

July 14, 2016

BY COURIER & RESS

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

**Re: Union Gas Limited (“Union”)
Sudbury Maley Replacement Project
EB-2016-0222**

Enclosed please find two copies of Union’s Application and pre-filed evidence for the above-noted project.

In the event that you have any questions on the above or would like to discuss in more detail, please do not hesitate to contact me.

Yours truly,

[original signed by]

W.T. (Bill) Wachsmuth, RPF
Senior Administrator, Regulatory Projects
:sb
Attach.

cc: P. Duguay
Z. Crnojacki

ONTARIO ENERGY BOARD

IN THE MATTER OF The Ontario Energy Board Act,
1998, S.O. 1998, c.15, Schedule B, and in particular, s.90
thereof;

AND IN THE MATTER OF an Application by Union Gas
Limited for an Order granting leave to construct a natural
gas pipeline and ancillary facilities in the City of Greater
Sudbury.

UNION GAS LIMITED

1. Union Gas Limited (the “Applicant”) hereby applies to the Ontario Energy Board (the “Board”), pursuant to Section 90(1) of the Ontario Energy Board Act (the “Act”), for an Order granting leave to construct approximately 2800 metres of NPS 12 natural gas pipeline in the City of Greater Sudbury.
2. Attached hereto as Schedule “A” is a map showing the general location of the proposed pipeline and the municipalities, highways, railways, utility lines and navigable waters through, under, over, upon or across which the proposed pipeline will pass.
3. The construction of the Proposed Pipelines will ensure the continued reliable, safe delivery of natural gas and meet the growing demands for natural gas in The City of Greater Sudbury.
4. The Applicant requests that this Application be dealt with in accordance with Section 32 of the Board’s Rules of Practice and Procedure for written hearings.

5. The Applicant now therefore applies to the Board for an Order granting leave to construct the proposed pipeline as described above.

Dated at Municipality of Chatham-Kent this 14th day of July, 2016.

[original signed by]

Per: W.T. (Bill) Wachsmuth, RPF
Senior Administrator, Regulatory Projects
Union Gas Limited

Comments respecting this Application should be directed to:

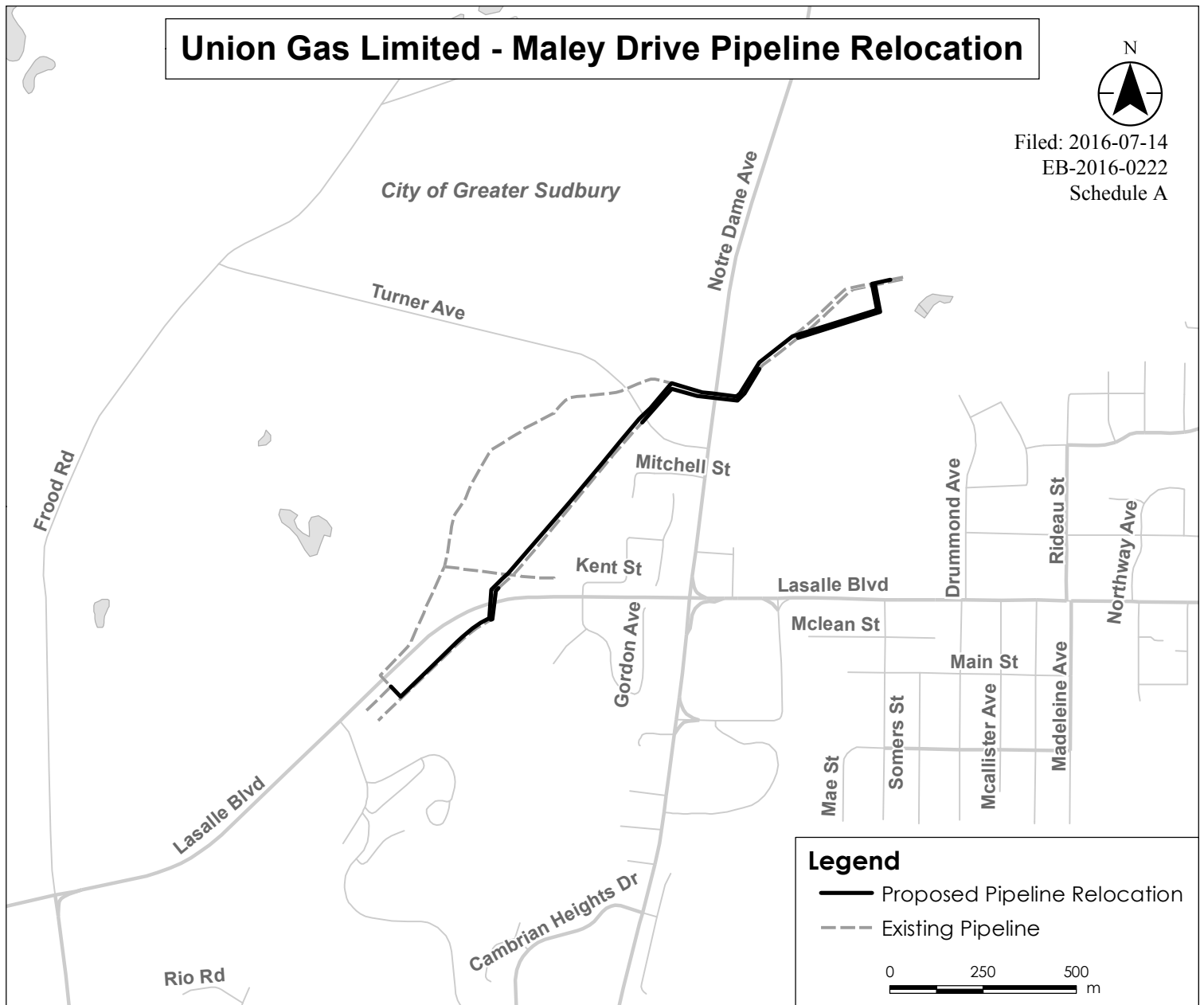
W.T. (Bill) Wachsmuth, RPF
Senior Administrator, Regulatory Projects
Union Gas Limited
50 Keil Drive North
Chatham, Ontario
N7M 5M1
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Union Gas Limited - Maley Drive Pipeline Relocation



Filed: 2016-07-14
EB-2016-0222
Schedule A



SUDBURY MALEY REPLACEMENT PROJECT

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Project Summary

1. The City of Greater Sudbury (“City” or “Sudbury”) is proposing to construct a four lane extension of Maley Drive in Sudbury. The City is proposing to commence this work in 2016 and it is to be completed by 2019. In order to facilitate the construction of the roadways the City requires that Union Gas Limited (“Union”) relocate those portions of its NPS 10 and NPS 12 Sudbury Laterals pipelines (“Sudbury Laterals”) in areas where there are conflicts between the new location of the Maley Drive and the current location of the pipelines.

2. Union is proposing to replace and upsize approximately 1955 metres of NPS 10 pipeline and replace 854 metres of NPS 12 pipeline in 2016 and 2017. The general location of the proposed new pipelines is shown on Schedule 1.

Background

3. The Sudbury Laterals connect the City of North Bay and the Town of Marten River with Sudbury and Espanola. They provide natural gas service along their routes from the TCPL system to Sudbury and beyond Sudbury to the Town of Espanola. The original NPS 10 lateral pipeline was constructed in 1958 and the installation of the NPS 12 pipeline was started in the 1970’s and continued over a number of years. A map showing the location of the Sudbury Laterals can be found on Schedule 2.

4. Sudbury first approached Union with plans for roadway upgrades in 2009. Union filed an application with the Ontario Energy Board (“OEB”) EB-2010-0154 in April 2010 to replace these pipelines, however, the project was deferred due to lack of funding.

1
2 5. Sudbury again approached Union about relocating its facilities in 2015. Sudbury now has the
3 Federal and Provincial funding in place to complete the Maley Project. With the funding in
4 place Sudbury provided Union, with two move orders, dated April 22, 2016, a copy of each is
5 attached as Schedule 3.

6
7 6. The move orders given to Union by the City require a short section of pipe to be replaced in
8 2016, and the majority of the work to be completed in 2017. In order to comply with the 2016
9 move order Union proposes to construct a short section of pipeline crossing Notre Dame
10 Avenue in 2016. This pipe would only be placed in service if the Board approves this
11 application. If the Board does not approve this application the costs associated with the 2016
12 construction would not become part of Union's next rate application.

13
14 Proposed Facilities

15 7. A drawing showing the existing and proposed pipeline systems in the area of conflict are
16 identified on Schedules 4.

17
18 8. Union reviewed the proposed growth forecasts for the Sudbury area to determine if increasing
19 the size of these pipelines would be a benefit to the system. Based on proposed growth, in
20 Sudbury and the surrounding area it was determined to increase the size of the NPS 10
21 pipeline to NPS 12 throughout the entire area. This is consistent with previous Union Gas
22 projects in the Sudbury area. It was determined that the NPS 12 pipe would be replaced size
23 for size, and that upsizing this pipeline was not required.

9. Union's plan is to replace and upsize the NPS 10 pipeline with approximately 1955 metres of NPS 12 pipeline. Union's plan is to replace the existing NPS 12 pipeline with approximately 854 metres of NPS 12 pipeline. The proposed plan is the most efficient method to relocate and upsize the pipelines in the areas of conflict.

Project Costs and Economics

10. The estimated Project costs for the project are approximately \$ 6,303,741. A detailed breakdown of the costs that will be incurred in 2016 and 2017 can be found at Schedule 5.

11. A Discounted Cash Flow report has not been completed for this Project as the Project is underpinned by the move order received from the City of Sudbury which requires relocation of the pipelines.

Design and Construction

12. The design and pipe specifications are outlined in Schedule 6. All the design specifications are in accordance with the *Ontario Regulations 210/01* under the *Technical Standards and Safety Act 2000, Oil and Gas Pipeline Systems*. This is the regulation governing the installation of pipelines in the Province of Ontario.

13. In consideration for future potential development along the route, the proposed pipeline is designed to meet Class 3 location requirements.

14. The proposed NPS 12 pipe has an outside diameter of 323.9 mm and a minimum wall thickness of 6.4 mm. The pipe is to be manufactured by the electric resistance weld process and will have minimum specified minimum yield strength of 359 MPa. This pipe will be manufactured to the CSA Z245.1-14 Steel Line Pipe Standard for Pipeline Systems and Materials.

15. The pipeline will be hydrostatically tested in accordance with the Ontario Regulation requirements.

16. The minimum depth of cover will be in accordance with Clause 4.11 of the CSA Code Z662-15 Additional depth will be provided to accommodate existing or planned facilities.

17. Schedule 7 describes the general techniques and methods of construction that will be employed in the construction of the proposed pipelines. This schedule details the following activities; clearing, stringing of pipe, trenching, welding, backfilling and clean up. Union's construction procedures have been continually updated and refined in order to be responsive to landowner concerns and mitigate potential environmental effects related to pipeline construction.

18. Blasting is anticipated along the route. A copy of Union's blasting specifications can be found at Schedule 8.

19. Material is readily available for this Project.

20. The proposed construction schedule for 2016 and 2017 can be found at Schedule 9.

21. Any pipe that is to be abandoned in place will be abandoned in compliance with TSSA guidelines. The TSSA abandonment guidelines can be found at Schedule 10.

22. The majority of pipe will be abandoned in place with appropriate mitigation measures. Longer sections will be pigged for liquids or debris and then cut and capped at both ends. It is expected that the sections of pipe remaining in the ground will be approximately 1064 metres in length of NPS 10 and 233 metres of NPS 12. Sections of pipe in direct conflict will be removed to accommodate pipeline and road construction. 954 metres of NPS 10 pipe will be removed, and 579 metres of NPS 12 pipe will be removed. A map showing the areas where the pipeline will be abandoned in place can be found at Schedule 11.

23. As identified in Schedule 3 Sudbury provided Union with two move orders, one to be completed in 2016 and the other to be completed in 2017. In 2016, Union is proposing to install two 100 metre sections of pipeline but not tie-in these short sections of NPS 12 pipeline. This will address the conflicts between the pipeline and construction adjacent to Notre Dame Avenue. This work will be completed in 2016 so that Sudbury could begin initial work on the Maley Drive Project in the winter of 2016/2017. A map showing the location of the 2016 construction can be found at Schedule 12.

Landowners

24. There are three landowners who will be directly affected by the Proposed Project. The majority of the pipeline will be constructed in existing easements or easements obtained as part of the EB-2010-0154 Project. Schedule 13 is a listing of the permanent land rights not yet obtained by Union. Union expects to obtain these land rights in the third quarter of 2016. Schedule 13 also shows the temporary land rights required to complete the Project. Union has obtained all of the temporary rights required to construct the Project.

City of Greater Sudbury:

For the City, Union will require three different land rights:

- For sections of pipeline that will be constructed within municipal road allowances, these pipelines will be constructed in accordance with Union's franchise agreement.
- For sections of pipe on city lands outside of road allowance Union has obtained permanent easements from the City.
- Union is in the process of obtaining all of the temporary land rights from the City of Sudbury.

Union has discussed the Project with the City and they have not identified any concerns with granting Union the land rights required for this Project.

Conservation Sudbury:

For the Conservation Sudbury lands, Union will require two different land rights:

- For sections of pipe on lands owned by the Conservation Authority Union has obtained the permanent easements from the Conservation Authority.
- Union is in the process of obtaining the required temporary land rights from the Conservation Authority.

Union has discussed the Project with the Conservation Authority and they have not identified any concerns with granting Union the land rights required for this Project.

Vale Inco Limited:

For Vale Inco Limited, Union will require two different land rights:

- For sections of pipe on lands owned by the Vale Inco Limited Union has obtained some of the permanent easements necessary to construct the Project and will have the remaining easements from Vale Inco Limited by the fourth quarter of 2016.
- Union is in the process of obtaining the required temporary land rights from Vale Inco Limited.

Union has discussed the Project with Vale Inco Limited and they have not identified any concerns with granting Union the land rights required for this Project.

25. The form of easement for the new easements Union will be obtaining in 2016 and can be found at Schedule 14. The form of easement being used for this project is the same easement that was approved for the Panhandle Relocation project (EB-2015-0366).

26. Union will implement a Lands Relation Program to keep the landowners informed about the project. This program will provide the municipality, and the directly affected landowners with information about construction, and access to Union construction personnel in the event that issues arise during construction.

Environmental

27. The City has completed an Environmental Assessment for the proposed road work. This report identified environmental features in the proposed construction zone and the mitigation measures that the City proposes to implement. As Union's work will be completed in the construction zone identified in the study completed by the City, the features identified in the City's report will also be impacted by the work Union is required to complete.

28. In addition, Union commissioned Stantec Consulting to update a previous Environmental Review written in 2010 as well as a review of the environmental documents prepared by the City. Union has completed an Environmental Protection Plan ("EPP") for the proposed facilities dated July 2016 which can be found at Schedule 15. Stantec Consulting has completed an Environmental Review ("ER") on the environmental features found in the project area with the report forming part of the EPP. The results of the ER indicate that the proposed facilities are environmentally acceptable. Union believes that following its standard construction practices and adhering to the mitigation measures identified in the ER, construction of this project will have negligible impacts on the environment.

29. Union will obtain all necessary environmental permits from the Ministry of Natural Resources and Conservation Sudbury where necessary prior to construction.

30. Some of the environmental features that will be encountered during pipeline construction and the proposed mitigation measures that will be implemented can be found in the EPP at Table 1.

31. By following Union's standard construction practices, and the mitigation measures identified in the environmental checklist, the Stantec report, and the measures identified at Table 1 of the EPP there will be no long term significant negative environmental impacts.

First Nations and Métis Consultation

32. Union has a long standing practice of consulting with First Nations and Métis, and has programs in place whereby Union works with them to ensure they are aware of Union's projects and have the opportunity to participate in both the planning and construction phases of the project.

33. Union has an extensive data base and knowledge of First Nations and Métis organizations in Ontario and consults with the First Nation Métis Communities and the data bases of the Ontario Ministry of Aboriginal Affairs and the Federal Department of Aboriginal Affairs and

Northern Development Canada to ensure consultation is carried out with the most appropriate groups.

34. Union has signed a General Relationship Agreement with the Métis Nation of Ontario which describes Union's commitments to the Métis when planning and constructing pipeline projects.

35. The following First Nations and Métis were notified of the Project.

Chief Ted Roque	Wahnapitaie First Nation
Chief Steve Miller	Whitefish First Nation
Councillor Juliette Denis	Region 5 Métis Nation of Ontario
Steve Sarrazin	LRC Coordinator Sudbury Métis Nation of Ontario

36. Union will continue to meet and consult with the First Nations and the Métis organizations noted above.

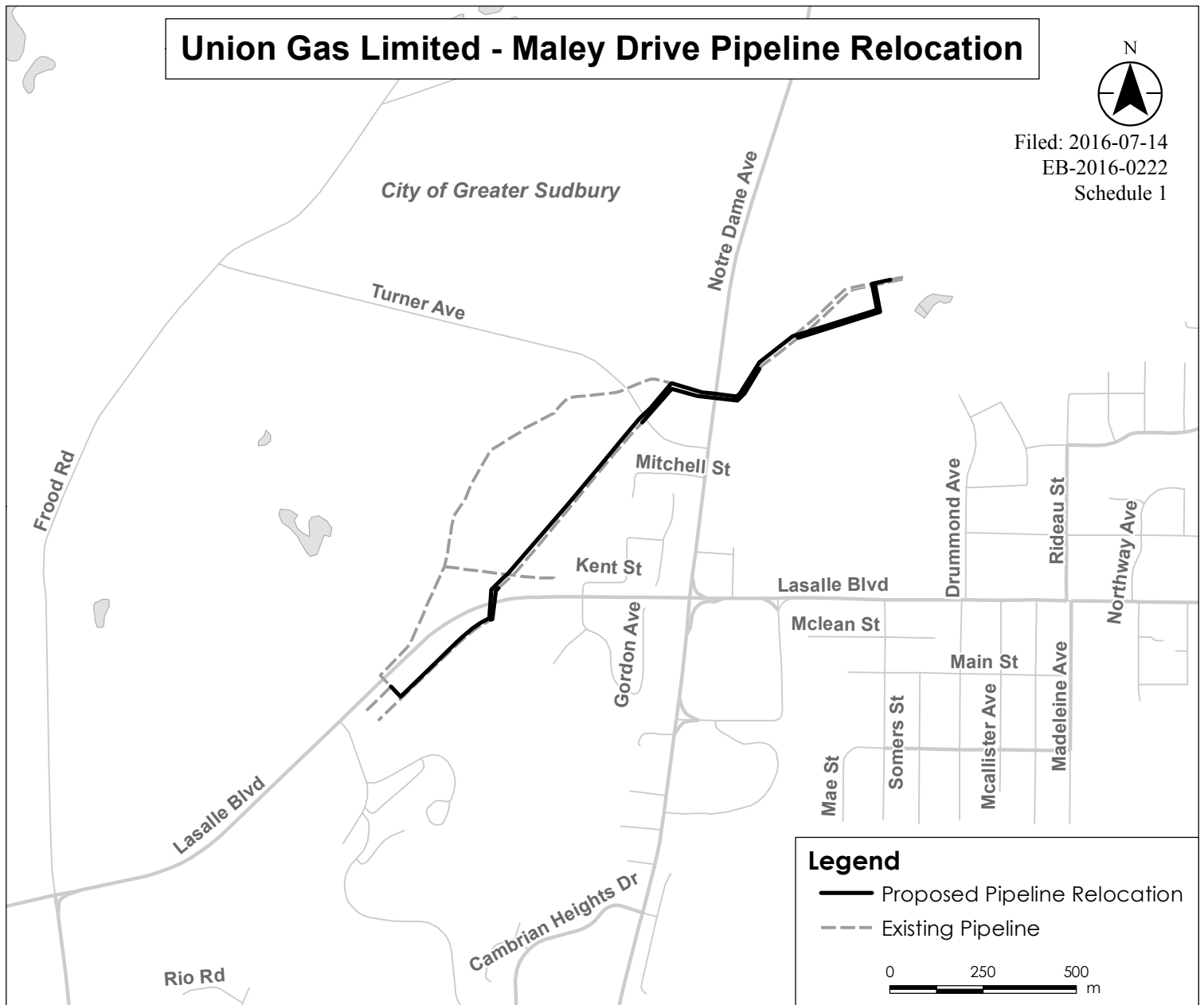
37. During construction, Union has inspectors in the field who are available to First Nations and Métis organization as a primary contact to discuss and review any issues that may arise during construction.

38. When Union completes the necessary archaeological assessments for the project Union will consult with and provide the result of the surveys to any First Nations or Métis upon their request.

Union Gas Limited - Maley Drive Pipeline Relocation

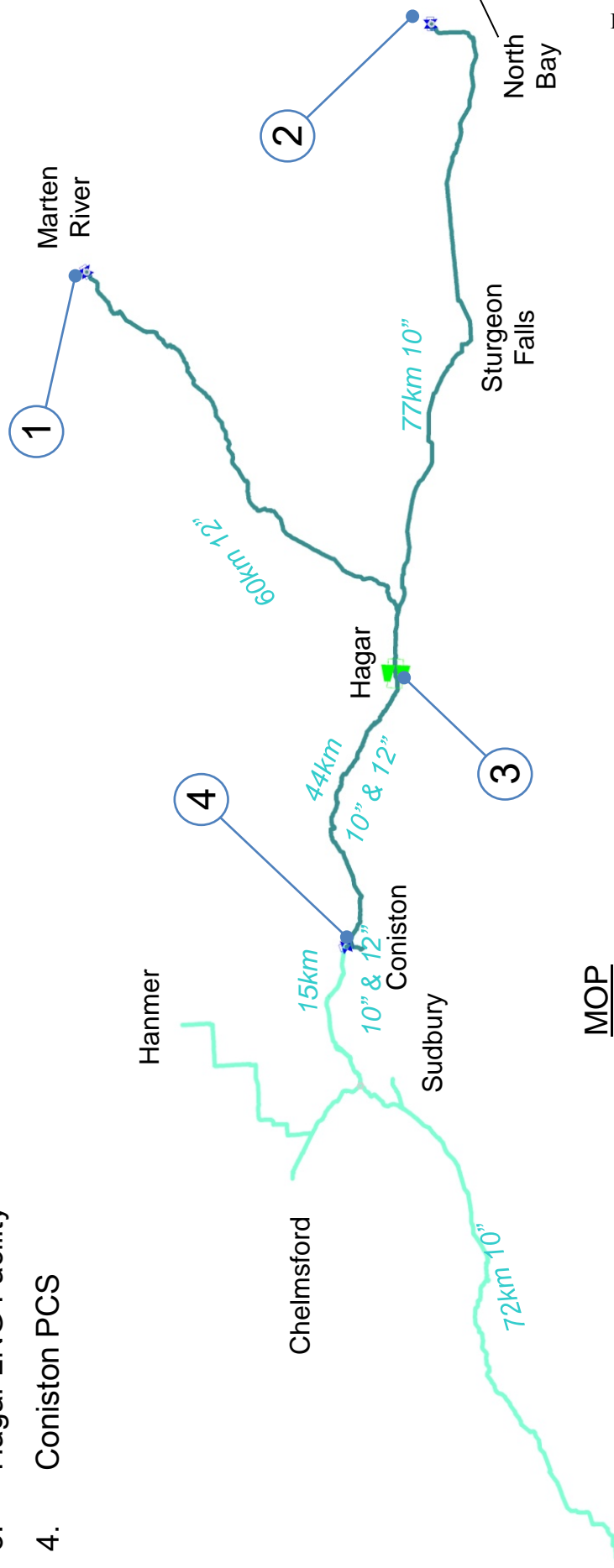


Filed: 2016-07-14
EB-2016-0222
Schedule 1



Sudbury System Overview

1. Marten River Control Valves
2. North Bay Control Valves
3. Hagar LNG Facility
4. Coniston PCS



MOP
- 6895 kPa upstream of Coniston
- 3725 kPa downstream of Coniston



Project Relocation Request

Dated: April 18, 2016

Project Name / Number: City of Greater Sudbury - Maley Dr Extension and Widening Project

Relocation Requested by: City of Greater Sudbury - David Shelsted

Project Description:

Notre Dame crossing relocation due to conflict with the Notre Dame Avenue Realignment and Interchange Structure

Description of Union Gas facilities requiring relocation:

NPS10 (105m) & NPS12 (79m) Transmission lines operating at 3723kPa

Projected Start Date of Union Gas Construction:

Summer/Fall 2016

Projected duration of Union Gas Construction:

2 months

Originated by: Chris Ridler Union Gas Project Manager, Construction

Cost estimate for above work:

City of Greater Sudbury's estimated contribution for this project is \$296,207.00

Final invoicing will be based on actual project total cost plus HST.

It is hereby requested the above noted Union Gas Facilities be relocated.

Please sign and return by April 22, 2016 to the Union Gas Project

Manager at Chris Minor - cminor@uniongas.com

Approved Signature: _____

A handwritten signature in blue ink, appearing to read "David Shelsted", written over a horizontal line.

Dated: _____

A handwritten date in blue ink, "Apr. 22/16", written over a horizontal line.



Project Relocation Request

Dated: April 18, 2016

Project Name / Number: City of Greater Sudbury - Maley Dr Extension and Widening Project

Relocation Requested by: City of Greater Sudbury - David Shelsted

Project Description:

Relocate remaining sections of Natural Gas pipeline in conflict with the Maley Dr Extension and Widening Project

Description of Union Gas facilities requiring relocation:

NPS10 (1531m) & NPS12 (483m) Transmission lines operating at 3723kPa

Projected Start Date of Union Gas Construction:

Upon approval from the Ontario Energy Board (anticipated in 2017), this estimate does not include winter construction.

Projected duration of Union Gas Construction:

4-5 months

Originated by: Chris Ridler Union Gas Project Manager, Construction

Cost estimate for above work:

City of Greater Sudbury's estimated contribution for this project is \$4,432,720.00
This cost does not include the Notre Dame Crossing Relocation

Final invoicing will be based on actual project total cost plus HST.

It is hereby requested the above noted Union Gas Facilities be relocated.

