstrating the Environmental Incidents must be managed to satisfy the requirements of the General Conditions in the contract.
5.0	**Contamination**	MECP	5.1	• Any vanadium impacted soils that are excavated will be managed and disposed of appropriately with due regard to environmental and health and safety regulations. All contaminated soils in areas that were identified during the detailed contamination investigations that are impacted by construction will be managed, and disposed of off-site at a MECP licensed landfill and treatment facility, as required.
			5.2	• It is recommended that the vanadium impacted excess soil be managed within the MTO right-of-way (ROW) lands subject to the criteria noted below: ○ The receiving lands are greater than 30 metres from a surface water body; ○ The overburden at the receiving lands is greater than 2 metres below ground surface; ○ The existing soil at the receiving lands has similar elevated levels of vanadium; and ○ The excess soil is geotechnically suitable (meets the project requirements) to be placed at the receiving lands. • If the above recommendation is not possible, the excess vanadium impact soil can be placed outside of the above-noted boundary conditions subject to a Screening Level Risk

				Assessment to identify and assess the potential human and ecological risks of placement of such soil at the identified receiving site(s); or the vanadium impacted soil can be disposed of at a MECP licenced landfill with a valid Environmental Compliance Certificate to receive such soil.
6.0	**Rock Blasting**	MECP Ministry of Labour	6.1	• Prior to blasting rock blasting completed for MTO highway construction contracts follow strict limits for noise and vibration produced from blasting which are set and regulated by the Ministry of Labour and the Ministry of the Environment, Conservation and Parks. Prior to blasting, the Contractor must prepare and submit a detailed rock blast plan that will address a wide range of requirements (e.g. pre-blast surveys for buildings, means to control fly rock, blast vibration monitoring, etc.).
7.0	**Mineral Aggregates**	MTO	7.1	• In accordance with the *Aggregate Resources Act*, MTO will review possible environmental concerns associated with aggregate operations (excluding commercial licensed operations) expressed by Government Agencies, local municipalities and the public, when applicable to site-specific projects.
8.0	**Management of Excess Materials**	MECP	8.1	• Management of excess soil to be generated will be outlined in the Contact Documents.
			8.2	• Excess soil will be re-used within the project area, however if excess soil cannot be deposited at an intended reuse site, disposal at a receiving site will have to be assessed and follow O. Reg. 406/19, including development of a tracking system for excess soil movement.
			8.3	• Should excavated soil need to be stockpiled on-site prior to off-site disposal, measures must be taken to prevent contamination of the land upon which any stockpiled soil is packed. Preference is given to placing any soil or excavated materials on polyethylene sheeting; however, where this is not

				feasible, the underlying in-situ soil will require analytical testing after the stockpiles are removed.
			8.4	• The Highway 11/17 Realignment and Expansion work areas should be restored to a condition that is safe and meets the Ministry's requirements. This may include: ○ Backfilling excavations with suitable imported fill as indicated above; and, ○ Site grading, including placement and compaction of clean fill in accordance with the geotechnical and engineering requirements.
			8.5	• All excess materials may be reused or recycled. Inside the right-of-way, materials such as asphalt, concrete, swamp material, wood, earth and rock may be reused as a construction material or managed as fill. Materials also may be temporarily stockpiled in preparation for these uses.
			8.6	• Management of excess materials outside the right-of-way, stockpiling and wood management depends on local circumstances, in agreement with property owners and responsible authorities. • Where required (based on property negotiations between MTO and private owners), the Contractor will be required to cut and stockpile wood (cut trees) on the owners' properties.
9.0	**Noise**	MECP Municipalities Residents	9.1	General construction measures, setbacks from Noise Sensitive Areas (NSAs), timing constraints, or specific scheduling of construction activities where required and where practical, must be included in the Contract Documents.
			9.2	• The Contractor must be required to keep the idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities.
			9.3	• If complaints regarding construction noise arise during construction, they will be investigated according to the provisions of the MTO Noise Guide (October 2006).

10.0	**Air Quality and Dust**	MECP Municipalities Residents	10.1	• Excavation using methods to minimize raising dust from construction operations;
			10.2	• Dust and particulate control measures during construction in accordance with applicable regulations;
			10.3	• Limited vehicle speeds on-site to reduce the generation of dust from traffic;
			10.4	• Positive means to prevent airborne dust from dispersing into atmosphere;
			10.5	• Appropriate covers on trucks hauling impacted and fine or dusty material;
			10.6	• Grading of truck surfaces, as required, to minimize the accumulation of surface silt. Paved surfaces on adjacent streets should be swept regularly to control dust;
			10.7	• Prevent dust from spreading to adjacent property sites; and
11.0	**Archaeology**	MTO MHSTCI	11.1	• The Contractor is bound by the General Conditions of the Contract related to Archaeology.
12.0	**Construction Staging and Traffic Management**	Residents	12.1	• Full mainline closures are not anticipated (i.e. one lane of traffic in each direction on Highway 11/17 will be maintained at all times during construction).
			12.2	• Localized single lane, two-way traffic operations under flagging along Highway 11/17 may be required at the tie-ins at the east and west project limits on occasion.
			12.3	• Access to side roads will be maintained for the majority of the construction, and short-term closures (e.g. 1-2 days) may be required to tie-in realigned side roads to existing roads. Detours will be signed in advance of the localized closures.
			12.4	• The Contractor will notify impacted property owners or stakeholders of any temporary road closures in advance of the closure.
13.0	**Emergency Access**	Municipalities Residents	13.1	• Local municipalities, local medical services, and Ontario Provincial Police will be notified of the final construction staging plan, start of construction, temporary road closures,

		OPP ES		etc. to minimize delay to emergency response times during and after construction.
14.0	**Utilities**	MTO UTIL	14.1	• Utility conflicts with Bell Canada, Hydro One, TC Energy were identified. • Utility relocations are anticipated to be completed in advance of construction.

5 MONITORING

On-site construction administration / inspection staff (retained by MTO) will ensure that the environmental protection measures outlined in this report are carried out.
If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation will be changed or modified to reduce those impacts. the Contract Administrator is retained by the Ministry to oversee construction and ensure the Contractor adheres to contract specifications, ministry and external policies and legislation, including environmental regulations. During construction, the on-site Contract Administrator ensures that implementation of mitigating measures and key design features are consistent with the contract and external commitments. In addition, the effectiveness of the environmental mitigating measures is assessed to ensure that:

- Individual mitigating measures are providing the expected control and/or protection;
- Composite control and/or protection provided by the mitigating measures is adequate; and
- Additional mitigating measures are provided, as required, for any unanticipated environmental problems that may develop during construction.

General Environmental monitoring will be required by the Contractor throughout the duration of construction, particularly in high risk areas. Where work in and in close proximity to fisheries watercourses is required, a Fisheries Contract Specialist will be on site to oversee the work.

On-site construction administration staff will ensure that the environmental measures outlined in the contract are carried out. Post-construction monitoring will be carried out as required. In the event that problems occur, the MTO Environmental Section and appropriate provincial ministries and/or agencies will be contacted to provide additional input and recommendation.