Please sign and return by April 22, 2016 to the Union Gas Project

Manager at Chris Minor - cminor@uniongas.com

Approved Signature: David Shelsted

Dated: Apr 22/16

TOTAL ESTIMATED PIPELINE CAPITAL COSTS – 2017 CONSTRUCTION

Maley Drive Extension

Pipeline and Equipment

NPS 12 Steel Pipe and Miscellaneous Material	\$	355,912
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Total Pipeline and Equipment

\$355,912

Construction and Labour

Replace 1,890 m of NPS 10 with NPS 12

Replace 789 m of NPS 12 with NPS 12 (Contract Labour and Equipment)	\$	4,241,461
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Company Labour, Inspection, X-Ray, Construction Survey, Legal, Environmental, and Permitting	\$	593,170
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Easements, Lands, Restoration & Regulatory	<u>\$</u>	<u>119,150</u>
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Total Construction and Labour

\$ 4,953,781

Subtotal Estimated Pipeline Capital Costs - 2017 Construction

\$ 5,309,693

Contingencies

\$ 639,442

Total Estimated Pipeline Capital Costs - 2017 Construction

\$ 5,949,135

TOTAL ESTIMATED PIPELINE CAPITAL COSTS

2016 Sudbury Replacement- Notre Dame Crossing

Pipeline and Equipment

NPS 12 Steel Pipe and Miscellaneous Material	\$	17,270
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Total Pipeline and Equipment		\$ <u>17,270</u>
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Construction and Labour

Replace 65 m of NPS 10 with NPS 12

Replace 65 m of NPS 12 with NPS 12 (Contract Labour and Equipment)	\$	271,727
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Company Labour, Inspection, X-Ray, Construction Survey, Legal, Environmental, and Permitting	\$	28,730
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Easements, Lands, Restoration & Regulatory	\$ <u>5,850</u>	
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Total Construction and Labour		\$ <u>306,307</u>
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Subtotal Estimated Pipeline Capital Costs - 2016 Construction		\$ 323,577
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Contingencies	\$	<u>31,029</u>
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Total Estimated Pipeline Capital Costs - 2016 Construction		\$ <u>354,606</u>
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Sudbury Maley Drive Project DESIGN AND PIPE SPECIFICATIONS

Design Specifications: NPS 12

Class Location (existing)	-	Class 2&3
Design Class Location	-	Class 3
Design Factor	-	0.8
Location Factor (Road)	-	0.625
Maximum Design Pressure	-	6895 kPa
Maximum Operating Pressure	-	3723 kPa (current) 6895 kPa (future)
Test Medium	-	Water
Test Pressure	-	9653 kPa
Valves/Fittings	-	PN 100
Minimum Depth of Cover (Road)	-	1.2 m

Pipe Specifications:

Size	-	NPS 12
Outside Diameter	-	323.9 mm
Wall Thickness	-	6.4 mm
Grade	-	359 MPa
Type	-	Electric Resistance Weld
Description	-	C.S.A. Standard Z245.1-14
Category	-	Cat. I, M5C
Coating	-	FBE, Dual Layer FBE
% SMYS	-	49% at design & future MOP

GENERAL TECHNIQUES AND METHODS OF CONSTRUCTION

1. Union Gas Limited (“Union”) will provide its own inspection staff to enforce Union’s construction specifications and *Ontario Regulation 210/01 under the Technical Standards and Safety Act 2000, Oil and Gas Pipeline Systems*.
2. Pipeline construction is divided into several crews that create a mobile assembly line. Each crew performs a different function, with a finished product left behind when the last crew has completed its work.
3. Union’s contract specifications require the contractor to erect safety barricades, fences, signs or flashers, or to use flag persons as may be appropriate, around any excavation across or along a road.
4. It is Union’s policy to restore the areas affected by the construction of the pipeline to “as close to original condition” as possible. As a guide to show the “original condition” of the area, photos and/or a video will be taken before any work commences. When the clean-up is completed, the approval of the landowner or appropriate government authority is obtained.
5. Construction of the pipeline includes the following activities:

Locating Running Line

6. Union establishes the location where the pipeline is to be installed (“the running line”). For pipelines within road allowances, the adjacent property lines are identified and the running line is set at a specified distance from the property line. For pipelines located on private easement, the easement is surveyed and the running line is set at the specified distance from the edge of the easement. The distance from the start of the pipeline (or other suitable point) is marked on the pipeline stakes and the drawings.

Clearing and Grading

7. The right-of-way is prepared for the construction of the pipeline. When required, bushes, trees and crops are removed and the ground leveled. When required, the topsoil is stripped and stored, and/or sod is lifted.

Removing Existing Pipeline

8. The existing trench is excavated exposing the existing pipeline. The spoil material is placed onto the easement, separate from the topsoil. The majority of the existing NPS 10 pipeline will be abandoned in place. Where the NPS 10 pipe is removed new NPS 12 will be installed.

Abandoning Existing Pipeline

9. The existing pipe within road allowance and in environmentally sensitive areas can be abandoned in place. The abandoned sections within road allowances are capped and filled with grout, a low density concrete. The abandoned sections outside of road allowances will be pigged, purged and cut into sections and abandoned in place as per Union Gas specifications.

Stringing

10. The joints of pipe are laid end-to-end on supports that keep the pipe off the ground to prevent damage to the pipe coating.

Welding

11. The pipe is welded/fused into manageable lengths. The welds in steel pipe are radiographically inspected and the welds are coated.

Backfilling

12. Pipe may be installed using either the trench method or the trenchless method. All utilities that will be crossed or paralleled by the pipeline within the identified construction area will be located by the appropriate utility owner prior to installing the pipeline. Prior to construction, all such utilities will be hand-located or hydro vacuumed to identify their location.

Trench Method: Trenching is done by using a trenching machine, backhoe or excavator depending upon the ground conditions. Provisions are made to allow residents access to their property, as required. All drainage tiles that are cut during the trench excavation are flagged to signify that a repair is required. All tiles are measured and recorded as to size, depth, type and quality. This information is kept on file with Union. If a repair is necessary in the future, Union will have an accurate method of locating the tile. For steel pipe the pipe coating is then

inspected and tested using a high voltage electrical tester as the pipe is lowered into the trench. All defects in the coating are repaired before the pipe is lowered in. Next, the trench is backfilled using suitable material such as sand or other approved material as per Union Gas specifications. After the trench is backfilled, drainage tile is repaired as applicable.

Rock Excavation: Rock in solid beds or masses will be fractured and removed using either a “Hoe Ram” and/or an approved blasting method. The blasting will be permitted in accordance with Union’s construction procedures and the *Canadian Explosives Act*. The contractor shall obtain all necessary permits and shall comply with all legal requirements in connection with the use, storage and transportation of explosives as well as abiding by Union Gas’ specifications for rock excavation.

Trenchless Method: Trenchless methods are alternate methods used to install pipelines under railways, roads, sidewalks, trees and environmentally sensitive areas and water courses. The trenchless method proposed for installing the NPS 12 pipeline is directional drilling. This method involves setting up a receiving hole and an exit hole, drilling a pilot hole on the design path, reaming the pilot hole larger by passing a cutting tool and pulling the pipe back through the bored hole.

Tie-Ins

13. The sections of pipelines that have been buried using either the trench or trenchless method are joined together (tied-in).

Cleaning and Testing

14. To complete the construction, the pipeline is cleaned, hydrostatically tested with water in accordance with Union’s specifications, dewatered and placed into service.

Restoration

15. The final activity is the restoration. The work area is leveled, the sod is replaced in lawn areas and other grassed areas are re-seeded. Where required, concrete, asphalt and gravel are replaced to return the areas to as close to the original conditions as possible.

Specification for Rock Excavation

3.10.1 Application

This specification applies to all solid rock (in its original formation) encountered in trenching for pipelines and which must be removed. Throughout this specification, all sections applicable to rock excavation using the Swartklip Boulder Buster are identified with the statement “applicable to the Swartklip Boulder Buster.”

3.10.2 EHS References

- Construction Regulations, Sections 196-206

3.10.3 General Requirements

Exercise great care to prevent damage to underground structures such as cables, conduits, and pipelines, water wells, springs and other underground water courses. Consult Environmental Construction Permitting when blasting near water courses. If the techniques of the Contractor appear to be injurious to these installations or formations, the Company maintains the right to require the cessation of work.

Solid rock, as classified by the Engineer, will be removed to a depth of 100 mm below the standard ditch depth to allow for padding between the rock and the pipe. The excavated ditch will be padded to a minimum thickness of 100 mm with earth, sand (free from rock), or other protective material approved by the Engineer. The padding material is to be placed in the trench in such a manner as to protect the pipe and the pipe coating from any hard points of rock. Use rockshield in locations designated by the Engineer.

Applicable to the Swartklip Boulder Buster - All Boulder Buster Operators must be certified and must carry proof of such certification while operating this equipment.

3.10.4 Use of Explosives

3.10.4.1 General

The Engineer will be notified of the Contractor's intention to use any explosive and may give consent to such use only after careful examination of the particular site of such use. After a careful inspection of the site, if there is an existing pipeline within 30 m of any proposed blasting, Form 2707, Blasting Information Request is to be filled out for blasting approval. When it is necessary to use explosives, blasting will not be done until occupants of nearby buildings, stores, houses, places of business and landowners have been notified in writing by the Contractor sufficiently in advance to protect property and livestock. The Qualified Individual will be present during blasting.

3.10

Specification for Rock Excavation

Take every precaution to protect the public and its workers from any injury or harm which might arise from the use of explosives. Only thoroughly experienced workers in handling explosives will be permitted to supervise, handle, haul, load or detonate explosives.

Blasting is not permitted within **5 m** of an existing operating pipeline without a consultant's recommendation and Pipeline and Station Operations Engineering written approval. However, in no event will any explosives be used at a point where, in the opinion of the Engineer, the use of such explosives would be dangerous to the existing pipeline(s) of the Company. A minimum of 48 hours notice must be given to the Company so that mainline valves may be inspected for accessibility and operability before blasting.

Where specified by the Engineer, furnish the necessary equipment to employ air bubble curtains at water crossings for the protection of fish and wildlife during blasting operations.

3.10.4.2 Blasting Consultant

The Contractor will employ, at his expense, the services of a blasting specialist to advise on drilling, loading patterns, and vibration levels as necessary.

3.10.4.3 Storage and Handling

Under no circumstances will detonating caps be stored with explosives. Store detonating caps in a separate place according to applicable codes and regulations. Do not prime or fuse explosives until just before use. Under no circumstances are loaded and fused holes to be left overnight.

3.10.4.4 Flyrock and Matting

Blanket all shots using heavy duty rubber blasting mats in good condition (e.g., joined tires). Do not use mats that have suffered a significant loss of rubber laminations. Do not use overburden material and sandfill as matting material.

Keep all flyrock to an absolute minimum and do not allow flyrock to be deposited outside the right-of-way. If flyrock is scattered over the right-of-way or adjacent property, clean up such flyrock to the satisfaction of the landowner and his tenants. Haul the flyrock to a location satisfactory to the Engineer for disposal. If, in the opinion of the Qualified Individual, the amount of rock scattered over the right-of-way or adjacent property is unwarranted, the Company maintains the right to require the cessation of work.

Notwithstanding the above requirements, place the mats over the blast area with the following minimum laps:

1. Within 50 metres of any house, building, structure, hydro tower, overhead wire or parked car, the mats will be double layered with lapped joints.
2. Use a 25% (minimum) lap at each abutting mat elsewhere.

Construction and Maintenance Manual

Specification for Rock Excavation

Lay additional mats, as necessary, to control flyrock and to protect seismographic equipment at blast monitoring locations.

3.10.4.5 Warning Signals

Give distinct warning signals with an air horn during all blasting.

- Give five short signals to warn of pending detonation and need to clear the area.
- Give three short signals immediately before the blast.
- Give one long signal after the blast to indicate the safe completion of the blast.

3.10.4.6 Blasting

Do not blast before 8:00 am or after 7:00 pm, nor on Sundays and Statutory Holidays. In addition, do not start loading for any blast unless the loading can be completed and the blast matted and detonated no later 7 pm.

3.10.4.7 Vibration Limits

During all blasting operations, the Contractor will limit the ground vibration operated by each blast to the following limits:

- Where blasting is occurring within 30 m of an existing operating pipeline, the vibration will be controlled to a maximum peak particle velocity (PPV) of 50 mm/s above the pipeline.
- Where blasting is occurring within 200 m of any structure and any other sites as required by the Company, the peak particle velocity will not exceed 50 mm/s.
- In ground adjacent to concrete or grout in place less than 60 hours, the peak particle velocity will not exceed 10 mm/s.

The above limits refer to the intensity of the ground vibrations generated by blasting in any of the three mutually perpendicular planes, measured at the nearest point above a line to the location of the blasting. Vibration monitoring shall be supplied by the contractor at his expense.

The Contractor must submit revised blasting patterns to the Company, and as set out in this specification, if unable to maintain satisfactory levels of vibration during blasting.

3.10.4.8 Monitoring Procedures for Blasting Near Existing Pipeline

The Blasting Contractor will retain the services of a Blasting Consultant to monitor vibration levels on existing Company pipelines during each blast if:

- The pipeline is greater than NPS 12; or
- The pipeline, at the time of blasting, is operating at a pressure greater than 1,723 kPa; or
- The maximum explosive charge per delay values exceed those given in Table 3.10.1.

3.10

Specification for Rock Excavation

The blasting consultant will also monitor the vibration and air overpressure levels at any nearby houses and structures within a minimum of 200 m from the blast and any other sites as required by the Company.

The monitoring equipment will consist of a portable seismograph capable of producing on-site printouts that include the following information:

- Ground vibrations up to 200 millimetres per second (mm/s) of peak particle velocity (PPV) in the three mutually perpendicular directions.
- Frequency of all three mutually perpendicular directions.

Set up the transducers at the nearest point above a line to the location of the blasting.

The Contractor will assist the blasting consultant in setting up the equipment, in the event that monitoring is required on an existing pipeline. All excavation in the vicinity of existing pipelines will be carried out in the presence of a Qualified Individual and only after the pipe location has been established by electronic means.

The printout of each seismographic reading will be given to the Qualified Individual immediately after each blast.

Table 3.10.1

Stand-off distance from facility (m)	Maximum Explosive Charge (kg per delay)
5	1.00
6	1.44
7	1.96
8	2.56
9	3.24
10	4.00
12	5.76
14	7.84
16	10.24
18	12.96
20	16.00
22	19.36
24	23.04
26	27.04
28	31.36
30	36.00

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Specification for Rock Excavation**3.10.4.9 Excessive Vibration Readings**

If there is any one seismographic reading in excess of the limits set out above, the following will apply:

1. Should any two consecutive seismographic readings fall between 50 and 80 mm/s PPV, the Blasting Contractor will cease all further blast hole loading other than those required for a third reading. The pipe will be exposed and a third reading will be taken on the pipe.
 - ♦ **If this third reading is below 50 mm/s PPV**, blasting may continue.
 - ♦ **If the third reading exceeds 50 mm/s PPV**, the Blasting Contractor will cease all blasting in the area and move to a new area and continue blasting. The Blasting Contractor will then submit a revised loading pattern to the Company for review in the area where blasting has been discontinued.
2. Should any one seismographic recording be in excess of 80 mm/s PPV, the Contractor will cease all further blast hole loading other than those required for one subsequent reading. The pipe will be exposed and the subsequent reading will be taken on the pipe.
 - ♦ **If this reading is below 50 mm/s PPV**, blasting may continue.
 - ♦ **If this reading exceeds 50 mm/s PPV**, the Contractor will cease all blasting in the area and move to a new area and continue blasting. The Contractor will then submit a revised loading pattern to the Company for review in the area where blasting has been discontinued.
3. In any area where blasting has been discontinued, blasting may only be resumed when permitted by the Qualified Individual.

3.10.4.10 Excavating and Backfill

When excavating loose rock from the trench after blasting, the Contractor must keep loose rock separate from any overburden that has previously been stripped. This can either be done by piling the overburden on the "spoil" side of the trench and the loose rock on the "work" side of the trench to be hauled out, or by piling both the overburden and the loose rock separately on the spoil side of the trench. The method to be used will depend upon the amount of overburden, width of the trench, and the type of terrain. The Qualified Individual will decide the preferred method and the material to haul away.

After backfilling operation is complete, the Contractor will remove excess material from the right-of-way. The material will be disposed of at a location satisfactory to the Engineer. This is also applicable to the Swartklip Boulder Buster.

3.10.4.11 Permits

Any permits necessary for blasting will be obtained by and at the expense of the Contractor, unless specified in the work description in the construction contract. Comply with all legal requirements in connection with the use, storage and transportation of explosives, including but not limited to the Canadian Explosives Act. Proper notification will be made to the authority having jurisdiction when required and conformance with all legal requirements will be made.

3.10

Specification for Rock Excavation

3.10.5 Damages

The Contractor will take all necessary precautions not to damage any structure owned by others. If damage should occur, the owner of the damaged structure will be contacted jointly by representatives of the Company and the Contractor and the repairs will be made at the Contractor's expense under the direction and to the satisfaction of the owner. This also includes damage to Company pipelines. This is also applicable to the Swartklip Boulder Buster.

3.10.6 Measurements

Rock removed for the clearing of right-of-way will not be considered as rock excavation.

A record of the location and quantities of all trench excavation classified as solid rock will be made for each property by the Inspector. This record will be submitted to the Contractor for acceptance and signature, after acceptable trench has been completed across the property. When signed by authorized representatives for both parties, this record will form the basis for calculating the compensation due to the Contractor for trenching in solid rock.

All areas to be considered as loose rock requiring removal by backhoe must be authorized by the Qualified Individual at the time the trench is being dug. No other areas will be considered as loose rock excavation. This is also applicable to the Swartklip Boulder Buster.

3.10.7 Basis of Payment

Solid rock excavation will be paid for at the unit price per linear metre as covered in Item 18 (a) (b) or (c) of the Schedule of Unit Prices. Loose shale rock that must be removed by backhoe will be paid for at the price per linear metre as given in item 18 (d), or (e) but will not include rock already paid for in item 18 (a), (b), or (c). Earth or sand padding in bottom of trench salvaged from spoil and disposal of rock spoils, will be considered as part of the cost of rock excavation.

2016 Maley Drive Extension Project- Notre Dame Crossing

Task Name	2016												2017											
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Environmental Report																								
Engineering																								
Pre-Construction Survey																								
Material Acquisition																								
File Application																								
OEB Approval																								
Construction Survey																								
Construction and Testing																								
Clean-up																								
In-service																								

2017 Maley Drive Extension Project

Task Name	2016												2017											
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Environmental Report																								
Engineering																								
Pre-Construction Survey																								
Material Acquisition																								
File Application																								
OEB Approval																								
Construction Survey																								
Construction and Testing																								
Clean-up																								
In-service																								



PIPELINE ABANDONMENT CHECKLIST

PLANNING

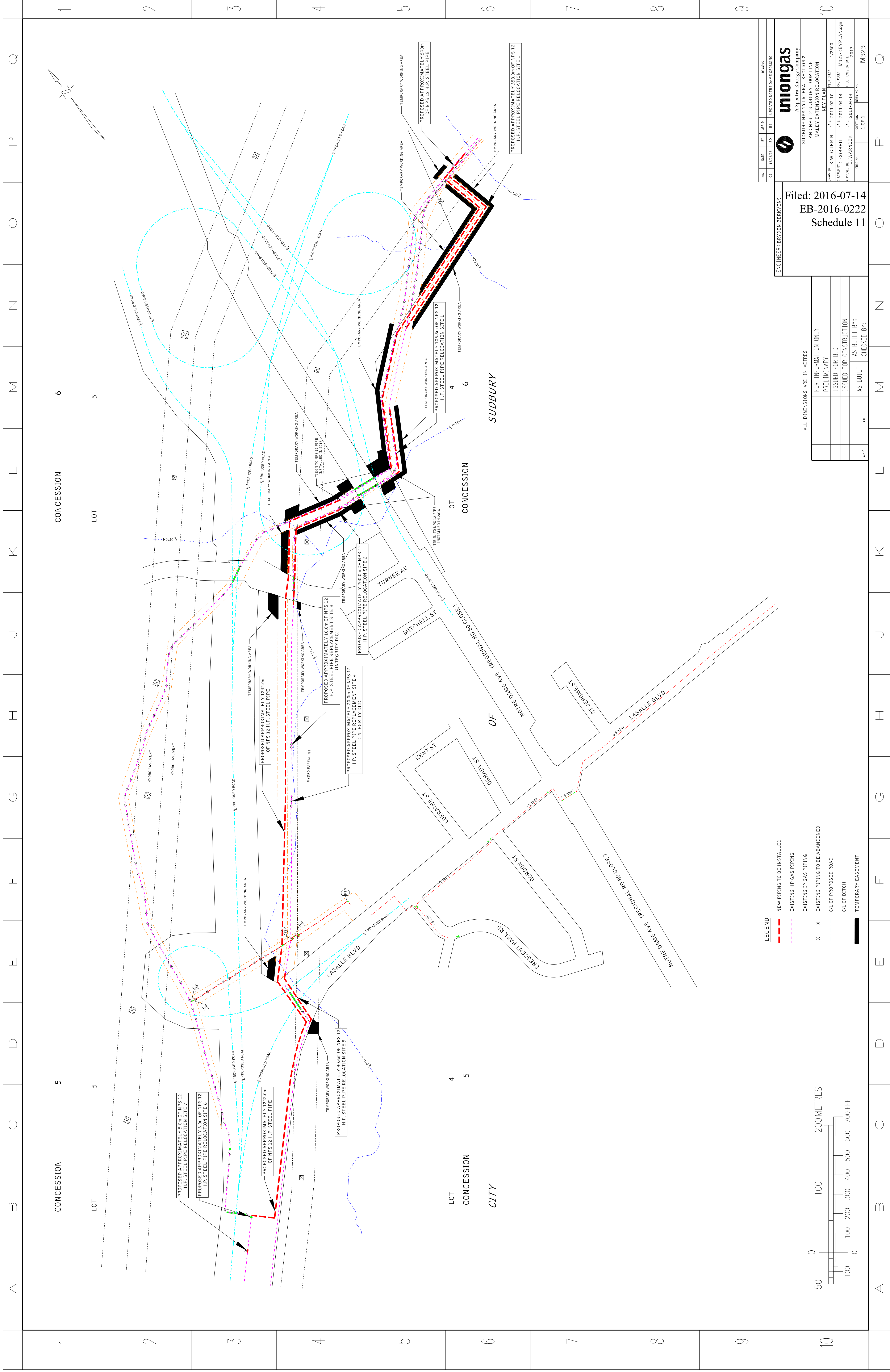
1. Has subsidence been considered for pipelines having a diameter greater than 323.9 mm (12 inches)?
2. Has the pipeline company notified the landowners and proper authorities (municipalities, MOE, MTO, MNR, etc.) of the abandonment?
3. Have abandonment procedures for crossings been agreed upon by utilities (road, railway, pipelines, etc.) and authorities responsible for rivers and streams crossed by the pipeline?
4. Has consideration been given to the effect of drainage in the area surrounding the abandoned pipeline, which may act as a conduit for ground water after the pipe is perforated by corrosion?
5. Has consideration been given to the removal of all the aboveground facilities?
6. Has consideration been given to any hazards posed to people, equipment, wildlife or livestock by any apparatus left in place above or underground?

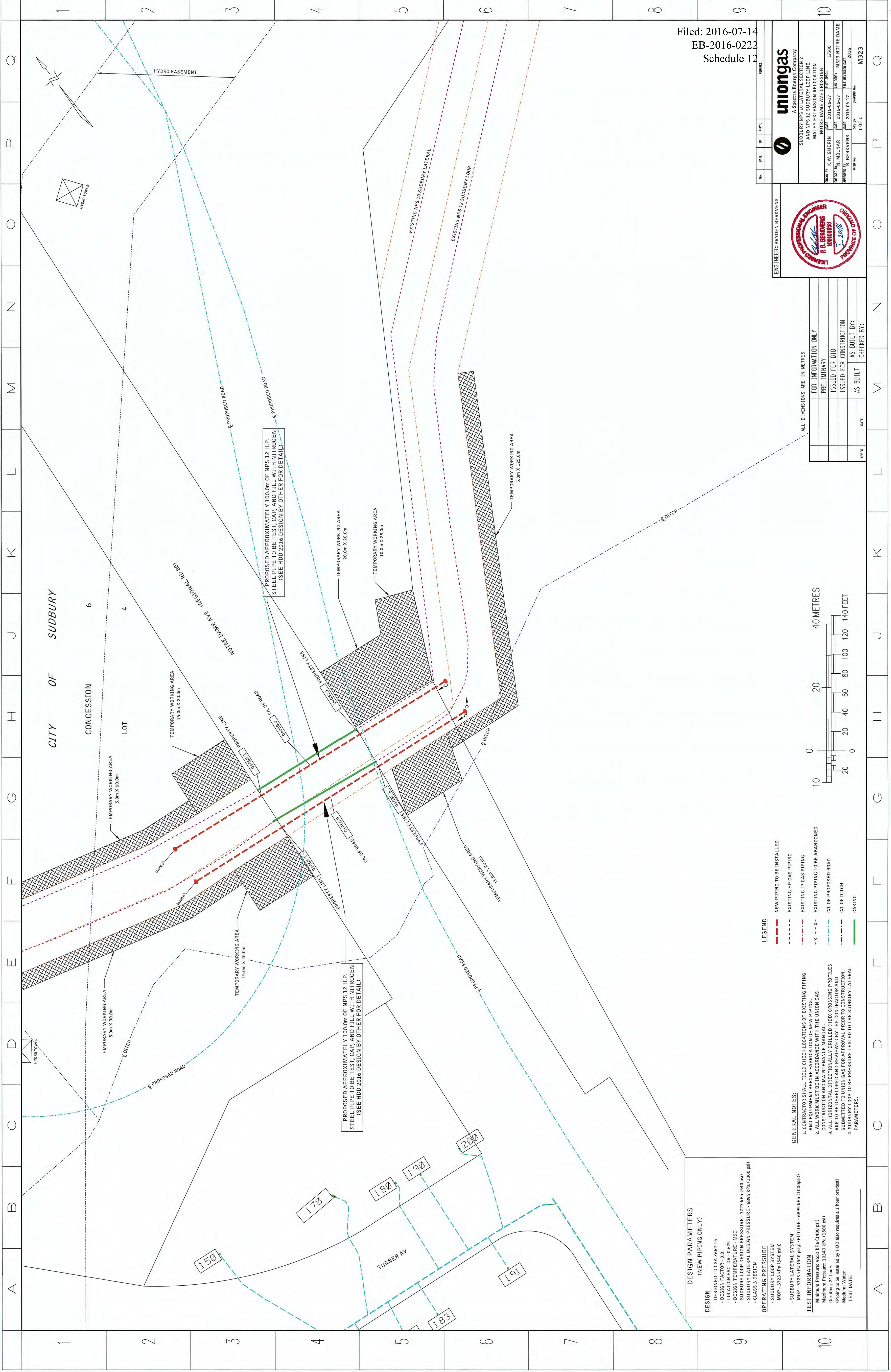
IMPLEMENTATION

1. Has the abandoned pipeline been physically isolated from the live pipeline?
2. Has the pipeline been drained of all fluids and adequately cleaned to prevent ground water contamination from hydrocarbon residue on the pipe wall after the pipe is perforated by corrosion?
3. Have all aboveground facilities been removed and has consideration been given to removing underground facilities such as anode beds and tanks?

LIABILITY/RISK MANAGEMENT

1. Does the pipeline company have a contingency plan to remedy any contamination caused by the abandoned pipeline?
2. Has consideration been given to conducting post-abandonment surveillance programs?
3. Has consideration been given to maintaining signage after the pipeline is abandoned?
4. Has consideration been given to providing a locate service after the pipeline is abandoned?





File #	PIN	NAME & ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT Dimensions (Metres) Area W x L Hectares	TEMPORARY EASEMENT Dimensions (Metres) Area W x L Hectares	MORTGAGE, LIEN/LEASE &/OR ENCUMBRANCES	REMARKS
2016 Sudbury Replacement (Maley)							
T384-012 T384-016 T380-082 T380-086 T380-095 T380-096	73601-0190(LT)		LT 4-6 CON 6 MCKIM EXCEPT PL 78S (SRO), S59181 (SRO), S69999 (SRO), S76430 (SRO), S78704 (SRO), S78878 (SRO), S96369 (SRO), S113521 (SRO), S113263 (SRO), S114221 (SRO); S/T S59888; S/T S46633 PARTIALLY RELEASED BY S58633; S/T RIGHT IN MM589; S1/2 LT 7 CON 6 MCKIM; PT LT 4 RCP 78S MCKIM SRO PT 4, 5, 6 & 7, 53R6999 & PT 1 & 2, 53R7204 EXCEPT PT 11, 53R7280; LT 41-44 RCP 78S MCKIM SRO; S/T MM1382, MM1384, MM1387, MM1388, MM1407, S114400, S45314, S51123, S58632, S62072, S67437, S75927, S95821, S95822 SUBJECT TO AN EASEMENT IN GROSS OVER PT 2, 53R19944 AS IN SD244604 SUBJECT TO AN EASEMENT IN GROSS OVER PTS 2, 3 & 4 53R20169 AS IN SD266527 SUBJECT TO AN EASEMENT IN GROSS OVER PTS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 & 11 53R20172 AS IN SD268042 CITY OF GREATER SUDBURY	15 x 559.1 0.839	5 x 305.0 0.153 5 x 200.0 0.100 5 x 125.2 0.063 10 x 25.0 0.025 5 x 25.0 0.013	(e) Union (e) Hydro (I) Lorne Investments Limited (e) The Regional Municipality of Sudbury (I) (Assignment Lease) Canada Trustco Mortgage Company	
T380-084 T380-083 T384-013	73601-0118(LT)		PT LT 4, 45-47 RCP 78S MCKIM SRO PT 1, 2, 3 & 4, 53R7280, PT 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71 53R16242; S/T MM1078, MM1387, MM1388, S96069, S96070; GREATER SUDBURY		5 x 32.7 0.016 5 x 75.9 0.038 10 x 28.0 0.028 20 x 20.0 0.040	(e) Hydro (e) Union	
T380-084 T384-013 T384-014	73601-0119(LT)		PT LT 4 RCP 78S MCKIM SRO PT 11, 53R10763; LT 45-47 RCP 78S MCKIM SRO EXCEPT 53R7280, 53R16242; S/T S106705, S96069, S96070; GREATER SUDBURY		5 x 94.7 0.047 15 x 20.0 0.030 5 x 27.3 0.014	(e) Union	

File #	PIN	NAME & ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT Dimensions (Metres) Area W x L Hectares	TEMPORARY EASEMENT Dimensions (Metres) Area W x L Hectares	MORTGAGE, LIEN/LEASE &/OR ENCUMBRANCES	REMARKS
T380-097 T380-085 T384-013	73601-0117(LT)		LT 37-38, 40 RCP 78S MCKIM SRO; PT LT 3 RCP 78S MCKIM SRO PT 7, 8, 11, 13, 14, 16, 19, 53R16162 & PT 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 29, 30, 56, 57, 58 53R16242; S/T MM1075, MM1106, MM1382, MM1384, MM1387, MM1388, MM1407, S95770, S96069; SUBJECT TO AN EASEMENT IN GROSS OVER PT LTS 37 & 38 PL 78S, PTS 1, 2 & 3 53R20168 AS IN SD271499 CITY OF GREATER SUDBURY		15 x 20.0 0.030 5 x 60.0 0.030 15 x 25.0 0.038 15 x 20.0 0.030 5 x 90.0 0.045 10 x 68.6 0.069	(e) Hydro (e) Union	
T380-086 T380-085	Road 73601-0200(LT)		LT 2 RCP 78S MCKIM SRO EXCEPT S53381; PT LT 36 RCP 78S MCKIM SRO PT 1, 53R16162 & PT 1, 53R16242; PT LT 5 CON 6 MCKIM SRO PT 1 TO 10, RD49 & PT 1 TO 5, 53R16151 AKA TURNER AV; S/T S59181; S/T MM1075, MM1077, MM1382, MM1384, MM1407, S62072; GREATER SUDBURY			(e) Hydro (e) Union	
T380-098 T384-013	73601-0146(LT)		LT 30, 36 RCP 78S MCKIM SRO, EXCEPT PT 1, 53R16162 & PT 1, 53R16242; S/T MM1077, S96069 SUBJECT TO AN EASEMENT IN GROSS OVER PT 1 53R20169 AS IN SD266518 TOGETHER WITH AN EASEMENT OVER PT LOT 4 CON 6 BEING UNIT 1 PL D242 AS IN SD297476 CITY OF GREATER SUDBURY		15 x 30.9 0.046 5 x 10.0 0.005	(e) Hydro (e) Union	
	02127-0260(LT)		PCL 33820"A" SEC SES PT LT 5, CON 5, TWP OF MCKIM, UNITS 1 - 3 PLAN D28 & UNIT 1 PLAN D51 EXCEPT PTS 1 - 4, 53R5214 S/T 269870, 398387, CITY OF SUDBURY		15 x 20.0 0.030	(e) Hydro (e) Nickel District Conversation Authority	



PIPELINE EASEMENT

(Hereinafter called the "Easement")

Between

(hereinafter called the "Transferor")

and

UNION GAS LIMITED

(hereinafter called the "Transferee")

This is an Easement in Gross.

WHEREAS the Transferor is the owner in fee simple of those lands and premises more particularly described as:

PIN:

Legal Description:

(hereinafter called the "Transferor's Lands").

The Transferor does hereby GRANT, CONVEY, TRANSFER AND CONFIRM unto the Transferee, its successors and assigns, to be used and enjoyed as appurtenant to all or any part of the lands, the right, liberty, privilege and easement on, over, in, under and/or through a strip of the Transferor's Lands more particularly described as:

PART OF THE PIN:

Legal Description:

(hereinafter called the "Lands") to survey, lay, construct, maintain, brush, clear trees and vegetation, inspect, patrol, alter, remove, replace, reconstruct, repair, move, keep, use and/or operate one pipeline for the transmission of Pipeline quality natural gas as defined in The Ontario Energy Board Act S.O. 1998 (hereinafter called the "Pipeline") including therewith all such buried attachments, equipment and appliances for cathodic protection which the Transferee may deem necessary or convenient thereto, together with the right of ingress and egress at any and all times over and upon the Lands for its servants, agents, employees, those engaged in its business, contractors and subcontractors on foot and/or with vehicles, supplies, machinery and equipment for all purposes necessary or incidental to the exercise and enjoyment of the rights, liberty, privileges and easement hereby granted. The Parties hereto mutually covenant and agree each with the other as follows:

1. In Consideration of the sum of --- XX/100 Dollars (\$) (hereinafter called the "Consideration"), which sum is payment in full for the rights and interest hereby granted and for the rights and interest, if any, acquired by the Transferee by expropriation, including in either or both cases payment in full for all such matters as injurious affection to remaining lands and the effect, if any, of registration on title of this document and where applicable, of the expropriation documents, subject to Clause 12 hereof to be paid by the Transferee to the Transferor within 90 days from the date of these presents or prior to the exercise by the Transferee of any of its rights hereunder other than the right to survey (whichever may be the earlier date), the rights, privileges and easement hereby granted shall continue in perpetuity or until the Transferee, with the express written consent of the Transferor, shall execute and deliver a surrender thereof. Prior to such surrender, the Transferee shall remove all debris as may have resulted from the Transferee's use of the Lands from the Lands and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible, save and except for items in respect of which compensation is due under Clause 2, hereof. As part of the Transferee's obligation to restore the Lands upon surrender of its easement, the Transferee agrees at the option of the Transferor to remove the Pipeline from the Lands. The Transferee and the Transferor shall surrender the Easement and the Transferee shall remove the Pipeline at the Transferor's option where the Pipeline has been abandoned. The Pipeline shall be deemed to be abandoned where: (a) corrosion protection is no longer applied to the Pipeline, or, (b) the Pipeline becomes unfit for service in accordance with Ontario standards. The Transferee shall, within 60 days of either of these events occurring, provide the Transferor with notice of the event. Upon removal of the Pipeline and restoration of the Lands as required by this agreement, the Transferor shall release the Transferee from further obligations in respect of restoration.
2. The Transferee shall make to the Transferor (or the person or persons entitled thereto) due compensation for any damages to the Lands resulting from the exercise of any of the rights herein granted, and if the compensation is not agreed upon by the Transferee and the Transferor, it shall be determined by arbitration in the manner prescribed by the Expropriations Act, R.S.O. 1990,

Chapter E-26 or any Act passed in amendment thereof or substitution thereof. Any gates, fences and tile drains curbs, gutters, asphalt paving, lockstone, patio tiles interfered with by the Transferee shall be restored by the Transferee at its expense as closely as reasonably possible to the condition and function in which they existed immediately prior to such interference by the Transferee and in the case of tile drains, such restoration shall be performed in accordance with good drainage practice and applicable government regulations.

3. The Pipeline (including attachments, equipment and appliances for cathodic protection but excluding valves, take-offs and fencing installed under Clause 9 hereof) shall be laid to such a depth that upon completion of installation it will not obstruct the natural surface run-off from the Lands nor ordinary cultivation of the Lands nor any tile drainage system existing in the Lands at the time of installation of the Pipeline nor any planned tile drainage system to be laid in the Lands in accordance with standard drainage practice, if the Transferee is given at least thirty (30) days notice of such planned system prior to the installation of the Pipeline. The Transferee agrees to make reasonable efforts to accommodate the planning and installation of future tile drainage systems following installation of the Pipeline so as not to obstruct or interfere with such tile installation. In the event there is a change in the use of all, or a portion of the Transferor Lands adjacent to the Lands which results in the pipeline no longer being in compliance with the pipeline design class location requirements, then the Transferee shall be responsible for any costs associated with any changes to the Pipeline required to ensure compliance with the class location requirements.
4. As soon as reasonably possible after the construction of the Pipeline, the Transferee shall level the Lands and unless otherwise agreed to by the Transferor, shall remove all debris as may have resulted from the Transferee's use of the Lands therefrom and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible, save and except for items in respect of which compensation is due under Clause 2 hereof.
5. It is further agreed that the Transferee shall assume all liability and obligations for any and all loss, damage or injury, (including death) to persons or property that would not have happened but for this Easement or anything done or maintained by the Transferee hereunder or intended so to be and the Transferee shall at all times indemnify and save harmless the Transferor from and against all such loss, damage or injury and all actions, suits, proceedings, costs, charges, damages, expenses, claims or demands arising therefrom or connected therewith provided that the Transferee shall not be liable under the clause to the extent to which such loss, damage or injury is caused or contributed to by the gross negligence or wilful misconduct of the Transferor.
6. In the event that the Transferee fails to comply with any of the requirements set out in Clauses 2, 3, or 4 hereof within a reasonable time of the receipt of notice in writing from the Transferor setting forth the failure complained of, the Transferee shall compensate the Transferor (or the person or persons entitled thereto) for any damage, if any, necessarily resulting from such failure and the reasonable costs if any, incurred in the recovery of those damages.
7. Except in case of emergency, the Transferee shall not enter upon any of the Transferor's Lands, other than the Lands, without the consent of the Transferor. In case of emergency the right of entry upon the Transferor's Lands for ingress and egress to and from the Lands is hereby granted. The determination of what circumstances constitute an emergency, for purposes of this paragraph is within the absolute discretion of the Transferee, but is a situation in which the Transferee has a need to access the Pipeline in the public interest without notice to the Transferor, subject to the provisions of Clause 2 herein. The Transferee will, within 72 hours of entry upon such lands, advise the Transferor of the said emergency circumstances and thereafter provide a written report to Transferor with respect to the resolution of the emergency situation. The Transferee shall restore the lands of the Transferor at its expense as closely as reasonably practicable to the condition in which they existed immediately prior to such interference by the Transferee and in the case of tile drains, such restoration shall be performed in accordance with good drainage practice.
8. The Transferor shall have the right to fully use and enjoy the Lands except for planting trees over the lesser of the Lands or a six (6) meter strip centered over the Pipeline, and except as may be necessary for any of the purposes hereby granted to the Transferee, provided that the Transferor shall not excavate, drill, install, erect or permit to be excavated, drilled, installed or erected in, on, over or through the Lands any pit, well, foundation, building, mobile homes or other structure or installation and the Transferor shall not deposit or store any flammable material, solid or liquid spoil, refuse, waste or effluent on the Lands. Notwithstanding the foregoing the Transferee upon request shall consent to the Transferor erecting or repairing fences, hedges, pavement, lockstone constructing or repairing tile drains and domestic sewer pipes, water pipes, and utility pipes and constructing or repairing lanes, roads, driveways, pathways, and walks across, on and in the Lands

or any portion or portions thereof, provided that before commencing any of the work referred to in this sentence the Transferor shall (a) give the Transferee at least (30) clear days notice in writing describing the work desired so as to enable the Transferee to evaluate and comment on the work proposed and to have a representative inspect the site and/or be present at any time or times during the performance of the work, (b) shall follow the instructions of such representative as to the performance of such work without damage to the Pipeline, (c) shall exercise a high degree of care in carrying out any such work and, (d) shall perform any such work in such a manner as not to endanger or damage the Pipeline as may be required by the Transferee.

9. The rights, privileges and easement herein granted shall include the right to install, keep, use, operate, service, maintain, repair, remove and/or replace in, on and above the Lands any valves and/or take-offs subject to additional agreements and to fence in such valves and/or take-offs and to keep same fenced in, but for this right the Transferee shall pay to the Transferor (or the person or persons entitled thereto) such additional compensation as may be agreed upon and in default of agreement as may be settled by arbitration under the provisions of The Ontario Energy Board Act, S.O. 1998, or any Act passed in amendment thereof or substitution therefore. The Transferee shall keep down weeds on any lands removed from cultivation by reason of locating any valves and/or take-offs in the Lands.
10. Notwithstanding any rule of law or equity and even though the Pipeline and its appurtenances may become annexed or affixed to the realty, title thereto shall nevertheless remain in the Transferee.
11. Neither this Agreement nor anything herein contained nor anything done hereunder shall affect or prejudice the Transferee's rights to acquire the Lands or any other portion or portions of the Transferor's lands under the provisions of The Ontario Energy Board Act, S.O. 1998, or any other laws, which rights the Transferee may exercise at its discretion in the event of the Transferor being unable or unwilling for any reason to perform this Agreement or give to the Transferee a clear and unencumbered title to the easement herein granted.
12. The Transferor covenants that he has the right to convey this Easement notwithstanding any act on his part, that he will execute such further assurances of this Easement as may be requisite and which the Transferee may at its expense prepare and that the Transferee, performing and observing the covenants and conditions on its part to be performed, shall have quiet possession and enjoyment of the rights, privileges and easement hereby granted. If it shall appear that at the date hereof the Transferor is not the sole owner of the Lands, this Easement shall nevertheless bind the Transferor to the full extent of his interest therein and shall also extend to any after-acquired interest, but all moneys payable hereunder shall be paid to the Transferor only in the proportion that his interest in the Lands bears to the entire interest therein.
13. In the event that the Transferee fails to pay the Consideration as hereinbefore provided, the Transferor shall have the right to declare this Easement cancelled after the expiration of 15 days from personal service upon the Manager, Land Services of the Transferee at its Executive Head Office in Chatham, Ontario, (or at such other point in Ontario as the Transferee may from time to time specify by notice in writing to the Transferor) of notice in writing of such default, unless during such 15 day period the Transferee shall pay the Consideration; upon failing to pay as aforesaid, the Transferee shall forthwith after the expiration of 15 days from the service of such notice execute and deliver to the Transferor at the expense of the Transferee, a valid and registrable release and discharge of this Easement.
14. All payments under these presents may be made either in cash or by cheque of the Transferee and may be made to the Transferor (or person or persons entitled thereto) either personally or by mail. All notices and mail sent pursuant to these presents shall be addressed to:

the Transferor at:

and to the Transferee at: Union Gas Limited
P.O. Box 2001
50 Keil Drive North
Chatham, Ontario N7M 5M1
Attention: Manager, Land Services

or to such other address in either case as the Transferor or the Transferee respectively may from time to time appoint in writing.

15. The rights, privileges and easement hereby granted are and shall be of the same force and effect as a covenant running with the Transferor's Land and this Easement, including all the covenants

and conditions herein contained, shall extend to, be binding upon and inure to the benefit of the heirs, executors, administrators, successors and assigns of the Parties hereto respectively; and, wherever the singular or masculine is used it shall, where necessary, be construed as if the plural, or feminine or neuter had been used, as the case may be.

16. (a) The Transferee represents that it is registered for the purposes of the Harmonized Goods and Services Tax (hereinafter called “HST”) in accordance with the applicable provisions in that regard and pursuant to the Excise Tax Act, (R.S.C., 1985, c. E-15), (hereinafter called “Excise Tax Act”), as amended.
- (b) The Transferee covenants to deliver a Statutory Declaration, Undertaking and Indemnity confirming its HST registration number, which shall be conclusive evidence of such HST registration, and shall preclude the Transferor from collection of HST from the Transferee.
- (c) The Transferee shall undertake to self-assess the HST payable in respect of this transaction pursuant to subparagraphs 221(2) and 228(4) of the Excise Tax Act, and to remit and file a return in respect of HST owing as required under the said Act for the reporting period in which the HST in this transaction became payable.
- (d) The Transferee shall indemnify and save harmless the Transferor from and against any and all claims, liabilities, penalties, interest, costs and other legal expenses incurred, directly or indirectly, in connection with the assessment of HST payable in respect of the transaction contemplated by this Easement. The Transferee’s obligations under this Clause shall survive this Easement.

17. The Transferor hereby acknowledges that this Easement will be registered electronically.

Dated this _____ day of _____, 2016.

Signature (Transferor)
Print Name(s) (and position held if applicable)
Address (Transferor)

Signature (Transferor)
Print Name(s) (and position held if applicable)
Address (Transferor)

UNION GAS LIMITED

Signature (Transferee)
I have authority to bind the Corporation.
519-436-4673
Telephone Number (Union Gas Limited)

Additional Information: (if applicable):

Property Address: Regional Road 80, Sudbury, ON

HST Registration Number:

District of Nipissing, in the City of North Bay

Province of Ontario

DECLARATION REQUIRED UNDER
SECTION 50 (3) OF THE PLANNING
ACT, R.S.O. 1990, as amended

I, _____, of the City of North Bay, in the Province of Ontario;

DO SOLEMNLY DECLARE THAT:

- 1. I am a **Choose an item.**, Lands Department of Union Gas Limited, the Transferee in the attached Grant of Easement and as such have knowledge of the matters herein deposited to.
- 2. The use of or right in the land described in the said Grant of Easement being **Part of the PIN:**
Legal Description:

acquired by Union Gas Limited for the purpose of a hydrocarbon line within the meaning of Part VI of the Ontario Energy Board Act, 1998.

AND I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath, and by virtue of The Canada Evidence Act.

DECLARED before me at the _____)
City of North Bay, in the District of _____)
Nipissing, in the Province of Ontario _____)
This _____ day of _____, 2016 _____)

A Commissioner, etc.

**2016 SUDBURY REPLACEMENT
MALEY DRIVE PROJECT
ENVIRONMENTAL PROTECTION PLAN**

**Prepared By: Union Gas Limited
Environmental Permitting
July, 2016**

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1.0 INTRODUCTION

This Environmental Protection Plan (EPP) has been prepared to document a plan by Union Gas Limited (Union) for the protection of the environment during the replacement and upsizing of the Sudbury Lateral Line natural gas system in the City of Greater Sudbury. The project will involve the relocation and upsizing of approximately 1955 metres NPS 10 inch and the relocation of approximately 854 metres of NPS 12 inch pipelines to facilitate the City of Greater Sudbury (“City”) proposal to construct a four lane extension of Maley Drive in Northern Sudbury. Maps showing the general locations of the project areas can be found in Appendix 1.

Specifically this report will:

- Describe the proposed work necessary for the Project.
- Describe the procedures that will be followed during construction of the facilities.
- Identify potential environmental impacts and recommend measures to minimize those impacts.

Union is proposing to increase the size of the NPS 10 pipeline to NPS 12 throughout the entire area. This is consistent with previous Union Gas projects in the Sudbury area. It was determined that the NPS 12 pipeline would be replaced size for size, and that upsizing this pipeline was not required. Both sections of pipeline to be replaced were predominately installed in 1958 as part of the “Sudbury Lateral System”. This system commences at both North Bay and Martin River joining together at Warren where it continues west to the eastern boundary of Sudbury. The pipeline then extends north around Sudbury with branch systems supplying the Towns of Capreol, Val Caron, Rayside, Balfour and Onaping and a branch continuing west to serve Espanola.

The relocation and upsizing of the existing NPS 10 inch pipeline to NPS 12 will commence at a tie-in point to an existing NPS 12 inch pipeline, on the south side of LaSalle BLVD. where it will proceed for approximately 325 metres and cross to the north side of La Salle BLVD. From this point the pipeline will travel in a northeast direction for approximately 850 metres where it will cross Notre Dame Ave and proceed to the tie-in point to an existing NPS 12. The existing NPS 10 inch pipeline will be abandoned in place. Please see Appendix 1.

The relocation of the NPS 12 inch pipeline will commence at Turner Road and travel in a southeast direction where it will cross Notre Dame Ave. and proceed northeast to a tie-in point to an existing NPS 12 inch pipeline. Please see Appendix 1.

This EPP defines the environmental features potentially affected by the proposed pipeline and documents the various environmental protection measures that will be implemented by Union during pipeline construction to reduce the effect on these features. Union has retained Stantec Consulting (Stantec) to prepare an Environmental Review. The report addresses the environmental implications of the installation of the new pipeline as they relate to the potential effects on existing and proposed land use and natural heritage features. The report can be found in Appendix 2.

2.0 PLANNING PROCESS

2.1 Key Activities

The following is a summary of the key activities for the development of the Sudbury Expansion Project.

Project Initiation	January, 2016
Determination of Route Alternatives	January, 2016
Agency Contact	January, 2016
Environmental Background Information Collection	May 2016
Confirmation of Pipeline Route	February, 2016
Finalize Environmental Report	June, 2016
Ontario Energy Board Application	July, 2016
Ontario Energy Board Decision	Fall, 2016
Phase I Construction	Summer, 2017
Pipeline In-Service	Fall, 2017
Post Construction Monitoring	Spring 2018

Agencies, First Nations, Métis Nation and directly affected landowners have and will continue to be consulted regarding this project. As a result of the short length of pipe and the limited number of parties impacted by the pipeline replacements, Union determined that a public open house was not required for this project. A notice will be posted in the local newspapers informing the public about the project following the Ontario Energy Board filing. Any issues raised by the general public will be documented and Union will make every effort to resolve the issue prior to construction.

Meetings have been held with the City of Greater Sudbury, First Nations and Métis Nation regarding the project. These groups as well as other agencies will provide Union with general information pertaining to the project areas. No significant environmental concerns, which could not be mitigated using Union's standard construction practices, have been brought forward thus far in response to the meetings. Presently, Union is not aware of any significant landowner or public concerns associated with the construction of this pipeline project.

Union has discussed the project with the Ministry of Natural Resources and Forestry (MNRF) pertaining to Species at Risk information. A permit will be required from Conservation Sudbury (CS) for the watercourse crossings.

3.0 ROUTING

3.1 Route Selection

To accommodate the City's construction of the Maley Drive Project, Union's preferred location will utilize the existing easement of the NPS 12 and a new adjacent easement for the relocated NPS 12. Please see Appendix 1 for the location of the pipelines.

4.0 CUMULATIVE IMPACTS

The following section considers the cumulative effects of construction on the lands due to the project. The definition of cumulative effects used in this report is: "changes to the environment that are likely to result from a particular project in combination with other projects or activities that have been or will be carried out". It is expected that construction of these natural gas pipeline systems will result in both positive and minor negative cumulative effects.

In view of the fact that the sections of pipeline will be installed in existing, adjacent easements or within road allowance, it is not anticipated there will be any cumulative effects. The short lengths of pipeline, the limited number of landowners and the fact that portions of the project will be replaced within an existing trench or installed using the horizontal directional drill (HDD) method, limits the impacts of the project.

5.0 POTENCIAL IMPACTS AND MITIGATION

5.1 General Environmental Features

Watercourse Crossings

It will be necessary to cross four (4) watercourses during the installation of the construction of this project using the horizontal directional drill (HDD) as the preferred method following the procedures as outlined in Unions Generic Sediment Control Plan – Horizontal Directional Drill. If however HDD is determined to be infeasible, the dam and pump method will be employed following the Union Gas/Department of Fisheries and Oceans Generic Sediment Control Plan – Dam and Pump. The drawings can be found in Appendix 3.

Union will acquire all necessary permits from the Ministry of Natural Resources and Conservation Sudbury when crossing or working in the vicinity of a watercourse.

Tree Clearing

It will be necessary to remove shrubs and small trees to allow for the installation of the pipelines. Any necessary tree clearing will be restricted from occurring between April 1 to August 31 in accordance with the Migratory Bird Convention Act and Migratory Bird Regulations, to avoid the avian nesting period. If project scheduling requires the removal of trees or shrubs during the nesting period, a qualified ornithologist will be required to assess the area of removal for evidence of nesting activity prior to removal to avoid any potential loss of active nests.

Archaeology

Aecom Sudbury employed the services of Woodland Heritage Services Limited to initiate a Stage I and Stage II Archaeological Survey (MTC PIF #P208-029-2011) within the area affected of the Maley Drive extension which includes the Sudbury Replacement Project. The Stage 2 survey was undertaken on August 6 & 7, 2011 and concluded that due to the intensive and extensive disturbance of the area from previous road construction as well as the low and wet conditions of the land, that it be considered to have no or low archaeological potential.

If however deeply buried cultural remains are encountered during construction, all activities will be suspended and the archaeological consultant as well as the Ministry of Tourism, Culture and Sport will be contacted to determine the appropriated course of action.

Blasting

Blasting will be necessary in areas for pipeline construction for both pipelines. Union will follow its standard blasting procedures during pipeline construction which includes house surveys, notification to residents, and pre blast warnings. The specifications can be found in Appendix 4.

Contaminated Soils

Union will follow its standard procedures relating to contaminated soils on the project. Based on the initial review of the sites and previous work completed in the same area, Union does not expect to encounter any contaminated material along the pipeline route.

5.2 Mitigation Summary

Table 1 provides a general summary of the potential impacts as well as the proposed mitigation measures that will be implemented during construction to minimize impacts on the environment.

6.0 CONSTRUCTION, OPERATION AND MAINTENANCE

6.1 General Construction Practices

The following is a summary of the general construction of the practices that will occur during pipeline construction:

Clearing and Grading

This prepares the right-of-way to allow for the construction of the pipeline. Brush and trees removed and the ground levelled.

Stringing

The pipe is strung next to the proposed pipeline location. The sections of pipe are laid end to end and set on supports that keep the pipe off the ground and prevent damage to the pipeline coating.

Trenching

To install the pipeline a trench will be dug. The trench is usually excavated using a Backhoe or Hoe-ram. The Hoe-ram is used to break up rock without the use of blasting similar to a jackhammer. Some areas may require blasting however. The excavator will dig the trench and place the spoil in a pile beside the trench. Once the trench is excavated, the pipeline will be installed and if the spoil is suitable, it will be placed back in the trench. Any unsuitable spoil will be removed from the site and disposed of in an appropriate manner.

Horizontal Directional Drilling (HDD)

Where feasible the HDD method will be utilized resulting in less impact to the natural environment. This procedure is essentially drilling a hole under the ground, removing the auger and inserting the pipeline into the hole. To set the auger in place, sending and receiving pits or boring bays must be dug on either end of the pipe length. The length of the crossing and the size of the pipe determine the size of the drilling equipment and bore bays.

Cleaning and Testing

To complete construction, the pipeline is cleaned and pressure tested in accordance with the Energy Act.

Restoration

It is Union's policy to restore the affected areas to "as close to original" condition as practicable.

6.2 Operation and Maintenance Practices

Once the pipeline system is installed it has to be maintained and serviced on a regular basis. The following paragraphs will describe the most common work to be performed by Union personnel after the gas main has been installed.

Locates

Union provides a free locate service to any person or business who may be working near a pipeline. The pipeline locator is comprised of two parts, a transmitter and a receiver. To perform locates, the transmitter is connected to the gas facility. The transmitter sends a small current through the facility, which is picked up by the receiver. The location of the pipeline is then marked using stakes or yellow paint. No excavation is required.

Leak Surveys

To ensure that there are no leaks in the system, a company representative or agent will "leak survey" the pipeline. The leak surveyor will walk along the gas main and carry a small machine that can detect natural gas. No excavation is required to complete the leak survey. However, if leaks are detected, excavations will be required to repair the pipeline. These repairs will be completed as soon as possible after they are detected.

7.0 SUMMARY AND RECOMMENDATIONS

This Environmental Protection Plan describes a strategy for the protection of the environment during the construction of a natural gas pipeline in the Sudbury area. The plan has been developed by noting the environmental features in the area and the potential impacts of construction. The plan recommends a number of measures to reduce the impacts of the development.

It is recommended that the pipeline be monitored the year after construction to ensure that restoration measures were effective. If additional restoration measures are required, they should be completed as soon as possible. It is also recommended that landowners have access to Union personnel in order to address any concerns that may arise during construction.

With the implementation of the recommended mitigation measures, and Union's ongoing landowner and agency communication program, the 2016 Sudbury Replacement Maley Drive Project is not anticipated to have any significant adverse environmental or socio-economic effects.

TABLE 1: MITIGATION SUMMARY

Issue	Potential Impact	Proposed Mitigation
Underground Utilities	Disruption of services	<ul style="list-style-type: none"> • Obtain “locates” from all utilities. • If utilities are damaged, repair as soon as possible.
Archaeology	Disturbance of heritage resources	<ul style="list-style-type: none"> • Archaeological survey undertaken in 2011 with no artifacts found.
Water Wells	Disruption to water supply	<ul style="list-style-type: none"> • Municipal water in area
Vegetation Cover	Loss of vegetative cover leading to soil erosion	<ul style="list-style-type: none"> • Small trees and shrubs to be removed outside of avian nesting window. • Restore cover by means of seeding or hydro-seeding as soon as possible.
Watercourse Crossings	Water quality concerns	<ul style="list-style-type: none"> • Union will acquire all necessary permits from Conservation Sudbury and comply with all permit conditions. • Union will adhere to all Company specifications and Department of Fisheries and Oceans endorsed Generic Sediment Control plans for watercourse crossings will be followed.
Natural Areas	Sedimentation run-off	<ul style="list-style-type: none"> • Ensure sediment barriers such as straw bales/sediment fencing are used where there is a potential for run-off.
Soils: Erosion	Introduction of sediment/ silt to adjacent lands	<ul style="list-style-type: none"> • Restore disturbed soils as soon as possible after construction following municipal and Company specifications •
Spills	Public safety issue	<ul style="list-style-type: none"> • Ensure the Ministry of Environment and Climate Change is notified. • Clean up spilled material.
Contaminated Soils	Dealing with contaminated materials Public safety issue	<ul style="list-style-type: none"> • Ensure the Ministry of Environment and Climate Change is notified, if necessary. • Clean up contaminated material following Company and MOECC procedures.
Traffic	Disruption to local citizens	<ul style="list-style-type: none"> • Public will be notified of road closure in a timely manner prior to construction and as directed by the City of Sudbury • Flag persons and warning devices will be used to notify traffic of the construction zone in accordance with Ministry of Transportation standards.
Public Safety	Public safety concerns	<ul style="list-style-type: none"> • Company inspectors to ensure public safety on construction site. • Ensure proper signage and flag persons if required.

TABLE 1: MITIGATION SUMMARY (Continued)

Issue	Potential Impact	Proposed Mitigation
Landowner Concerns	Disturbance to landowners.	<ul style="list-style-type: none"> • The Company to provide landowners with the telephone numbers of supervisory personnel. •
Construction Noise	Disturbance to landowners.	<ul style="list-style-type: none"> • Construction to be carried out during daylight hours whenever possible. • Ensure equipment is properly muffled.
Nuisance Dust	Disturbance to landowners.	<ul style="list-style-type: none"> • Control dust as required.
Site Restoration	Disturbance to public and private properties	<ul style="list-style-type: none"> • Construction area to be restored as soon as possible upon completion of pipe installation. • Disturbed areas to be replaced as close as possible to preconstruction conditions.

APPENDIX 1

LOCATION MAPS

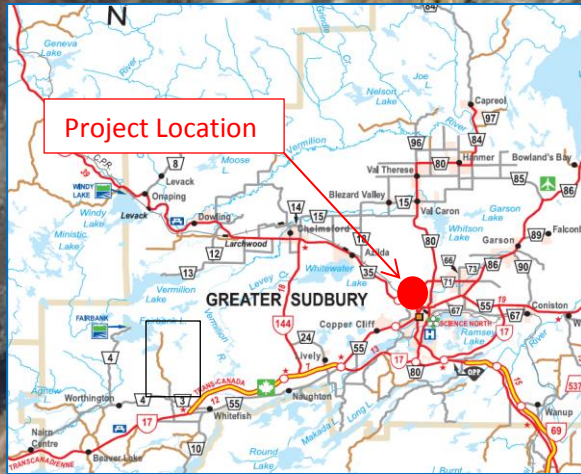
Project Location Map

Filed: 2016-07-14

EB-2016-0222

Schedule 15

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NPS 10 to be Abandoned

New NPS 12

Notre Dame Ave.

Existing NPS 12

Tie-in

Turner Ave.

Lasalle Blvd

Lasalle Blvd

City of Greater Sudbury

NICKELDALE

Existing NPS 12

Théâtre du
Nouvel-Ontario

Collège Boréal - Sudbury

Terry Fox
Sports
Complex

Sudbury Tax
Services Office

McDonald's

Sudbury Bus Terminal

APPENDIX 2

ENVIRONMENTAL REPORT



July 12, 2016
File: 160961138

Attention: Norm Dumouchelle
Union Gas Limited
745 Richmond Street
Chatham, ON N7M 5J5

Dear Norm,

Reference: Environmental Review – 2016 Sudbury Replacement Maley Project

Background

In April 2010, an Environmental Review was completed by Stantec to assess potential environmental and socio-economic impacts that may occur as a result of the Maley Drive Pipeline Replacement Project (see attached). Relocation of an existing 10 inch and 12-inch diameter natural gas pipelines owned and operated by Union Gas Limited is required to accommodate the proposed Maley Drive extension and road widening work being undertaken by the City of Greater Sudbury. The road construction work was deferred in 2010 but has recently resumed.

The following assessment provides an update to the 2010 Environmental Review. A pipeline relocation route survey was completed by Stantec on May 18, 2016, to observe if any changes have occurred along the proposed pipeline route.

In February 2016, the City of Greater Sudbury City Council completed a Business Case Report for Phase 1 of the Maley Drive Extension Project. The Business Case Report identifies the extension project as a combination of new road and reconstruction/rehabilitation of existing road to alleviate traffic congestion and promote economic activity while improving safety. Phase 1 of road construction includes a four lane road from the College Boreal entrance on LaSalle Boulevard to the intersection of Maley Drive and Barry Downe Road, and the rehabilitation of Maley Drive from Barry Downe Road to Falconbridge Road. Phase 2 of the road construction includes the widening of LaSalle Boulevard to four lanes from College Boreal to Elm Street and widening Maley Drive to four lanes from Barry Downe Road to Falconbridge Road.

Road construction activities will require the relocation of portions of the two existing pipelines where there are conflicts between the new locations of the roads and the existing pipelines. Construction of the new section of road is anticipated to commence in the summer of 2017 and the pipeline relocation work is anticipated to occur during the summer of 2017.



Environmental Constraints

Bedrock

The 2010 Environmental Review noted that blasting bedrock will be required for the pipeline relocation work. No additional impacts to bedrock have been identified and no additional mitigation measures are recommended, other than those listed in the 2010 Environmental Review.

Soil Erosion & Sediment Control

The 2010 Environmental Review identified that soil erosion may occur during road construction activities due to shallow soils over bedrock, vegetation clearing activities and steep slopes and banks. Slope and bank erosion was observed at several locations during the pipeline relocation route survey conducted in May 2016. No additional mitigation is recommended, other than those listed in the 2010 Environmental Review.

Watercourses

The 2010 Environmental Review identified three watercourse crossings affected by the pipeline relocation work. The pipeline relocation plans have been modified since 2012 and will now involve crossing four watercourses (see attached map):

- SC#1 – Junction Creek Upstream
- SC#2 – Junction Creek Upstream
- SC#3 – Tributary to Junction Creek
- SC#4 – Tributary to Junction Creek

All four stream crossings are located within the Junction Creek Watershed. During the pipeline relocation route survey conducted in 2016, a fish was observed in Lasalle Tributary just east of Notre Dame Avenue, which was likely a Central Mudminnow. No rare or at risk aquatic species have been identified in Fisheries and Oceans Canada (DFO) Species at Risk mapping or existing environmental reports.

During the pipeline relocation route survey a beaver dam was observed just east of stream crossing #2. The dam caused flooding in the area of Stream crossings #1 and #2, and decreased flow downstream of the dam at stream crossings #3 and #4. As the beaver and dam are located



on private property and could cause potential damage to private property, the landowner should retain a trapper licensed under Ontario Regulation 667/98 to remove the beaver and dam.

In addition to the mitigation measures outlined in the 2010 Environmental Review, trenchless crossings should follow the Generic Sediment Control Plan - Horizontal Directional Drilling or the Generic Sediment Control Plan – Dam and Pump. Should blasting be necessary for watercourse crossings, section 5.2.7 of the more recent *Pipeline Associated Watercourse Crossings 4th Edition* (CAPP/CEPA/CAG, 2012) should be followed where applicable.

Vegetation Cover

The 2010 Environmental Review noted that the pipeline relocation work will occur within vegetation communities identified as Shrub-Sedge Meadow, White Birch Heathland, Rock Barrens, and Man-Centred Vegetation. Tree clearing should not occur within the migratory bird nesting window of April 15 – August 13.

Species at Risk and Conservation Concern

Species at Risk (SAR) are identified as endangered or threatened federally by the Committee on the Status of Endangered Wildlife in Canada and/or provincially by the Committee on the Status of Species at Risk in Ontario (COSSARO) and are protected under Ontario's *Endangered Species Act* (ESA 2007). Species of Conservation Concern (SOCC) are not listed as 'At Risk', but are identified as special concern or S1-S3 by COSSARO.

The Natural Heritage Information Centre (NHIC) database was searched to obtain records of SAR and SOCC in the vicinity of the proposed pipeline relocation. The Ontario Breeding Bird Atlas (Cadman et al. 2007), Reptile and Amphibian Atlas (Ontario Nature 2015) and Ontario Mammal Atlas (Dobbyn 1994) were also consulted. Based on a review of background information, three SAR and three SOCC are known to occur in the vicinity of the proposed pipeline relocation. These six species are listed in **Table 1**.



Table 1: Terrestrial SAR and SOCC

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	National Status (COSEWIC)	Source
INSECTS					
Purplish Copper Butterfly	<i>Lycaena helloides</i>	S3	---	---	NHIC
REPTILES					
Eastern Milksnake	<i>Lampropeltis triangulum</i>	S3	SC	SC	OHA
Blanding's Turtle	<i>Emydoidea blandingi</i>	S3	THR	THR	OHA
Snapping Turtle	<i>Chelydra serpentina</i>	S3	SC	SC	OHA
BIRDS					
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	S4B	THR	THR	AECOM
MAMMALS					
Little Brown Myotis	<i>Myotis lucifugus</i>	S4	END	END	OMA

NHIC – Natural Heritage Information Centre

OHA – Ontario Herpetological Atlas

OMA – Ontario Mammals Atlas

THR – Threatened - a species that is at risk of becoming endangered

SC – Special Concern - a species with characteristics that make it sensitive to human activities or natural events

END – Endangered - a species facing imminent extinction or extirpation

S3: Vulnerable – Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

B: Breeding Status Rank

Purplish Copper

The Purplish Copper is a local and uncommon butterfly species that feeds on knotweeds and dock species. It can be found in sandy and dry open areas as well as bogs within Northern Ontario (Holmes et al. 1991). This species has potential to occur in the general area. To avoid potential impacts to this species, clearing and disturbance to natural areas should be minimized, to the extent possible.

Eastern Milksnake

The Eastern Milksnake is frequently reported in and around buildings, especially old structures. However, it is found in a variety of habitats, including prairies, pastures, hayfields, rocky hillsides and a wide variety of forest types. Two important features of ideal habitat are proximity to water,



and suitable locations for basking and egg-laying/nesting sites (which may include compost or manure piles, stumps, under boards, or in loose soil) (COSEWIC 2002).

Supporting habitat for this species may occur in the Shrub-Sedge Meadow, White Birch Heathland and Rock Barrens habitats that area located in the vicinity of the pipeline relocation.

To prevent reptile and amphibian species from entering the workspace, proposed mitigation includes:

- trenching should be followed as closely as practical with backfilling, to facilitate the movement of wildlife across the trench
- gaps in stockpiles should be created, in consultation with a biologist, to allow for the potential movement of wildlife across the right-of-way
- fencing should be erected around deep excavations to prevent wildlife entrapment
- the contractor should inform their personnel to not threaten, harass or injure wildlife
- if wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site
- where practical, avoid construction in the vicinity of wetland communities during the amphibian breeding season (March 1 – June 30).

Blanding's Turtle

Blanding's Turtles frequent lakes, ponds, and marshes. This species prefers water bodies rich in nutrients, soft muddy bottoms, and abundant aquatic vegetation (MacCulloch 2002). Nesting can occur up to 410 metres from any body of water, typically in loose substrates including sand, organic soil, gravel, and cobblestone. Nesting may also occur along gravel roadways (COSEWIC 2005).

Blanding's Turtle was not observed during the 2015 site investigations for the road construction study, which were conducted by FRi and reported by AECOM. An Information Gathering Form (IGF) and Alternatives Assessment Form (AAF) were submitted by the City of Greater Sudbury to the Ministry of Natural Resources and Forestry (MNRF) to address potential impacts to Blanding's Turtle (see attached). In a response letter dated April 13, 2016, the MNRF stated that based on the results of the study, Blanding's Turtle and its habitat were absent from the proposed Notre Dame Interchange, which generally overlaps with the Maley Drive Pipeline Relocation. As such, the MNRF stated that the proposed road construction would likely not contravene section 9 (species



protection) or Section 10 (habitat protection) of the ESA. As the two projects occur in the same area, it is anticipated the Maley Drive Pipeline Relocation will also not result in contravention of the ESA.

Eastern Whip-poor-will

The Eastern Whip-poor-will favours open woodlands with frequent clearings. Its preferred nesting sites contain shaded leaf litter or pine needles and generally occur along wooded edges or in clearings without any herbaceous growth (Cadman et al. 1987). The species is considered to be area-sensitive, preferring 100 hectares of suitable habitat for breeding.

Eastern Whip-poor-will were encountered within the road construction study area; however, during 2015 site investigations conducted by FRi and reported by AECOM, it was determined that this species and its protected habitat were absent from the road construction limits. An Information Gathering Form (IGF) and Alternatives Assessment Form (AAF) were submitted by the City of Greater Sudbury to MNRF to address potential impacts to Eastern Whip-poor-will (see attached). In a response letter dated April 13, 2016, the MNRF stated that based on the results of the study Eastern Whip-poor-will and its habitat were absent from the proposed Notre Dame Interchange, which generally overlaps with the Maley Drive Pipeline Relocation. As such, the MNRF stated that the proposed road construction would likely not contravene section 9 (species protection) or 10 (habitat protection) of the ESA. As the two projects occur in the same area, it is anticipated the Maley Drive Pipeline Relocation will also not result in contravention of the ESA.

Snapping Turtle

Snapping Turtles inhabit ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms. Females show strong nest site fidelity and nest in sand or gravel banks at waterway edges in late May or early June (COSEWIC 2008).

There is potential to encounter this species along stream crossings within the project area. As mentioned above, where trenchless watercourse crossings occur, the Generic Sediment Control Plan - Horizontal Directional Drilling (HDD) should be followed. The use of trenchless crossings is anticipated to avoid or minimize impacts to the Snapping Turtles aquatic habitats. Where open cut watercourse crossing methods occur, Snapping Turtles that are discovered should be relocated during associated fish rescues. Mitigation for Eastern Milksnake (above) will reduce impacts to turtles occupying adjacent upland areas.



Little Brown Myotis

Little Brown Myotis is commonly found near waterbodies, and will roost in buildings, attics, roof crevices, under bridges, or under loose bark and small tree cavities (Eder 2002). Maternity roosting habitat for Little Brown Myotis may occur in mid-aged and mature woodlots, where tree stands have a diameter at breast height of >25 centimetres. Treed communities in the pipeline relocation area are stunted and are in the stages of regeneration, therefore, suitable bat roosting trees for maternity colonies are not anticipated.

Hibernating colonies for Little Brown Myotis reside in abandoned mines or caves, where temperatures are maintained above freezing (close to 2°C) and high humidity (close to 100% relative humidity) (Fenton 2005; McManus 1974). No mines or caves are known to occur in the proposed pipeline relocation area.

Land Use

The 2010 Environmental Review noted that the pipeline relocation will require temporary closure of a paved trail providing access to Collège Boréal. No additional impacts to land use are anticipated and no additional mitigation measures are recommended, other than those identified in the 2010 Environmental Review.

Archaeology

A Stage 1 and 2 Archaeological Assessments were completed for the Maley Drive road extension in December 2011. The limits of the Stage 1 and 2 assessments encompass the pipeline relocation work.

No archaeological or heritage resources were identified at the 10 areas where surface and sub-surface inspection was conducted for the Stage 2 assessment. Further, it was recommended that the City of Greater Sudbury be allowed to proceed with the Maley Drive road extension without conducting further archaeological or heritage work and that these areas should be reclassified as having low archaeological and heritage potential.



Summary

Based on the above review, and provided that all mitigation measures referenced in this report and the 2010 Environmental Review are properly implemented, pipeline relocation activities are not anticipated to have significant adverse environmental or socio-economic impacts.

Regards,

STANTEC CONSULTING LTD.



Mark Knight, MA, MCIP, RPP

Team Leader – Assessment Permitting & Compliance

Phone: (519) 585-7430

mark.knight@stantec.com

Attachments:

- Attachment A – Project Location Map
- Attachment B – Environmental Review – Sudbury Replacement Project (2010)
- Attachment C – Generic Sediment Control Plans
- Attachment D – Stage 1 and 2 Archaeological and Heritage Assessment
- Attachment E – MNRF Letter of Advice



References

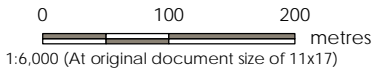
- Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner. 1987. Atlas of the Breeding Birds of Ontario. University of Waterloo Press.
- COSEWIC. 2002. COSEWIC assessment and update status report on the Milksnake *Lampropeltis tirangulum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 29 pp.
- COSEWIC. 2005. COSEWIC assessment and update status report on the Blanding's Turtle *Emydoidea blandingii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 40 pp.
- COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.
- Canadian Association of Petroleum Producers, Canadian Energy Pipeline Association and Canadian Gas Association. 2012. Pipeline Associated Watercourse Crossings. Prepared by TERA Environmental Consultants. Calgary, AB.
- Eder, D. 2002. Mammals of Ontario. Lone Pine Publishing, Edmonton, Alberta. 215
- Fenton, B., E. Fraser, and, C. Davy. 2005. Bat Ecology: a summary of Ontario Species. Ontario Ministry of Natural Resources.
- Fisheries and Oceans Canada. 2007. High-Pressure Directional Drilling Ontario Operational Statement
- Holmes, A.M., Q.F. Hess, R.R. Tasker, A.J. Hanks. 1991. The Ontario Butterfly Atlas. 1991. Toronto Entomologists' Association, Toronto. 167pp.
- MacCulloch, R.D. 2002. The ROM Field Guide to Amphibians and Reptiles of Ontario. Royal Ontario Museum: Toronto, ON. 168 p.
- McManus, J.J. 1974. Activity and thermal preference of the little brown bat, *Myotis lucifugus*, during hibernation. Journal of Mammalogy 55(4):844-846.



ATTACHMENT A PROJECT LOCATION MAP



- Legend
- Project Components
- Proposed Pipeline Replacement
 - Existing Pipeline
 - Watercourse Crossing
- Existing Features
- Major Road
 - Minor Road
 - Hydro Line
 - Watercourse
 - Waterbody
 - Wetland (Unevaluated)



- Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Orthoimagery: © 2016 DigitalGlobe Image courtesy of USGS Earthstar Geographics



Project Location
District of
Sudbury

160961138
Prepared by PW on 2016-07-12

Client/Project
UNION GAS LIMITED
MALEY DRIVE PIPELINE REPLACEMENT

Figure No.
1

Title
Project Location





ATTACHMENT B ENVIRONMENTAL REVIEW – SUDBURY REPLACEMENT PROJECT (2010)

April 1, 2010
File: 160960578

Union Gas Limited
Attention: Mr. Tony Vadlja
109 Commissioners Road West
London, ON N6J 1X7

Reference: Environmental Review – Sudbury Replacement Project

Dear Mr. Vadlja:

The following analysis identifies potential environmental and socio-economic impacts that may occur as a result of the Sudbury Replacement Project. Pipeline relocation is required to accommodate the Maley Drive extension/Lasalle Boulevard widening road works being undertaken by the City of Greater Sudbury. Environmental and socio-economic features potentially impacted by the proposed pipeline relocation were identified through a review of the two existing environmental reports, *Maley Drive Extension Class Environmental Assessment* (MMM, October 1995) and *Maley Drive Extension Lasalle Boulevard Widening Municipal Class EA Addendum* (EarthTech, May 2008). The presence of the identified features was confirmed through a pipeline relocation route survey conducted by Stantec Consulting Ltd. on March 3, 2010.

Background

The *Maley Drive Extension Class Environmental Assessment* (MMM, October 1995) was completed to assess a proposed east-west arterial road along the northerly edge of the developed areas of the City of Sudbury. The Extension would function as a truck bypass of Lasalle Boulevard and the Kingsway in order to reduce truck and auto conflicts on these roads, improve traffic operations, and minimize the degradation of the structure of both roadways. In 2005 the City of Greater Sudbury undertook a Transportation Background Study as part of a comprehensive review of its existing official plans that were developed for the former municipalities. The Study confirmed the findings of the 1995 Class Environmental Assessment, and included additional reconstruction and widening of Lasalle Boulevard. The subsequent recommendations in the *Maley Drive Extension Lasalle Boulevard Widening Municipal Class EA Addendum* (EarthTech, May 2008) are:

- The reconstruction and widening of Lasalle Boulevard from just east of the CPR Overhead to 0.3 km west of Notre Dame Avenue, from two lanes to four lanes;
- The extension of Maley Drive westerly from its existing western terminus at Barrydowne Road to the Lasalle Boulevard Extension, west of Notre Dame Avenue. This segment would be constructed as a four-lane road; and,
- The reconstruction and widening of the existing Maley Drive, east of Barrydowne Road to Falconbridge Highway, as a four-lane road.

Road construction activities will necessitate the relocation of portions of two natural gas pipelines owned and operated by Union Gas Limited where there are conflicts between the new locations of the roads and the current pipeline locations. As road construction is anticipated to commence in 2010, pipeline relocation is anticipated to occur during Summer/Fall of 2010.

Environmental Constraints

Bedrock

The study area contains an extensive amount of exposed bedrock, with glacial till deposits present throughout.

Pipeline Review

Pipeline relocation activities will require bedrock blasting in several locations. Blasting activities will adhere to *Union Gas Specification 3.10: Specification for Rock Excavation*. Blasting will also occur in proximity to several watercourses; to avoid contravention of the *Fisheries Act* (1985) setback distances from the centre of detonation should be adhered to as outlined in Tables 1 and 2 of the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (DFO, 1998).

Personal correspondence with staff at the Ontario Ministry of Northern Development, Mines and Forestry indicates that sulphide rich bedrock may be encountered within the area of pipeline relocation. Additional studies will need to occur to confirm the presence of acid generating rock. Mitigation measures, as applicable, will follow standard management practices of Union Gas Limited.

Soil Erosion & Sediment Control

Soil erosion is a possibility for road construction activities due to shallow soils over bedrock, vegetation clearing activities and landscape gradients.

Pipeline Review

Pipeline relocation activities will face similar soil erosion potential as road work activities. Efforts to minimize erosion and sedimentation will follow applicable Union Gas Limited standards and procedures, including the use, inspection and maintenance of sediment barriers, erosion control measures and revegetation practices. Sediment and erosion control for watercourse crossings will follow plans outlined in the agreement letter between Union Gas Limited and Fisheries and Oceans Canada, Ontario Great Lakes Area (*DFO-UGLA/UGL Agreement 2008*).

Watercourses

Road construction activities include ten watercourse crossings. While all watercourses are considered fish habitat, no rare species or species at risk have been identified.

Pipeline Review

Pipeline relocation will involve crossing three watercourses (see attached map):

- SC#1 – Lasalle Tributary Upstream
- SC#2 – Lasalle Tributary Upstream
- SC#3 – Unnamed Watercourse

All three stream crossings are situated on Junction Creek; SC#1 and SC#2 are situated on the main branch of the watercourse, and SC#3 is on an unnamed first order tributary to Junction Creek. Based on fieldwork conducted for the existing environmental reports, the pipeline relocation route survey, and aerial photography interpretation, Junction Creek is a small, meandering urban watercourse that is typical of degraded warmwater systems. The fish community includes tolerant baitfish species, such as Brook Stickleback, Central Mudminnow, and Northern Redbelly Dace. No rare species or species at risk have been identified in the existing environmental reports or DFO's Species at Risk mapping.

Stream crossings #1 and #2 are anticipated to be crossed via trenchless method, and stream crossing #3 via dam and pump. For any dry crossings in-water works are prohibited April 1 to June 30. Watercourse crossings will follow applicable Union Gas Limited standard practices and procedures, and the agreement letter between Union Gas Limited and Fisheries and Oceans Canada, Ontario Great Lakes Area (*DFO-OGLA/UGL Agreement 2008*).

As per the *Agreement 2008*, provided that crossings are carried out as specified by the DFO-OGLA/UGL approved generic sediment control plans, dry and trenchless crossings are not likely to contravene the *Fisheries Act* (1985). Prior to watercourse crossings notification should occur to DFO as per the *Agreement 2008*, and a permit from the Nickel District Conservation Authority should be obtained as per Section 28 of the *Conservation Authorities Act* (1990).

Preliminary borehole information indicates that blasting will not be necessary for watercourse crossings. Should blasting be necessary for watercourse crossings, the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (DFO, 1998) and section 5.2.7 of *Pipeline Associated Watercourse Crossings* (CAPP/CEPA/CAG, 2005) will be followed where applicable.

Vegetation Cover

The dominant vegetation community within the study area for road construction is White Birch Heathland, with additional areas of Wet Shrub Thicket, Shrub-Sedge Meadow, Poplar-Birch Woodland, Poplar-Field, Dry Shrub Thicket, Red Oak-Heath Woodland, Heath Barrens, Rock Barrens and Man-Centred Vegetation. No species of conservation concern have been identified.

Pipeline Review

Pipeline relocation will occur within areas identified as Shrub-Sedge Meadow, White Birch Heathland, Rock Barrens and Man-Centred Vegetation. It is understood that clearing and revegetation will follow standard Union Gas Limited practices and procedures. To avoid impacts to migratory birds, tree cutting should be avoided May 1 – July 31. Where unavoidable, a nest search should be undertaken by qualified individuals 48 hours prior to clearing to ensure no active nests are destroyed.

Species of Conservation Concern

No species of conservation concern are noted as occurring within the road construction study area.

Pipeline Review

A search of the Ministry of Natural Resources' Natural Heritage Information Centre identified Blanding's Turtle (*Emydoidea blandingii*) as existing in the vicinity of pipeline relocation; Blanding's Turtle is characterized as threatened under Ontario's *Endangered Species Act* (2007). To-date, protection is provided for individual Blanding's Turtles, with habitat protection anticipated by 2013.

Prior to pipeline relocation activities a Blanding's Turtle Response Protocol should be developed to ensure construction activities are compliant with the *Endangered Species Act* (2007). The Protocol should be reviewed by the Ministry of Natural Resources and should at a minimum provide direction on avoiding Blanding's Turtles, measures to be taken upon encountering Blanding's Turtles, and associated education and communication activities to convey the Protocol to project personnel.

A search of the Ministry of Natural Resources' Natural Heritage Information Centre also identified the Purplish Copper butterfly (*Lycaena helloides*) as existing in the vicinity of pipeline relocation; Purplish Copper is designated as S3 by the Ontario Ministry of Natural Resources, indicating that it is vulnerable. Purplish Copper is not regulated by federal or provincial legislation.

Land Use

Road construction will occur within a study area containing a variety of land uses.

Pipeline Review

Pipeline relocation will require the temporary closure of a paved trail associated with Collège Boréal; consultation should occur with the college regarding signage to re-direct trail traffic.

Archaeology

No archaeological assessment has been conducted to-date for the road construction.

Pipeline Review

As portions of pipeline relocation will occur within previously undisturbed lands, and pipeline relocation will occur within close proximity to watercourses, a Stage 1 assessment of archaeological potential is required. The assessment may be completed in conjunction with City road work. Based on the findings of the Stage 1 assessment, further archaeological investigations may be recommended.

Summary

Based on the above review, and provided that all referenced mitigation measures are properly implemented, pipeline relocation activities are not anticipated to have significant adverse environmental or socio-economic impacts.

Sincerely,

STANTEC CONSULTING LTD.



Mark Knight, MA
Environmental Planner
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Fax: (519) 836-2493
mark.knight@stantec.com

Attachment: Stream Crossing Locations

Cc: Bill Wachsmuth, Union Gas Limited



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March 31, 2010
 160960578

Legend

- Approximate Stream Crossing Location
- Watercourse
- Waterbody

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
2. Data Sources: Ontario Ministry of Natural Resources © Queens Printer Ontario, 2009.
3. Image Source: © Google Earth Pro, 2010 (© GeoEye, 2010) - Imagery Date: October 2, 2006.

Client/Project

UNION GAS LIMITED

Figure No.

1

Title

**STREAM CROSSING
LOCATIONS**





ATTACHMENT C GENERIC SEDIMENT CONTROL PLANS

Generic Sediment Control Plan – Horizontal Directional Drill

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the Fisheries Act no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by the DFO. By following the conditions and measures set out in the Stream Crossing Review and this Drawing, you will be in compliance with subsection 35(1) of the Fisheries Act.

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors in order to avoid negative impacts to fish habitat during horizontal directional drill crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the DFO.

Measures to Protect Fish and Fish Habitat when Horizontal Directional Drilling

- The company must use materials, construction practices, mitigation techniques and monitoring of operations of every water crossing in order to prevent an unauthorized HADD or the impairment of water quality. The following requirements apply to any permanent or intermittent waterbody (stream, river, pond) and areas adjacent to it.
- * Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed. Ensure the drill entry and exit points are far enough from the banks of the water course to have minimal impact on these areas.
 - * The company will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
 - * The company will notify the appropriate federal or provincial agencies related to watercourse crossings.
 - * Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
 - * Sediment fence must be installed between the work site and the watercourse. Ensure all fencing is properly keyed into the ground.
 - * Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum and within the road or utility right-of-way. Delay grubbing to immediately prior to the crossing operation.
 - * Materials removed or stockpiled during construction must be deposited in a manner to ensure sediment does not enter into a waterbody. This material must be protected with appropriate erosion and sediment controls devices (sediment fencing, strawbales).
 - * All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any waterbody. The company is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings. This plan is endorsed by the DFO.
 - * Refuelling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available on site.
 - * Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.
 - * There are no in-stream timing restrictions on this work.
 - * The company will be held responsible for implementation of this plan.

Crossing Procedures

- * Sediment fences are to be established between the entry and exit points and the watercourse (potential for sediment to enter watercourse)
- * At a minimum the entry and exit points must be located as identified on this plan.
- * Mud sump pits are to be excavated at the entry and exit points of the drill to contain drilling fluids to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. These pits must be excavated prior to back reaming.
- * All drilling fluids are to be contained during the entire drilling process and promptly removed as sump pits are filled and/or when the drill is completed.
- * All excess material is to be removed from the construction site to an approved location.
- * Monitoring of the watercourse must be completed during all phases of the crossing attempt.

Emergency Frac-out Response and Contingency Planning

- * Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.
- * The drilling procedure will be closely monitored throughout the crossing attempt to limit the extent of a “fracture” (frac out).
- * If the pilot drill results in a “fracture” (drill fluids enter the stream bed or stream banks), drilling should be stopped immediately and the procedures outlined in the Environmental Compliance section should be followed.
- * Measures must be taken to contain the drilling mud and prevent its further migration into the watercourse. Measures to control fracturing will include, stopping the drill, the use of vacuum trucks, excavation of relief pits (dry land) and any other measure deemed appropriate by the company.
- * Prioritize cleanup activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
- * Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.
- * Once the site has been deemed secure and the risk of drilling mud entering the watercourse has been addressed, the drill shall be pulled back and can be restarted with a new deeper attempt and/or a change to the existing running line, to attempt to avoid the fracturing problem.
- * If subsequent drill attempts result in additional fracturing, then the crossing shall be halted and the Environmental Planning group should be contacted. Additional permits or authorizations to continue the drill using in-stream mitigation or to change the crossing technique, may be required.
- * In the event that the horizontal directional drill cannot be completed a dam and pump or flumed crossing technique will be implemented following the specific Generic Sediment Control Plan endorsed by DFO under the DFO–OGLA AGREEMENT 2008.

Environmental Compliance

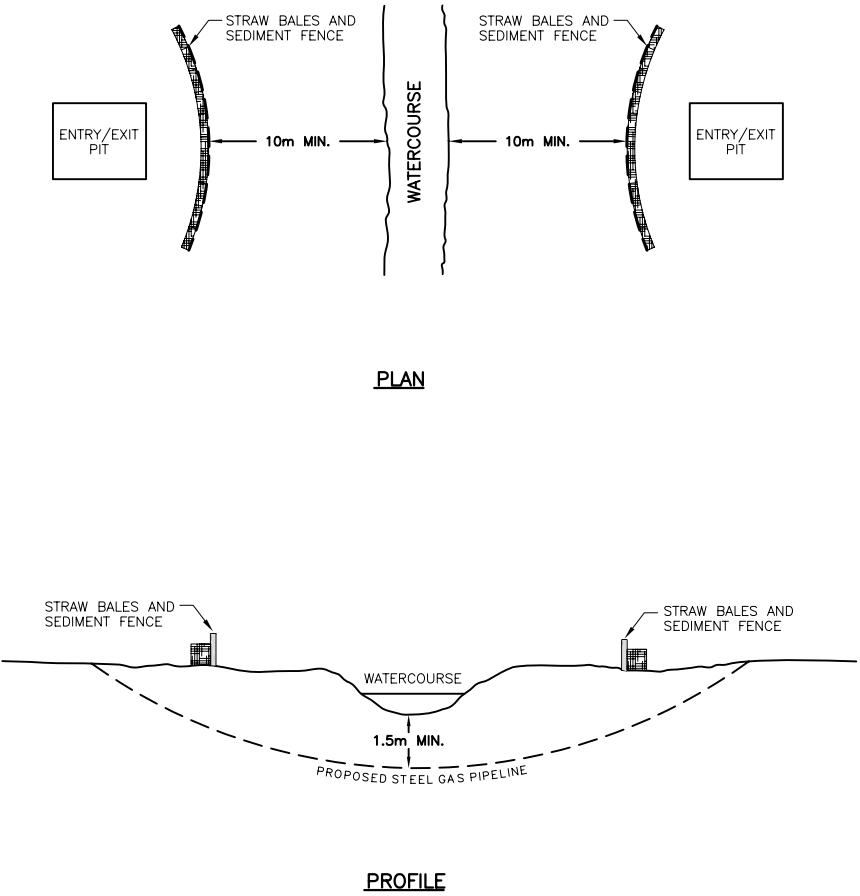
Contractor

- * In the event that drilling fluids enter the watercourse or turbidity is generated by air migration, the Ministry of the Environment (MOE) shall be contacted by the contractor in compliance with their spills policy
- * Such an incident is to be phoned into the MOE Spills Action Centre at 1–800–268–6060 by the contractor. The Spills Action Centre will require the following information:
 - * The nature of the incident (what happened and what materials were involved).
 - * Approximate volume of material involved.
 - * The incident location (lot, concession, township, county and/or city).
 - * Actions that have or will be taken.
 - * The name and telephone number of the person calling.
- * The incident should be monitored:
 - * The date, time and duration of the event should be recorded, as well as the content of the call to the MOE Spills Action Centre.

Company

- * In the event that drilling fluids enter the watercourse or turbidity is generated by air migration, the Department of Fisheries and Oceans or local Conservation Authority (CA) shall be contacted by the Company Inspector. DFO contact information is provided on the Stream Crossing Review and CA contact information can be found on the permit.
- * When this has been completed, Union’s Environmental Planning Department or Lands Department staff shall also be notified.
- * All calls identified above are mandatory and are to be completed immediately after the incident has occurred.

Minimum Horizontal Directional Drill Setback and Depth.



- NOTES:
- STRAW BALES AND SEDIMENT FENCE TO BE SET UP A MINIMUM OF 10m FROM WATERCOURSE.
 - HORIZONTAL DIRECTIONAL DRILL TO BE SET UP BEHIND STRAW BALES AND SEDIMENT FENCE.
 - MINIMUM OF 1.5m COVER FROM TOP OF PIPE TO BED OF WATERCOURSE.
 - ALL DISTURBED AREAS TO BE RESTORED TO PRE-CONSTRUCTION CONDITIONS OR AS CLOSE AS POSSIBLE.

Restoration

- The following conditions should be adhered to for the restoration of the construction site and adjacent lands:
- * Ensure the entry and exit pits are cleaned of drilling fluids and the fluids are disposed of in an approved location.
 - * Any disturbed areas adjacent to the watercourse will be seeded, covered with erosion control matting or equivalent and restored as close as possible to preconstruction conditions.
 - * Vegetation on watercourse banks will either remain in place or will be replaced following construction.
 - * All seeding and vegetation replacement will be with native species to Ontario.
 - * If post construction monitoring reveals erosion problems, remedial work will be undertaken as quickly as possible.
 - * All debris/garbage shall be removed from construction site to an approved location.
 - * If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
 - * Maintain effective sediment and erosion control measures until revegetation of disturbed areas is achieved.

Contingency Plan

If, for any reason, the attempt to cross this watercourse by means outlined above is not successful, the Environmental Planner will be contacted to discuss an alternative crossing method. It should be noted that under no circumstances shall an alternative crossing method be attempted for any crossing without prior notification. Any changes to this Stream Crossing Review may require permit amendments or governmental agency approval.

If unforeseen events cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, the company is expected to respond in a safe and timely manner with all reasonable measures to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO or CA is to be notified as soon as practical.


Spill reporting procedures established by MOE shall be used to report any unexpected discharge of silt or sediment or other deleterious substance at the water crossing. The spill/incident shall also be reported to the DFO or CA as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approval from DFO for implementation by the company.

Filed: 2016-07-14
NOTES
EB-2016-0222

Union Gas is responsible for the implementation of appropriate sediment and erosion control to mitigate impacts to fish and fish habitat.

DATE	REV NO	REVISION	BY	APPD	



uniongas
A Spectra Energy Company

PROJECT

UNION GAS LIMITED
CONSTRUCTION PROGRAM

LOCATION

ALL HORIZONTAL DIRECTIONAL DRILL
CROSSINGS IN ONTARIO

DRAWING TITLE

GENERIC SEDIMENT CONTROL PLAN
HORIZONTAL DIRECTIONAL DRILL

SCALE	NTS	DATE	MAY 16/12
FILE No.		PROJECT NO	
DRAWN GTH	CHECKED	DRAWING 4 of 4	REV 0

APPROVED

Generic Sediment Control Plan – Dam & Pump Crossing

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors to control downstream sediment to the lowest level practically achievable during the construction of dam and pump type crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

General Measures

The company must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. The following requirements apply to any permanent or intermittent waterbody (stream, river, pond) and areas adjacent to it.

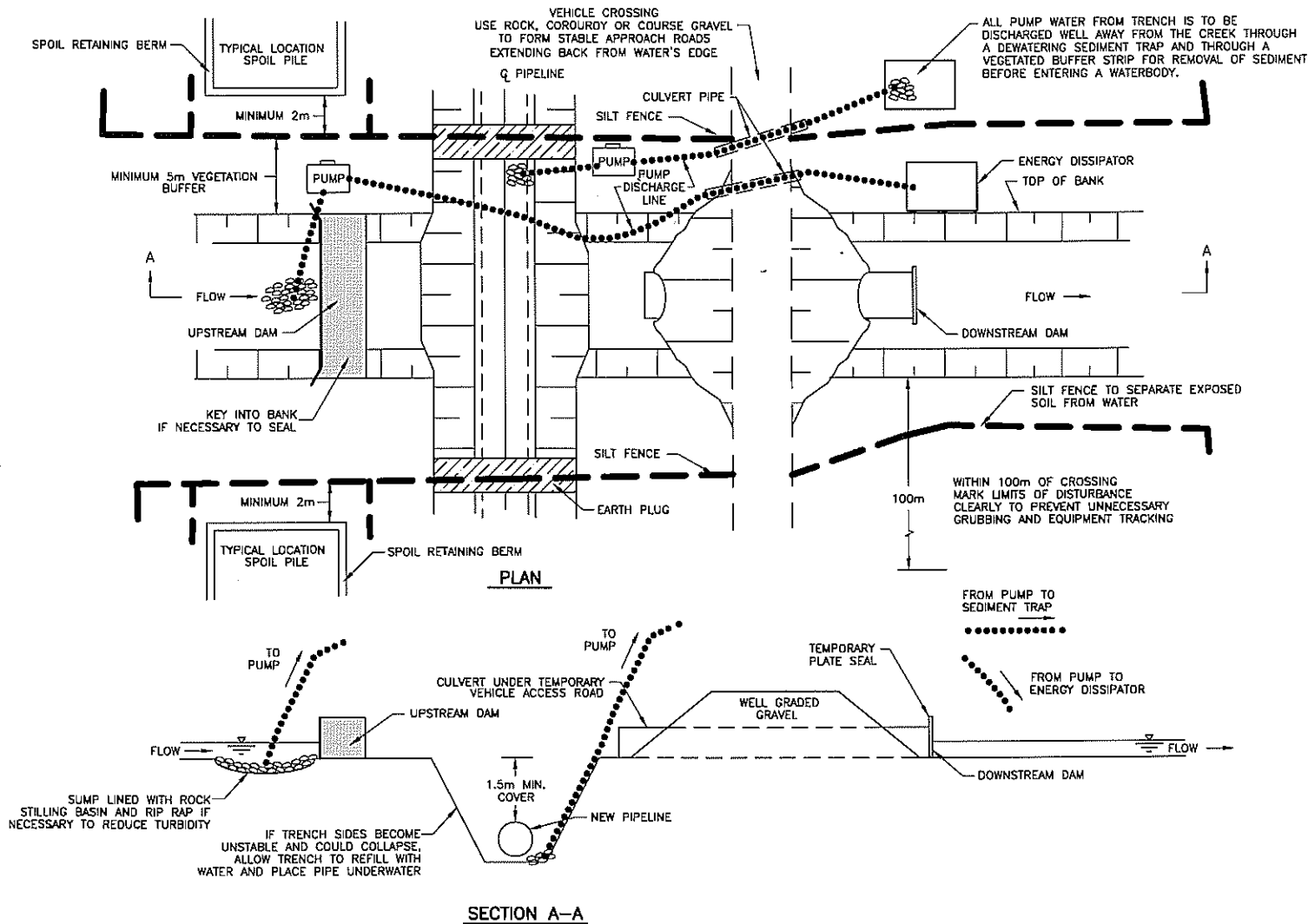
- * The company will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
- * The company will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
- * In-stream work will occur during the appropriate time windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
- * Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
- * All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the waterbody. This flagging will be set back a minimum of 5m from the waterbody and will be based on site specific conditions. Extra work area required at watercourse crossing will be situated away from the waterbody outside of the minimal disturbance zone (MDZ).
- * Materials removed or stockpiled during construction (e.g., excavated soil, backfill material) must be deposited in a manner to ensure sediment does not enter a waterbody. Appropriate erosion and sediment controls (e.g. revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fence or other appropriate mitigation measures) will be installed around spoil or stockpiles, to prevent sediment from stockpile runoff from entering a watercourse.
- * All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any stream.
- * Except during construction of the crossing, the company will not obstruct any watercourse so as to impede the free movement of fish.
- * Flow shall be maintained at all times downstream of the watercrossing.
- * All exposed soil must be stabilized (e.g. graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
- * The company is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings.
- * All required materials (e.g., silt fencing, filter cloth, polyethylene liners, granular material, rip rap, dam materials) and installation equipment (e.g., pipe, flumes, pumps, pump hoses, generators, spores, energy dissipators) will be on-site and in good working order prior to construction.
- * Prior to commencing watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forecasted. In-stream activity will be delayed if flows are in flood stage and until weather conditions are favourable.
- * If there is any flow in the creek, the company is to install pumps to maintain streamflow around the blocked off section of channel. An energy dissipator is to be built to accept pump discharge and prevent streambed or streambank erosion.
- * Adequate pump capacity will be on site to handle anticipated water flows and any potential increases in flow during the construction period. Backup pumps with adequate capacity to handle 100% of the downstream flow must be on site and ready for immediate replacement, should the primary operating pump(s) fail.
- * Water intakes used in fish bearing waters will be screened in accordance with the DFO Freshwater Intake Fish Screening Guidelines (1995).
- * Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit regulations. See detailed construction sequence for timing of fish recovery operations.
- * In-stream activities in all watercourses (e.g., trenching, pipe installation, backfilling) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
- * In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for some day installation.
- * Refueling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available on site.
- * The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
- * Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
- * The company will be held responsible for implementation of this plan.
- * All use of silt fence, rock check dams and dewatering traps shall be constructed/instolled in accordance to the most up to date company specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the waterbody, additional mitigation measures will be implemented to prevent sediment from entering the waterbody.

Contingency Plan

If unforeseen events (e.g., bedrock in trench, dam washout) cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, the company is expected to respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO is to be notified as soon as practical.

Spill reporting procedures established by MOE shall be used to report any unexpected discharge of silt or sediment or other deleterious substance at the water crossing. The spill shall also be reported to the DFO as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approval from DFO for implementation by the company.



Detailed Construction Sequence – Dam and Pump Crossings

In general terms, the following sequence of construction and mitigation measures will be followed at all "dam and pump" type water crossings.

1. Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install pre-work sediment control measures, including silt fences and measures to contain excavated spoil and backfill. All necessary equipment and materials to build the dams and to pump water must be on site or readily available prior to commencing in-water construction. Pipe shall be strung, welded and coated ready for installation prior to watercourse trenching.
2. Install pumps in natural pool upstream of the excavation. Excavate temporary sump within right-of-way if no natural pool exists. Check pump operation to equalize flow and ensure water intakes used in fish bearing waters are screened in accordance with DFO guidelines. Rip rap, stilling wells, filter cloth, gravel filters or other mitigation measures will be used at the upstream inlet of the pump to prevent suspension of sediment from pumping when necessary. Rip rap and rack check dams will be used when necessary to prevent scouring and erosion at the pump outlet. Pump discharge lines shall be installed to keep pumped water from coming into contact with soil on the construction site.
3. Dams are to be made of steel plate, inflatable rubber dam (aquadam), peastone bags, cobbles, well graded coarse gravel fill or rock fill and constructed so that sediment is not introduced to the waterbody. An impervious membrane is to be incorporated into the dam if necessary to control seepage flow. Dams may need keying into the banks and streambed. Install downstream dam only if needed to keep the trench area dry. Dewater the area between dams and for fish bearing streams, conduct fish salvage operations. All pump water is to be discharged well away from the creek and through a dewatering sediment trap for removal of sediment before entering the waterbody.
4. Excavate trench through plugs and streambed as quickly as possible, re-positioning discharge hose as necessary. Lower the pipe in the trench and backfill immediately. During this operation, try to maintain pumping as much as possible. The top 300 mm of trench backfill is to be clean rock, cobble material or native streambed material. The company is to use granular backfill if the native material is not suitable. Any excess material is to be disposed of above the high water mark in an approved location and stabilized to prevent reentry into the waterbody. Work is to be completed as quickly as possible.
5. Restore, stabilize and reclaim bed and banks of waterbody to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., *do not use erosion control matting in the bankfull channel* coarse gravel or rip rap) to the maximum extent possible between dams. If rip rap material contains fines, the completed face is to be washed off and the turbid water pumped to the dewatering sediment trap. All construction material (e.g. dams, rip rap, spilled pea gravel from pea stone bags) not required to return the waterbody to preconstruction condition shall be removed from the site and stabilized above the high water mark in an approved location. Removal of all materials will be done in a manner that will not introduce sediment to the waterbody. The downstream dam shall be removed first. Keep pump running until normal flow is resumed. Complete bank trimming and erosion protection. If pea stone bags are used for the dams, place and remove by hand to avoid equipment breaking bags.
6. Site stabilization, which includes control of stormwater drainage using combinations of silt fences, erosion blankets, diversion berms and check dams etc., is to be completed within 10 days of trench backfilling. If stabilization is delayed, short term erosion control measures shall be used to prevent sediment entering the water. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stabilized.
7. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
8. If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.



PROJECT
UNION GAS LIMITED
CONSTRUCTION PROGRAM

LOCATION
ALL DAM AND PUMP WATER
CROSSINGS IN ONTARIO

DRAWING TITLE
GENERIC SEDIMENT CONTROL PLAN
DAM AND PUMP WATER CROSSINGS

SCALE NTS DATE JAN. 1/08

FILE No. PROJECT NO

DRAWN GTH CHECKED GTH DRAWING 2 of 3 REV 0

APPROVED



ATTACHMENT D STAGE 1 AND 2 ARCHAEOLOGICAL AND HERITAGE ASSESSMENT

**WOODLAND HERITAGE SERVICES LIMITED
STAGE ONE AND TWO PROJECT REPORT**

**STAGE 1 AND 2 ARCHAEOLOGICAL AND CULTURAL HERITAGE
ASSESSMENT OF THE PROPOSED MALEY DRIVE EXTENSION WITHIN THE
CITY OF GREATER SUDBURY, SUDBURY DISTRICT**

Prepared for

AECOM - Sudbury

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P3C 4R9**

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Submitted by

**WOODLAND HERITAGE SERVICES LIMITED
17 Wellington Street, Box 2529
New Liskeard, Ontario
P0J 1P0**

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Province of Ontario Archaeological Licence #P016, P208
MTC PIF # P208-029-2011
Our Project # J2010-29**

December 23, 2011

**WOODLAND HERITAGE SERVICES LIMITED
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AECOM - Sudbury
1040 Lorne Street South, Unit 1
Sudbury, Ontario
P3C 4R9

Attn: Ted Archuticz, P. Eng., Senior Project Manager, Transportation

Re: Stage 1 and 2 Archaeological and Cultural Heritage Assessment of the Proposed
Maley Drive Extension in the City of Greater Sudbury, Sudbury District

Please find attached three copies of an Archaeological and Heritage Impact Assessment Report for the above captioned project.

For licence and regulatory purposes, we will be sending an additional three copies on your behalf to the following offices:

Ministry of Tourism and Culture
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto, Ontario
M7A 0A7

We were pleased to have assisted you with this project and hope to be of continuing service with your future undertakings.

Yours truly,
WOODLAND HERITAGE SERVICES LIMITED.

Ryan Primrose, M.A.
RP/jp, Enclosures

Executive Summary

On August 6th and 7th 2011, Mike O'Connor (WHS) and David Gadzala (WHS) undertook a ground based Stage 1 and 2 field assessment and survey of 10 areas that had been preliminarily identified as high potential through the map-based Stage 1 assessment. No field visit was carried out in 2010 to confirm these identified areas of archaeological potential. This Stage 2 work investigated these 10 areas and tested all areas of archaeological potential and documented all the areas using photographs and GPS coordinates (see Figures 3 – 33).

The Maley Drive extension is planned to travel from the existing Maley Drive near the east of Sudbury and travel west then south to tie into Lasalle Boulevard.

For those areas identified as having archaeological potential, they were surveyed using sub-surface test pits at a 5 metre grid with all soil screened through 6mm. mesh. No archaeological or cultural heritage resources were located.

Recommendations have been made in this report to allow the proponent to proceed with their plans to develop the Maley Drive extension without further archaeological or cultural heritage concerns or work.

Project Personnel

Ryan Primrose, M.A. P208	- Report Author, Project Director
John Pollock, Ph.D. P016	- Report Author
Mike O'Connor, B.A. P022,	- Field Director
David Gadzala	- Field Assistant

Acknowledgements

Woodland Heritage Services Limited would like to acknowledge the help of Ted Archuticz (AECOM) for providing maps, and background information.

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1.0 PROJECT BACKGROUND

This section of the project report provides the context for the archaeological fieldwork. The project background section covers three areas: development context, historical context, and archaeological context.

1.1 Development context

The archaeological and cultural heritage field work was required by the Ministry of Tourism and Culture in advance of the planned construction of the Maley Drive extension (Figure 3 – 33).

The archaeological field work was performed in advance of any new ground-disturbing activities.

The area of disturbance will include the reworking of the road platform, some curve realignment and improvements to the drainage features, as well as the construction of a new platform from the western terminus of the present Maley Drive to a curve in Lasalle Blvd to the southwest.

Woodland Heritage Services received permissions to pass on the property and perform all activities related to archaeological and cultural heritage assessments.

1.2 Historical context

Cultural Prehistory

Archaeologists generally divide northeastern Ontario's prehistory into the following generalized temporal/cultural sequences;

Late Palaeo (circa 7,000 - 5000 BC)

Shield Archaic (circa 5,000 - 500 BC)

Middle Woodland (circa 500 BC - AD 1200)

Late Woodland (circa AD 1200 - AD 1600)

Historic (circa AD 1600 - present)

Shield Archaic- 5,000 years ago

The earliest known inhabitants of the northeastern Ontario some 6,000 – 8,000 years ago were the Shield Archaic Peoples. In northern Ontario, this era is comparable to the Archaic period in southern Ontario in terms of its longevity, representing as it does some 4,000 years of prehistoric occupation in northern Ontario stretching from the Manitoba border on the west to the Quebec border on the east. The Shield Archaic appears to evolve directly out of the preceding Late Paleo-Indian occupations. The presence of Shield Archaic quarry/workshop and habitation sites on the Nipissing beach line, the next glacial lake stage below Minong in the Thunder Bay area, combined with an emphasis on the same raw materials used in the preceding Paleo-Indian period and a similar technology centred on the production of large bifaces and somewhat less refined lanceolate points, suggests this transition. Following what appears to be the initial Shield Archaic period characterized by large bifaces and lanceolate points, there is an apparent proliferation of point styles including various forms of stemmed and notched points.

The earliest peoples whom archaeologists refer to as the Shield Archaic Tradition, were big game hunters who lived in the area following the last glacial ice-age. About 2,000

years ago, these people shifted to an economy of smaller game and fishing which required smaller tools and a seasonal round to exploit various resources at different times of the year. Fired clay pottery was added to the material culture at this time by the people who are called the Laurel Tradition or Middle Woodland Culture. The Laurel Culture gradually evolved into the late Woodland Blackduck (Ojibway) and Selkirk (Cree) pottery styles. These people were the ancestors of present day regional cultural/social groups such as the Mattagami First Nation (Settlement Surveys Ltd. 1995:37).

Initial Woodland-Laurel- 2,000 years ago

Economically, Laurel Tradition peoples who followed the Shield Archaic Peoples practised a hunting/gathering subsistence pattern which was similar to the Archaic patterns. Bands consisted of groups of closely related families and people probably spent much of the year in extended family groups relying on large and small game and fish for subsistence. During the summer the band would have camped together on a large lake or river.

Other than the summer group campsites, Laurel sites are generally small, possibly reflecting the establishment of a seasonal round which saw the Laurel people break up into individual families during the fall, winter and spring periods of the year to more effectively exploit available resources. Laurel site distribution and settlement patterns differ from the inland site pattern noted for the Archaic period and set the pattern for settlement in the following Terminal Woodland period. Laurel peoples showed a preference for large lakes and rivers with preferred campsites on sandy bays, portage ends, points, peninsulas and locations near waterfalls, below rapids and at river mouths. These locations served for the establishment of small, seasonal hunting and fishing camps.

Terminal Woodland Period (Anishnabeg Peoples) 800 years ago

Recent data from northern Ontario suggests a trend toward an increase in population during the Terminal Woodland period reflected in an increased frequency of sites recovered during archaeological surveys. This trend seems to be repeated across northern Ontario and whether this actually represents population increases or a bias in site recovery remains to be demonstrated.

Archaeological evidence suggests that a seasonal cycle of travelling to resource exploitation areas may have been well established during this era. Site locations follow an established pattern with preference given to level places on islands, peninsulas, narrow parts of lakes, sandy beaches and portage ends, as well as rapids and waterfalls on rivers.

With the advent of the fur trade, traditional subsistence and settlement patterns became somewhat disrupted, with settlements often occurring in the vicinity of fur trade posts or near the railways especially later in the period.

The project lies within the traditional territories of the Wahnipitei and Whitefish Lake First Nations.

Wahnapitae First Nation

The Wahnapitae First Nation has a small community and reserve (N^o. 11) on the northwest shore of Wanapitei lake. The First Nation participated in the Sudbury Forest Management Plan and is active in regional land use planning issues.

The Wahnapitae and other Aboriginal Peoples have shared the Sudbury Forest area for more than three hundred years with Europeans. However, their history in the area goes back a minimum of 6,000 years and perhaps several thousand years earlier to the days

The broader territory of the Ojibway-speaking (Anishnabek) peoples once extended from the Ottawa valley and southern Ontario around both sides of the upper great lakes to the western prairies. The Anishnabek or Ojibway is still the largest tribal grouping north of Mexico (Ritzenthaler 1978:742).



Brief History of Atikameksheng Anishnawbek First Nation (Formerly Whitefish Lake First Nation)

(From: <http://www.wlfn.com/>, accessed December 2010)

Atikameksheng Anishnawbek are descendents of the Ojibway, Algonquin and Odawa Nations. In 1850, Chief Shawenekezhik, on behalf of the Whitefish Lake First Nation signed the Robinson-Huron Treaty granting the Canadian Government surrender of much of the First Nation's land.

The First Nation is located approximately 19 km west of the Greater City of Sudbury. The current land base is 43,747 acres, much of it being deciduous and coniferous forests, surrounded by eight lakes, with eighteen lakes within its boundaries.

As of November, 2009 the total population is 1018 members.

The community has grown significantly throughout the years. Currently there are 120 houses located in the community, 30 cottages owned by residents on various lakes throughout the First Nation. Along the northern shores of Lake Penage, 43.5 acres of land was surrendered for cottage leasing purposes. Currently, there are 97 lots that have road access to the cottages. Not only is it road accessible but electricity and telephone services are available for the cottagers.

The following letter is contained in the notes by the Provincial Land Surveyor, Abrey, who surveyed the reserve in 1884.

Sir,

I have the honour in accordance with instructions received from the department of Indian affairs through the agent J.C. Phipps Esq. of Manitowaning to submit the following report on the survey of the White Fist lake Indian Reserve in Ontario.

That is to say: on examination of the locality occupied by the Indians at White Fish Lake. I found that the very indefinite description of the reservation contained under the Robinson treaty did not satisfactorily determine the bounds of the same, in fact – could not apply at all. The Indians belonging to the band did not at the time of the treaty nor since occupy between the White Fish and Wahnepatae Rivers.

I called together the head men of the Band and learned from them that they live now in the same place that they did at the time of the treaty, that they did not at any time understand that their reserve extended to the Wahnepatae River, but that the bounds which they pointed out to me and the same as now shown in the within returns, represents the reserve that they have always claimed and believed to be that given to them under the treaty.

I would remark that the nearest distance to the Wahnepatae River from the place occupied by the Indians is some 17 miles, as measured along Salter's Base Line, and the distance between White Fish River and the Wahnepatae River along the same line is a couple of miles less.

Therefore on becoming acquainted with the facts, I accepted the only information available, (the position and statements of the Indians themselves) outside of the wording of the treaty, and proceeded with the Survey conforming closely with the information given by the Indians living on the reservation.

It will be observed that the townships of Graham and Waters, subdivided by the Crown Lands Department of Ontario during last season cover some of the reserve and include some of the improvements made by the Indians. Also that the Hudson Bay Co. have houses and other buildings within the survey, and that J. Cozens Esq P.L.S. Surveyed a location for the Hudson Bay Co. about their buildings. I have taken copies of the plans of these various surveys as deposited in the office of the Crown Lands, and when in the field during the progress of the survey connected the lines run of the same whenever discovered, and have represented all in the Field Notes and Plans herewith returned.

The Georgian Bay branch of the Canadian Pacific Railway crosses the northerly portion of the reserve. The location of which is taken from the township maps.

Generally the country comprised in the Reserve is very rough and broken and not suited for agriculture, some flats of good land exist in the north easterly portion of the reservation however.

Almost the whole extent of the reserve has been overrun by fires and the timber destroyed. Some tracts have partially escaped in the neighbourhood of Lake Panache and on the Island in the same, a considerable quantity of small pine fit for lumbering purposes can be obtained over this portion.

The lakes would seem to abound with Fish of the same kinds and qualities found in Lake Huron. Water covers a large portion of the Country. There are many lakes within the bounds of the reserve now shown in these returns, and taken separately were not of sufficient extent, it was assumed to warrant a survey.

The straight line boundaries of the reserve have been well opened out and marked, and much care has taken to obtain accurate courses and distances throughout the survey.

June 20th 1884 G. Abrey P.L.S.

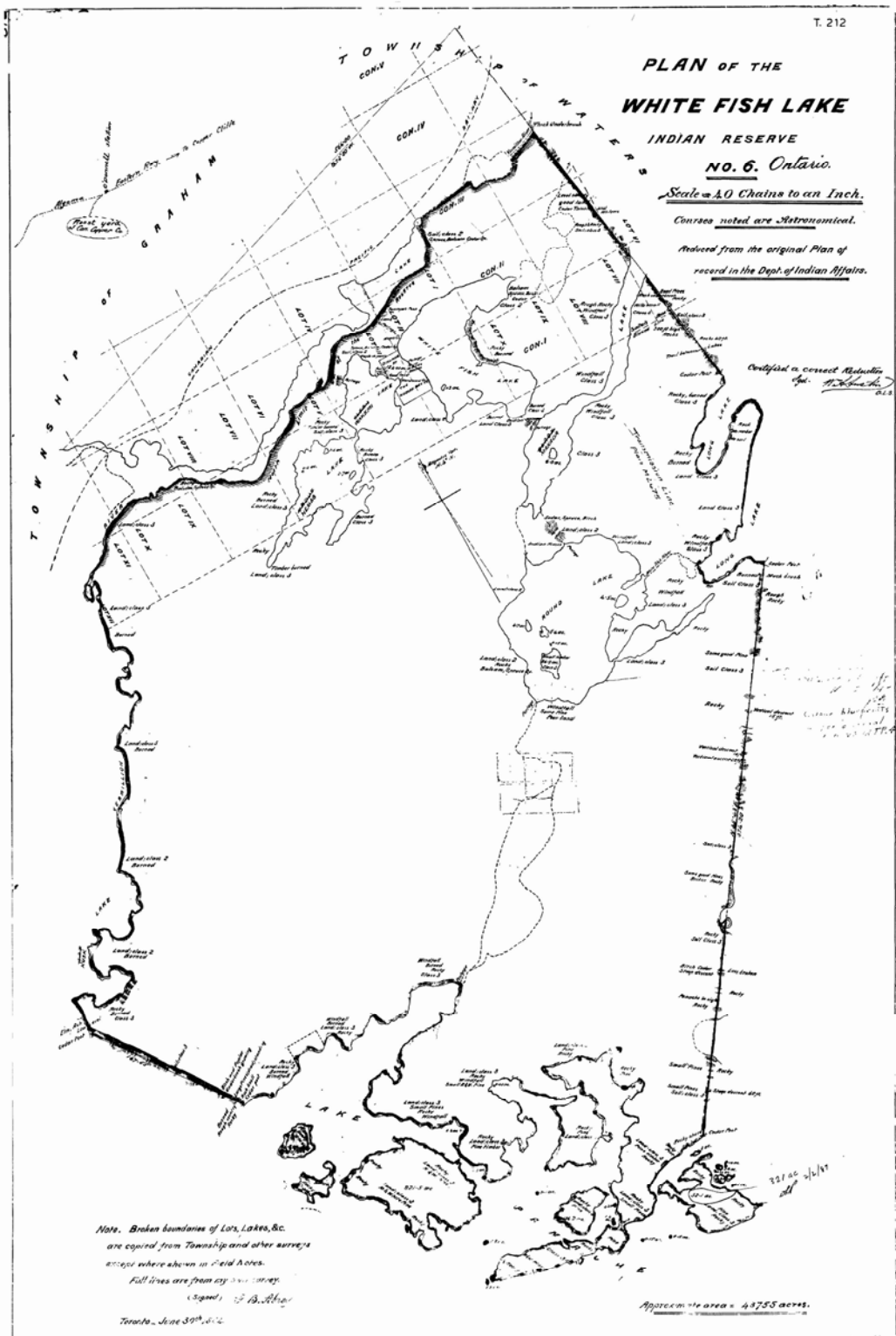


Figure 2. Map of the original survey of the Atikameksheng Anishnawbek (Whitefish Lake) reserve. (<http://clss.nrcan.gc.ca/plansearch-rechercheplan-eng.php>: accessed December 2010)

1.3 Archaeological context

1.3.1 Before initiation of fieldwork, the site files and catalogued reports at Woodland Heritage Services Ltd. and/or the offices of the Archaeological Data Coordinator, Ministry of Culture were checked to determine if any pre contact or historic archaeological sites had been previously recorded either in or near the study area.

No archaeological or cultural heritage sites have been registered within 5 kilometres of the study area.

1.3.2. Current Land Use(s), Field Conditions, Soils and Topography

Some of the lands directly associated with the property in question currently are currently part of the City of Great Sudbury's existing infrastructure. Whereas the area of new road construction will pass through the Maley Conservation Area to the west of Maley Drive and the Nickeldale Conservation Area north of Lasalle Blvd.

The vegetation of this area is typical of the Great Lakes / St. Lawrence transition forest. One difference exists, that is, much of the soils in areas around Sudbury have been eroded due to the acidic rain killing off of the vegetation during the increased smelter production during WW2. This creates an unusual archaeological field condition in that pre-contact sites can sometimes be identified without sub-surface testing. All areas of exposed rock were checked for archaeological resources.

1.3.3. Field Work Schedule

The field work was carried out in August 2011.

1.3.4. Past Fieldwork

It is unknown if past field work was carried out within the planned Maley Dr. extension area. Woodland Heritage Services has conducted fieldwork along the Highway 17 corridor both to the east and west of Sudbury.

1.3.5. Physical features affecting fieldwork strategy, decisions or the identification of artifacts or cultural features.

None encountered.

2.0 Stage 1 Assessment Background

2.0.1 Property Inspection

A visual inspection was carried out for the entire study area. Of the 10 areas that were selected to be examined, only two general areas demonstrated archaeological potential (Areas 4, 5, 6 and Area 7). Those areas were tested as part of the Stage 2 field work.

2.1 Stage 1 Analysis and Conclusions

2.1.1 Identify and describe areas of archaeological potential within the project area.

This study area is located within the Canadian Shield and as such often presents areas of complex archaeological potential.

Areas of archaeological potential were encountered in the areas yet to be developed that are near to water: areas 4, 5, 6 and 7.

2.1.2 Identify and describe areas that have been subject to extensive and deep land alterations.

Previous road construction caused intensive and extensive alterations to the study area by means of platform construction and developing drainage features.

Most of the original streams visited has been substantially altered, channelized and reworked as a consequence of the initial road building efforts and infrastructure maintenance. These are areas 1, 2, 3, 8, 9 and 10

2.2 Stage 1 Recommendations

2.2.1 Make recommendations regarding the potential for the property.

As areas of archaeological potential were identified, Stage 2 subsurface testing should be carried out, and was during the Stage 2 portion of the field work.

3.0 Stage 2 Field methods

3.0.1 Background

As two general areas of archaeological potential were identified (Areas 4, 5, 6 and Area 7), sub-surface testing was carried out. Sub-surface testing did not recover any archaeological or cultural heritage resources.

Photographs and GPS waypoints were used to document the ground conditions within the study area.

3.0.2 Areas of Disturbance

i. a map depicting the exact limits of the area

Figures 3 – 33 depict the exact limits of the areas facing disturbance.

ii. documentation describing how the limit of the area was determined during the survey and confirming that the area included enough overlap to ensure that all adjacent impacted lands were surveyed.

Communication with Ted Archuticz (AECOM) provided the exact locations of those areas to be disturbed.

3.1 Stage 2 Property Survey – As relevant, provide detailed and explicit descriptions:

a. of how each standard was addressed for property survey generally

All of the standards referring to property survey were carried out in full for the area to be impacted.

b. of how each standard was addressed for pedestrian survey and test pit survey

All of the standards for test pit survey were carried out in full for the areas felt to have some archaeological potential.

c. to address any differences in approach for areas possessing different conditions

Not applicable.

d. of how each standard was addressed where alternative methods acceptable through Guidelines or Special Conditions were used.

Not applicable.

3.2 Stage 2 Property Assessment – Provide estimates of the percentage of each of the following:

3.2.1 the property surveyed, by coverage and survey interval

A total of ten areas were inspected/ tested for their archaeological potential, those areas with archaeological potential were tested at 5 metre intervals using sub-surface techniques with all soil screened through 6 mm. mesh. The ten areas inspected trend southwest from the western terminus of the existing Maley Drive and continue to a section of Lasalle Blvd.

The following area descriptions of the areas inspected that resulted in the conclusion of the areas having low archaeological potential. All coordinates are in UTM 17 NAD 83

unless otherwise stated. All subsurface test units were at minimum 30cm x 30cm with all soils screened through 6mm. mesh.

Areas 4, 5 and 6. Located at 503829mE 5153747mN, 503669mE 5153747mN and 503571mE 5153743mN respectively, and MTM Zone 53 Northing – 53524, Easting – 53816 / Northing – 53524, Easting – 53656 / Northing – 53520, Easting – 53558 respectively (Figures: Area 4 – 12, 14, 17, 18; Area 5 – 12, 14, 19, 20, 21; Area 6 – 12, 14, 22, 23) appeared as a small pond on the satellite imagery used to define the Stage 1 areas of archaeological potential. In advance of the Stage 2 work, it was noticed that this feature is not present on the National Topographic Series maps. Research using historic air photography was carried out and it appears as though there was never any water in this system until recently. The historic photographs show a treed wetland abutting the former farm fields in the area (before the development of this part of the City of Greater Sudbury). It is suspected that some of the natural drainage of the area was cut off from the encroaching infrastructure, subsequently some surface water may have developed that was then taken advantage of by the beavers. The air photographs of the present day show the pond area with many beaver dams constructed throughout.

The field crew did investigate the east and west sections of this present feature. They noted newly created wetland conditions as well as areas of permanently saturated soil. On the west it was rocky, and the crew noted an area of recent partying activity. Some areas of level well drained soils were encountered in the areas of 5 and 6. These were tested using sub-surface methods.

Area 7. Located at 501865mE 5153210mN / MTM Zone 53 Northing – 52987, Easting – 51851 (Figures 24, 25, 28, 29). This area presents itself as a small stream with a mix of exposed bedrock and marsh vegetation. The exposed bedrock was carefully inspected for archaeological resources. No testing was carried out in the marsh area. No

archaeological or cultural heritage resources were located through the inspection of this area.

3.2.2 the property not surveyed because there were areas of no archaeological potential

The following area descriptions of the areas inspected that resulted in the conclusion of the areas having low archaeological potential. All coordinates are in UTM 17 NAD 83 unless otherwise stated.

Area 1. Located at 506648mE 5153749mN / MTM Zone 53 Northing – 53526, Easting 56636 (Figures 5, 6, 8, 9). The stream at this location, upon inspection, was highly disturbed with extensive channelization on both the north and south side. Due to the disturbance no testing was carried out. Photographs and GPS waypoints were used to document the existing ground conditions.

Area 2. Located at 505834mE 5153740mN / MTM Zone 53 Northing – 53517, Easting – 55822 (Figures 5, 7, 10, 11). This area, upon inspection, was found to be disturbed to the north (where the new disturbance was planned to occur) where the stream had been channelized and fill (blast rock and sand), was brought in to stabilize the banks and provide the road platform. Due to this disturbance the archaeological potential was not confirmed. As such, no sub-surface testing was carried out. Photographs and GPS waypoints were used to document the existing ground conditions.

Area 3. Located at 504508mE 5153743mN / MTM Zone 53 Northing – 53520, Easting – 54496 (Figures 12, 13, 15, 16). The new disturbance is planned to occur on the north side of the existing road. It is only slightly offset from the original road providing a future 4 lane section of the road. This area is a persistent wetland with low alder filled permanently saturated soils flanking the wetland. As such, the archaeological potential was not confirmed, and no sub-surface testing was carried out.

Area 8. Located at 501308mE 5152586mN / MTM Zone 53 Northing – 52363, Easting – 51294 (Figures 24, 26, 30). This area, likely due to its proximity to developed areas, had been disturbed in the past. This previous disturbance and the rugged nature of the southern bank of the stream preclude archaeological potential. As such, no testing was carried out. Photographs and waypoints were collected to document this area.

Area 9. Located at 501218mE 5152592mN / MTM Zone 53 Northing – 52369, Easting – 51204 (Figures 24, 26, 30, 31). The stream located at this area is small, slow and un-navigable by canoe. The entire extent of the area of the stream where the road is planned to intersect is low and marshy. As such it did not meet the conditions of archaeological potential and was not tested. Photographs and waypoints were used to document this area.

Area 10. Located at 500743mE 5152081mN / MTM Zone 53 Northing – 51858, Easting – 50729 (Figures 24, 27, 32, 33). The area where the proposed road is planned to intersect has been completely altered from its natural state through the development of Lasalle Boulevard. As no areas that had not been disturbed were located, the area was documented but not tested.

3.3 Record of finds

Inventory of field documentation.

- Photographs were taken of the study area landforms and vegetation.
- Photographs were taken of the areas to be impacted.
- Areas were noted on maps of all the areas to be impacted.
- GPS coordinates were taken using a Garmin 60 CSX with an error rated (with WAAS) to +/- 5 metres on average. All coordinates are in UTM 17T NAD 83.

3.4 Stage 2 Analysis and conclusions

No archaeological or significant cultural heritage sites were identified during the Stage 2 fieldwork for those areas tested using sub-surface techniques or the careful inspection of exposed bedrock in areas 4, 5, 6 and 7. For areas 1, 2, 3, 8, 9 and 10 it is felt that due to the intensive and extensive disturbance of the area from previous road construction, as well as the low and wet conditions of the land, that it be considered to have no or low archaeological potential.

3.5 Stage 2 Recommendations

As no archaeological or cultural heritage resources were located through the surface and sub-surface inspection of the 10 areas, it is recommended that the City of Greater Sudbury be allowed to proceed with their plans to develop the Maley Drive extension without further archaeological or cultural heritage work.

It is also recommended that those areas inspected through this study have their associated archaeological and cultural heritage concerns removed and be reclassified as low potential.

3.6 Advice on compliance with legislation

Advice on compliance with legislation is not part of the archaeological record. However, for the benefit of the proponent and approval authority in the land use planning and development process, the report must include the following standard statements:

a. This report is submitted to the Minister of Culture as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological licence, and that the archaeological fieldwork and

report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario.

b. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.

c. The Cemeteries Act requires that any person discovering human remains must notify the police or coroner and the Registrar of cemeteries, Ministry of Small Business and Consumer Services.

*Reports recommending further archaeological fieldwork or protection for one or more archaeological sites must include the following standard statement: 'Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act. and may not be altered, or have artifacts removed, except by a person holding an archaeological licence'.

4.0 Figures (Maps and Images) On following pages.

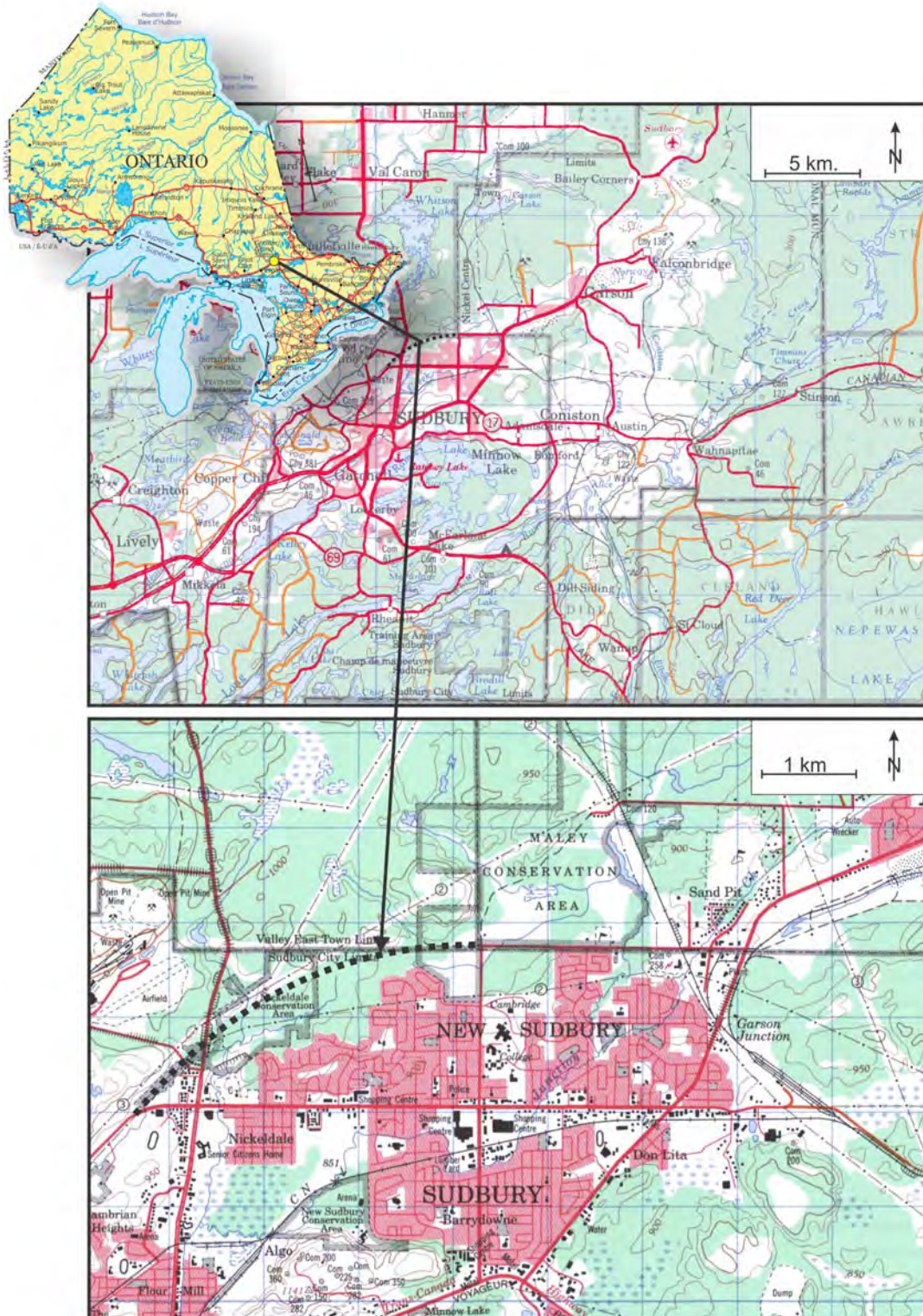


Figure 3. Maley Dr. extension project location map.

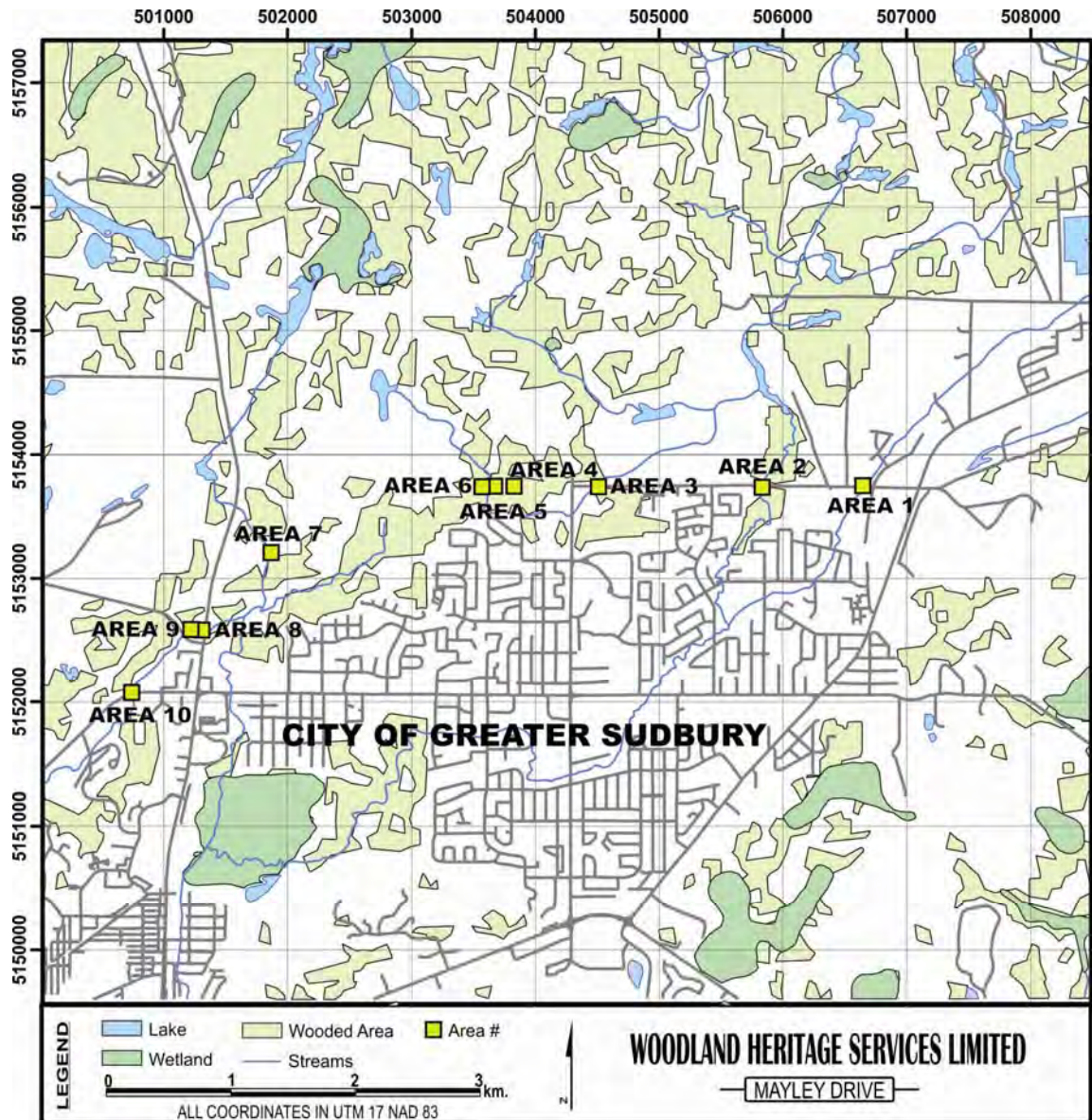


Figure 4. Location of areas inspected.

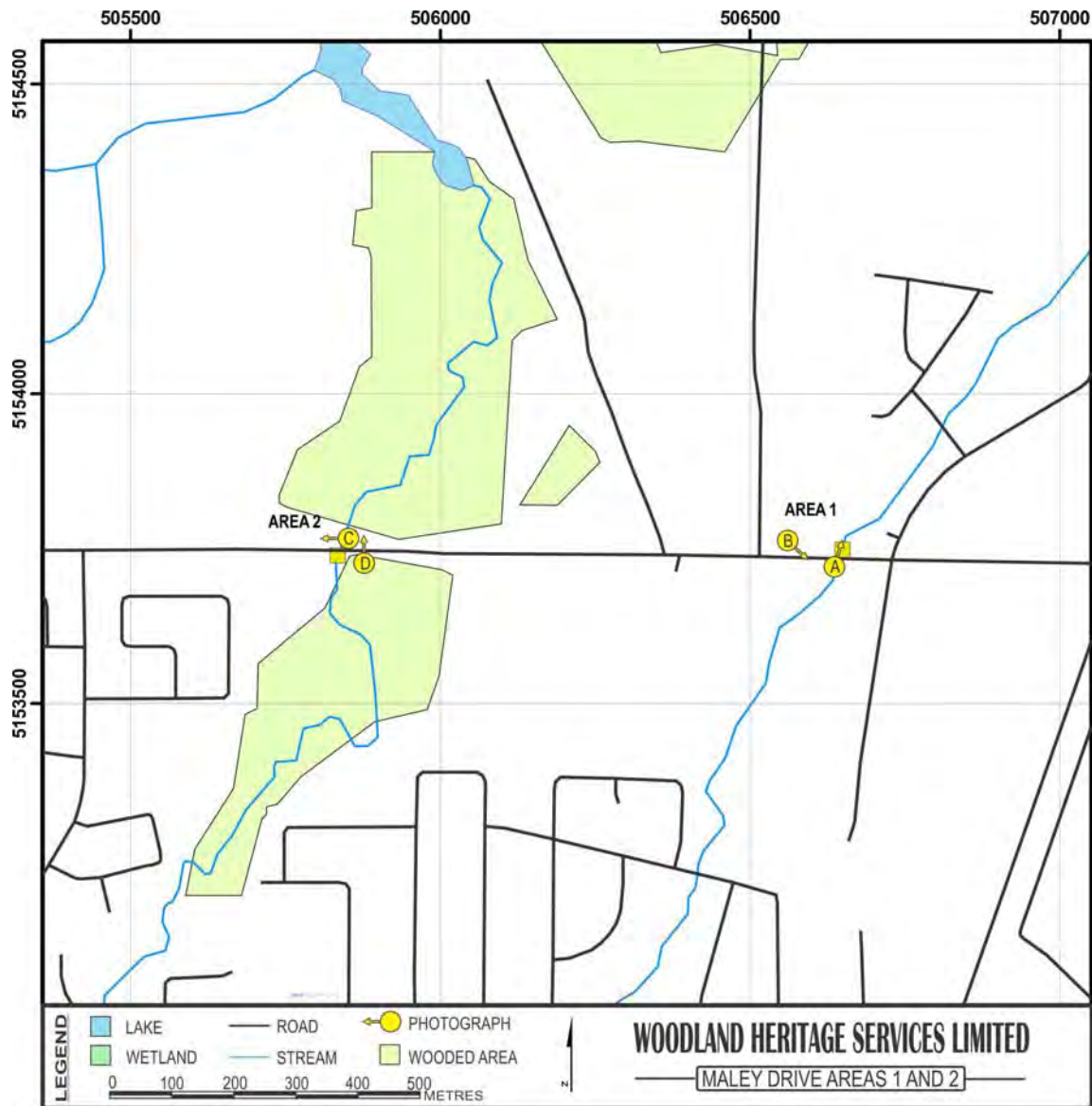
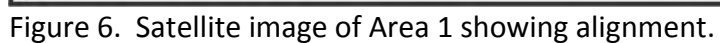


Figure 5. Map of areas 1 and 2 showing photograph locations.



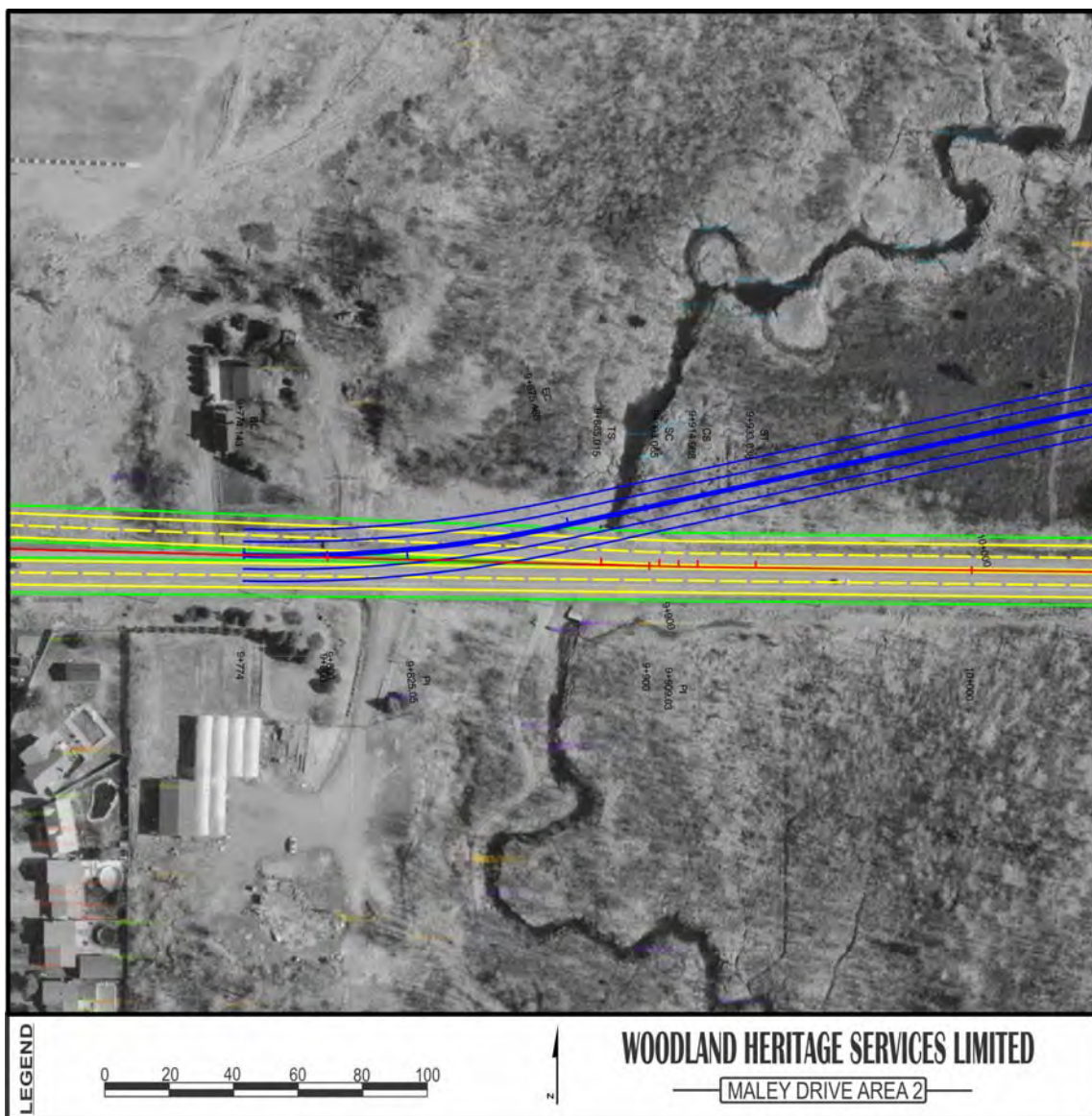


Figure 7. Satellite image of Area 2 showing alignment.



Figure 8. Photograph "A" looking northeast.



Figure 9. Photograph "B" showing the channelized stream and road.



Figure 10. Photograph "C" showing an area of disturbance through road building.



Figure 11. Photograph "D" showing culvert area.

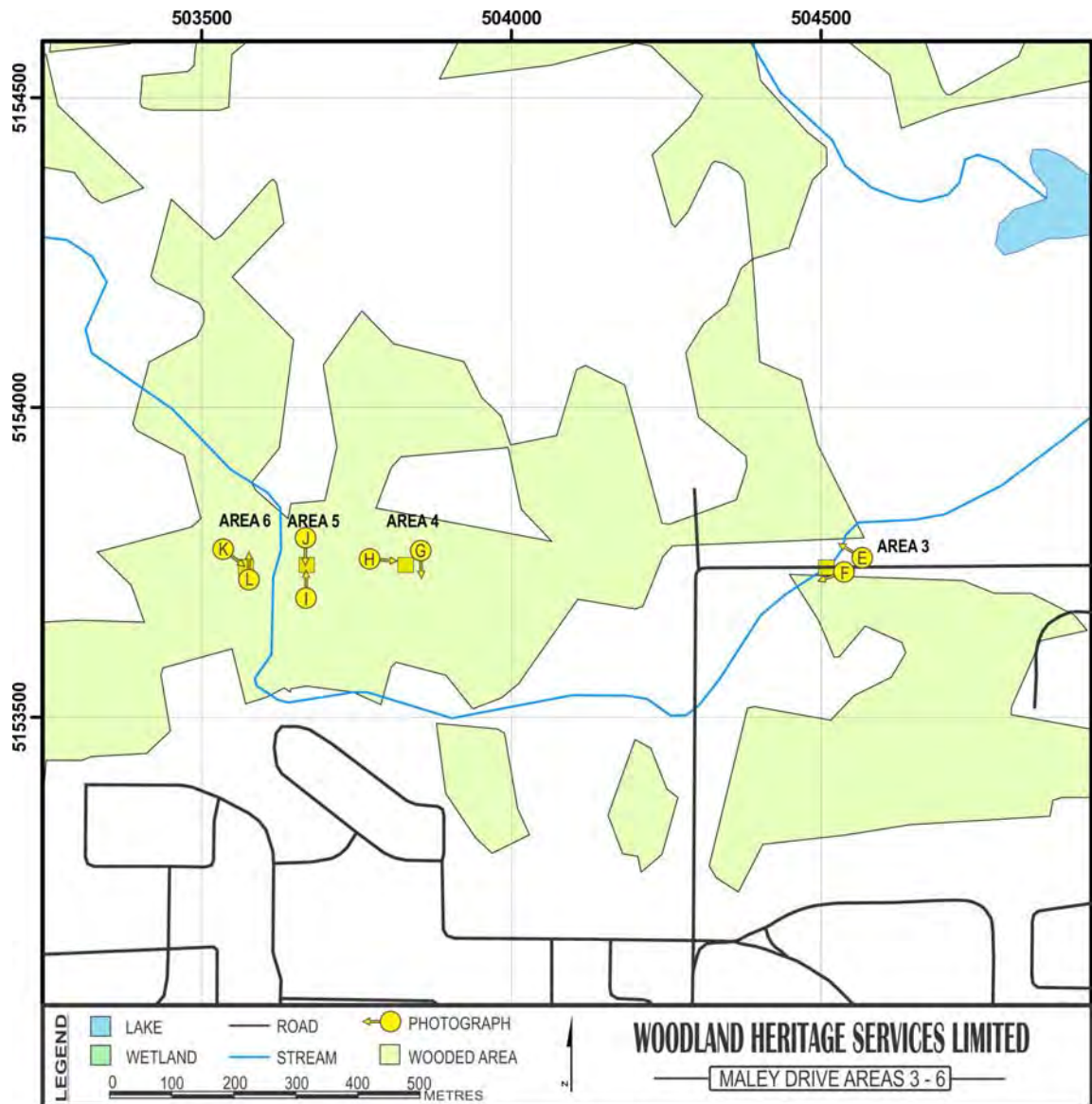


Figure 12. Map of areas 3 – 6 showing photograph locations.

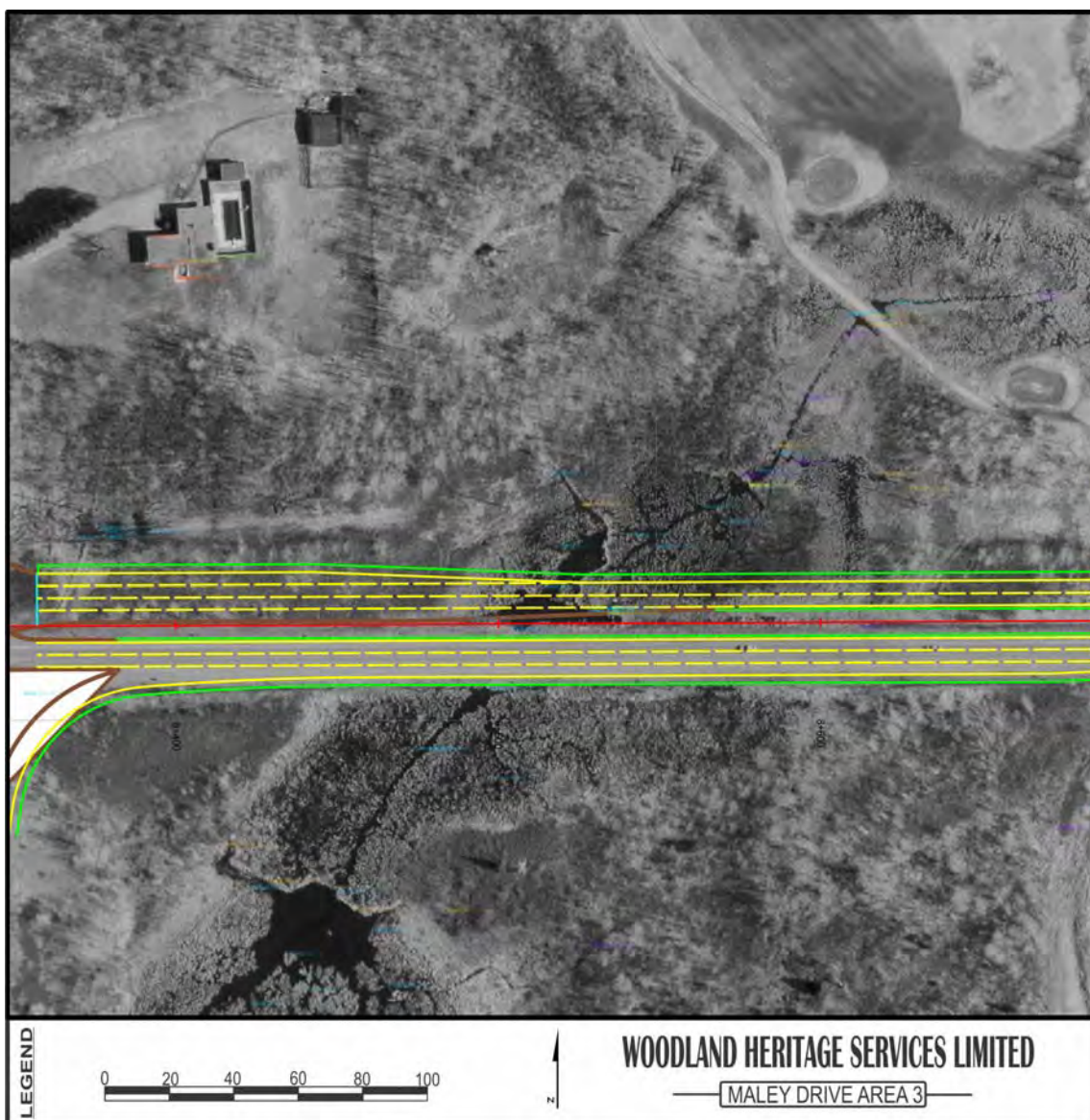


Figure 13. Satellite image of Area 3 showing alignment.

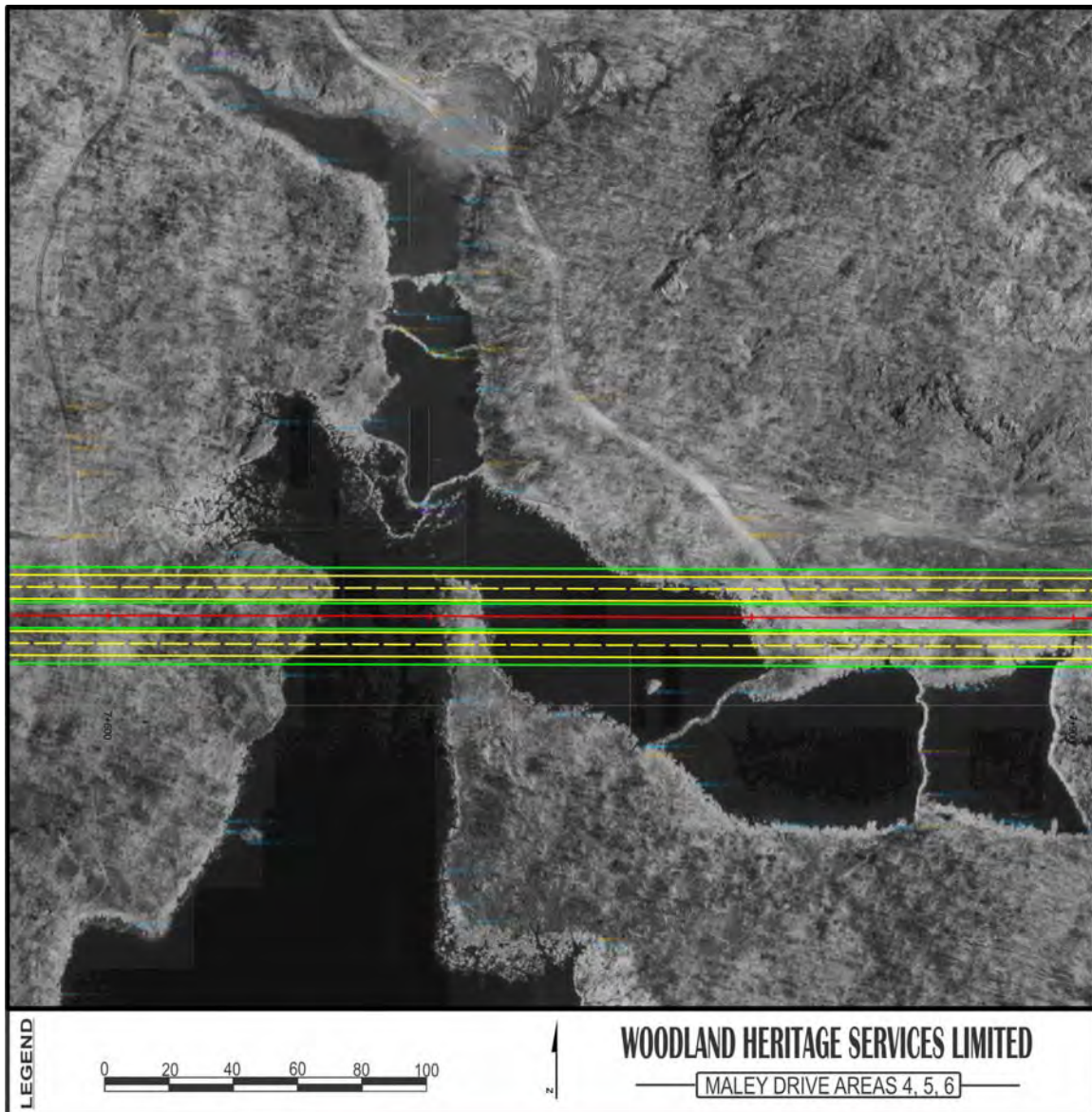


Figure 14. Satellite image of Areas 4 – 6 showing alignment. This pond is a newly created feature due to increased water being trapped due to expanding city infrastructure, and has been taken over by beavers. That is why this pond does not show up on the map.



Figure 15. Photograph "E" looking northwest at Area 3.



Figure 16. Photograph "F" looking southwest at Area 3.



Figure 17. Photograph “G” looking south at Area 4.



Figure 18. Photograph “H” looking east at two beaver dams at Area 4.



Figure 19. Photograph "I" looking north at Area 5.



Figure 20. Photograph "J" looking south at Area 5.



Figure 21. Photograph of a typical sub-surface test pit at Area 5.



Figure 22. Photograph "K" looking south at Area 6.



Figure 23. Photograph “L” looking east at Area 6.

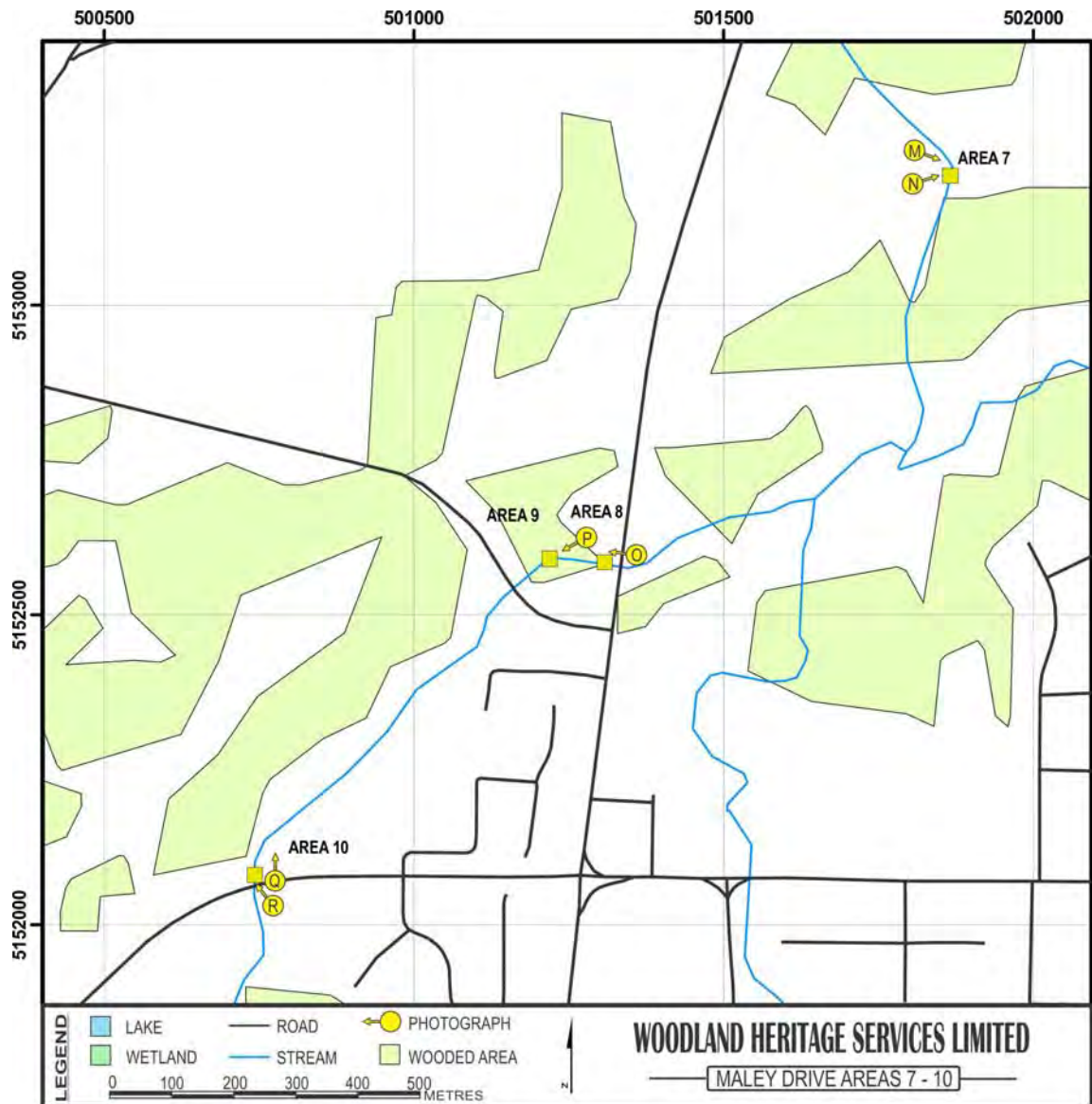


Figure 24. Map of Areas 7 – 10 showing photograph locations.

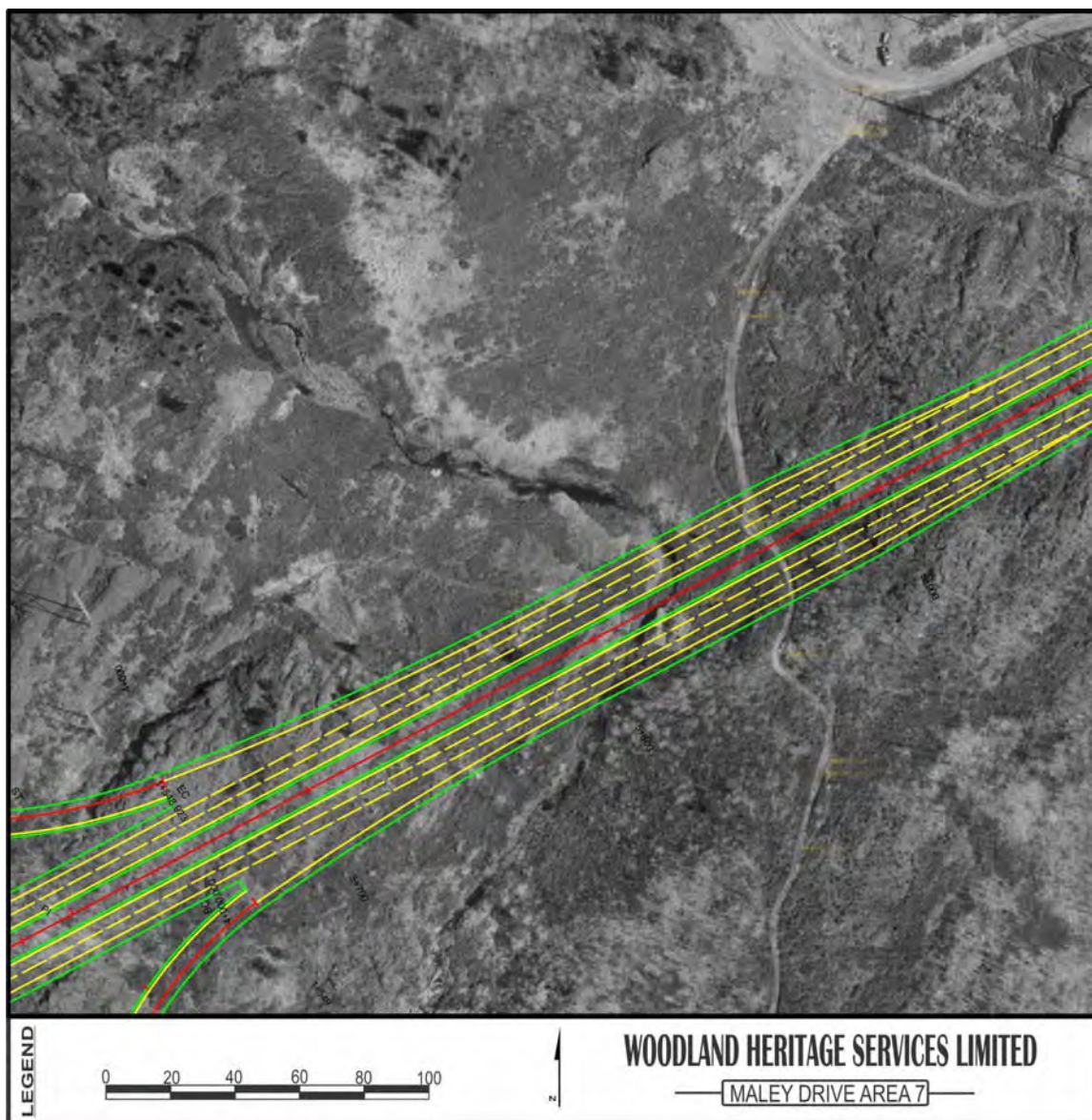


Figure 25. Satellite image of Area 7 showing alignment.

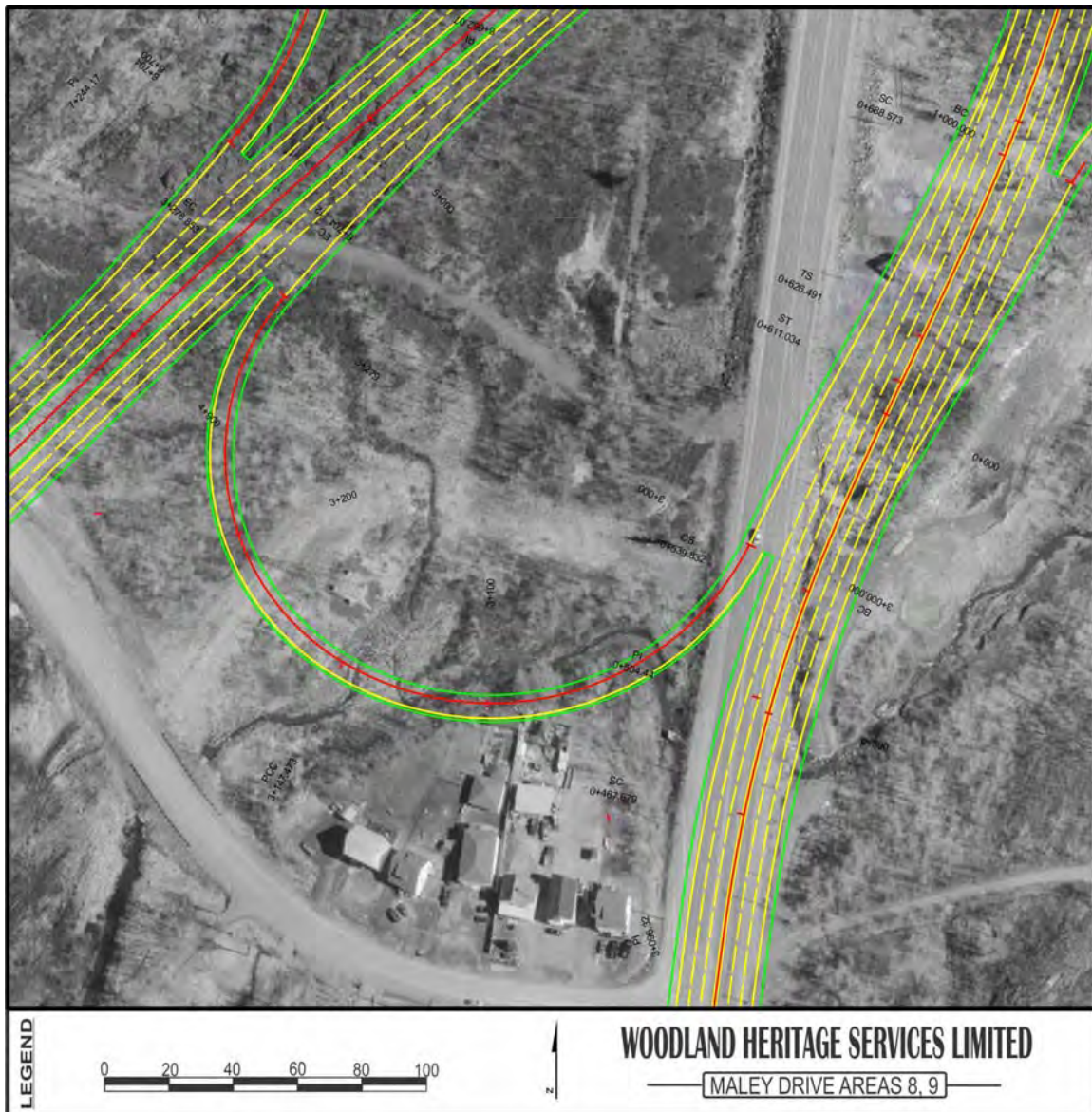


Figure 26. Satellite image of Areas 8 and 9 showing alignment.

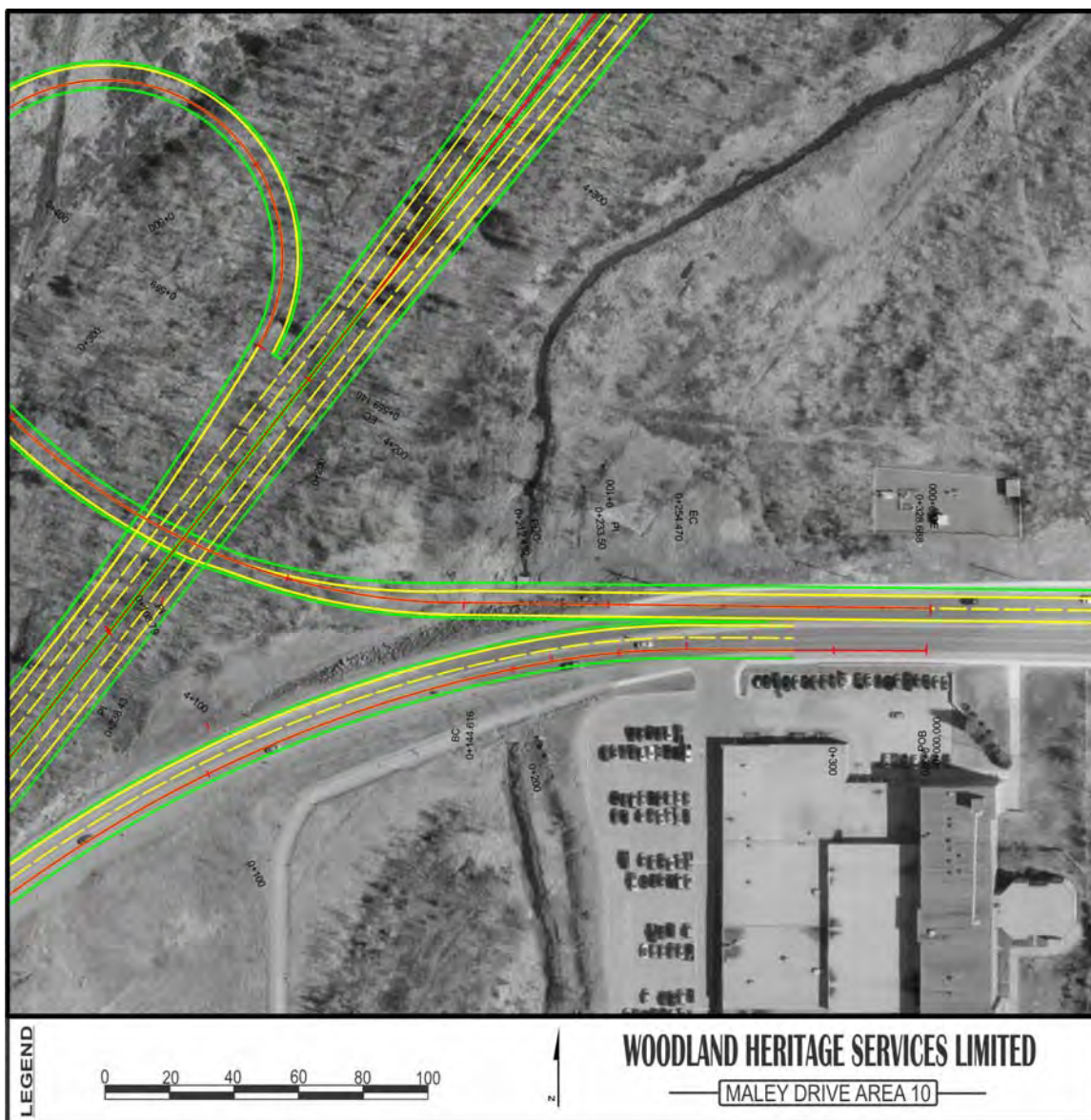


Figure 27. Satellite image of Area 10 showing alignment.



Figure 28. Photograph “M” showing the creek at Area 7.



Figure 29. Photograph “N” showing the general environment of Area 7.



Figure 30. Photograph "O" looking west at Area 8 looking to Area 9.



Figure 31. Photograph "P" looking south at Area 9.



Figure 32. Photograph “Q” looking north at Area 10.



Figure 33. Photograph “R” looking southwest at environment of Area 10.

5.0 References

Biggar, H.P. editor

- 1922 The Works of Samuel de Champlain. In Six Volumes. The Champlain Society: Toronto, 1922-1936.

Boyer, G.W.

- 1970 Early Days in Muskoka. Bracebridge: Herald-Gazette Press.

Canada

- 1891 Indian Treaties and Surrenders from 1680 to 1890. 2 vols. Ottawa. Ottawa: Queen's Printer.

Canada

- 1923 Copy of the Treaty Made October 31, 1923 between His Majesty the King and the Chippewa Indians of Christian Island, Georgina Island and Rama. Ottawa: King's Printer.

Canada

- 1986 Registered Indian population by sex and residence 1986. Ottawa: Indian and Northern Affairs Canada.

Coombe, Geraldine

- 1976 Muskoka Past and Present. McGraw-Hill Ryerson Limited.

Chiefs of Ontario

- 1990 List of First Nations in Ontario. Xeroxed copy obtained from the Ontario Archaeological Society, Willowdale, Ontario.

Day, Gordon and Bruce Trigger

- 1978 "Algonquin" in Handbook of North American Indians. Volume 15. Bruce Trigger volume editor. Smithsonian Institution, Washington.

DCB IX

- "Musquakie", Dictionary of Canadian Biography, Volume IX Toronto: University of Toronto Press, 1976:589-90.

DCB XI

- Robert Peter Gillis, "W.G. Perley", Dictionary of Canadian Biography, Volume XI. Toronto: University of Toronto Press, 1982:681-682.

Dickson, James

- 1885 Camping in the Muskoka Region. Toronto: C. Blackett Robinson.

Guide Book & Atlas of Muskoka and Parry Sound Districts

1879 Maps by J. Rogers and S. Penson, H. Page & Co., Toronto.

Hanson, Lise C.

1986 "Research Report: The Algonquins of Golden Lake Indian Band Land Claims". Office of Indian Resource Policy, Ontario Ministry of Natural Resources.

HBC Arch. B109/a

Hudson's Bay Company Archives, Winnipeg. LaCloche Post Journals, 1826-1836.

Hunter, A.F.

1909 A History of Simcoe County. 2 vols. Barrie: The County Council.

Jones, Peter

1861 History of the Ojebway Indians: With Especial Reference to their Conversion to Christianity. London:A.W. Bennett. Reprinted Freeport, N.Y.: Books for Libraries, 1970.

Kennedy, Clyde C.

1970 The Upper Ottawa Valley. Renfrew County Council, Pembroke.

Lambert, Richard

1967 Renewing Nature's Wealth: A Centennial History of the Public Management of Lands, Forests & Wildlife in Ontario, 1763-1867. Toronto: Ontario Department of Lands and Forests.

Long, Gary

1989 This River the Muskoka. The Boston Mills Press.

Mika, Nick and Helma, editors.

1977 Places in Ontario: Their Names Origins and History. Mika Publishing, Belleville.

Murray, Florence

1963 Muskoka and Haliburton 1615-1875: A Collection of Documents. Toronto: The Champlain Society for the Government of Ontario.

Ontario Atlas

1969 Economic Atlas of Ontario. Toronto: University of Toronto Press. Plate 98: Evolution of Administrative Areas, 1788 to 1899; Plate 99: Original Township Surveys, Southern Ontario.

OMNR

- n.d. "Algonquin Land Claim in the Ottawa Valley". Map # 48. Ontario Ministry of Natural Resources. Office of Indian Resource Policy.

Ontario, Ministry of Natural Resources

- 1974 Historical Sites Branch Annual Review: Research 1973-74, edited by Donald G. McLeod.

Penson, Seymour

- 1983 "Seymour Penson and his Muskoka Neighbours, Part I: An Autobiography [1910]", East Georgian Bay Historical Journal, Volume III: 168-226.

Pollock, John W.

- 1975 Algonquian Culture Development and Archaeological Sequences in Northeastern Ontario. Canadian Archaeological Association, Bulletin 7:1-53.
- 1976b The Culture History of Kirkland Lake District, Northeastern Ontario. National Museum of Man, Mercury Series, Archaeological Survey of Canada, Paper 54.
- 1984 A Technological Analysis of Lake Abitibi Bifaces. Unpublished Ph.D. Thesis, Department of Anthropology, University of Alberta.
- 1994 Lake Abitibi Model Forest, Cultural Heritage Project. In the Fifth Annual Archaeological Report, Ontario. Volume 5 (New Series 1994) pp. 50-56.

Pryke, Suxan

- 1987 Explore Muskoka. The Boston Mills Press, Erin, Ontario.

Reid, Richard, editor

- 1990 The Upper Ottawa Valley to 1855: A collection of Documents. The Champlain Society, Toronto.

Ritzenthaler, Robert E.

- 1978 "Southwestern Chippewa", in Bruce G. Trigger (ed.), Northeast, Volume 15 of Handbook of North American Indians. Washington: Smithsonian Institution: 743-759.

Robinson-Huron

- 1850 Copy of the Robinson Treaty made in the Year 1850 with the Ojibewa Indians of Lake Huron, Conveying Certain Lands to the Crown. Ottawa:Queen's Printer, 1964.

Rogers, Edward S.

- 1978 "Southeastern Ojibwa", in Bruce G. Trigger (ed.), Northeast, Volume 15 of Handbook of North American Indian. Washington: Smithsonian Institution: 760-771.

Sarazin, Greg

- 1989 "220 Years of Broken Promises" in Drumbeat: Anger and Renewal in Indian Country, Boyce Richardson, editor. Summerhill, Toronto.

Saunders, Audrey

- 1963 Algonquin Story. Ontario Department of Lands and Forests.

Schmalz, Peter S.

- 1990 The Ojibwa of Southern Ontario. Toronto: University of Toronto Press.

Scott, David E.

- 2007 Ontario Place Names. DESPUB Printing, Allanburg Ontario.

Speck, Frank G.

- 1915 Family Hunting Territories and Social Life of Various Algonkian Bands of the Ottawa Valley. Geological Survey of Canada, Memoir 70. Ottawa

Settlement Surveys Ltd.

- 1985 1985 Archaeological Surveys, Ontario Ministry of Transportation and Communications, North Bay, by Dr. John Pollock. (Contains an archaeological field survey of Highway 69 from Port Severn to Highway 141).

- 1992(a) Archaeological and Heritage Impact Assessment W.P. 341-87-00, Highway 11 Preliminary Design Study for an Ultimate Freeway Design. Unpublished report prepared for R.E. Winter & Associates and the Ministry of Transportation. On file with the Ministry of Culture and Communications Toronto.

- 1992(b) Archaeological and Cultural Heritage Impact Assessment -Highway 69 Route Planning and Environmental Assessment. Unpublished report prepared for McCormick Rankin and the Ontario Ministry of Transportation. On file with the Ministry of Culture and Communications, Toronto.

Thompson, John

- 1991 Materials Relating to the History of the Land Dispute at Kanasetake (Oka). Indian and Northern Affairs Canada: Treaties and Historical Research Centre.

Thwaites, Rueben Gold (ed.)

1896-1901 The Jesuit Relations and Allied Documents.

Cleveland: Burrows Brothers. Volume XVIII: Hurons and Quebec, 1640.

Vidal and Anderson

1849 Report of Commissioners A. Vidal and T.G. Anderson on visit to Indians...
5 December 1849. Archives of Ontario. Irving Papers. MU 1464.
26/31/04.

Woodland Heritage Services Limited (Dr. John Pollock)

1999 Archaeological and Cultural Heritage Resources Study Hwy. 69
Preliminary Design and EA From Sudbury Southerly 20 Km to Burwash, W.
P. 327-91-00

2000 Archaeological and Heritage Impact Assessment of Highway 63- From 1.0
Km North of the Junction with highway 533, northerly to the Quebec
border, 23.5 Km, W.P. 167-90-00. Earth Tech (Canada Inc.).

2001 Archaeological Assessment of Highway 69 Interchanges, from 0.3 km
North of Highway 537, Northerly 8.8 km. G.W.P. 327-91-00, Consultant
Agreement No. 5005-A-000163, TSH Project # 42-91 022.

2001 Stage 1&2 Archaeological and Heritage Assessment, Pickerel River Bridge
Replacement, Hwy. 69 and 1 KM of New Highway Alignment MTO
Agreement # 5005-A-000146, W.P. 330-85-00, LGL Project # TA2502 (DS
Lea & Associates)

2001 Archaeological and Cultural Heritage Resource Assessment of Highway 69
from Deux Rivieres Easterly 19.0 Km, to Bissett Creek, District 54,
Sudbury. MTO Project # G.W.P. 16-84-01, MTO Agreement Number PO
5005-A-000039

2002 Re: Stage One and Two Archaeological / Geophysical Survey, Proposed
Highway 69 Bridges at Portage Lake, G.W.P. 293-97-00. (McCormick
Rankin Corporation).

2003 Stage One and Stage Two Archaeological/Cultural Heritage Site
Assessment of Highway 69 From Stonecliffe Easterly 12.7 km, District 54,
Sudbury. MTO Agreement Number PO 5005-A-000156,.W.P. 83-89-00

2003 Archaeological and Heritage Impact Assessment of the Commanda Stone
Piles, Nipissing Forest Management Unit

Wright, J.V.

1963 A Regional Examination of Ojibwa Culture History.
Anthropological, N.S. Vol. VII, No. 2, pp. 189-227.

1981 The Glen Site: An Historic Cheveux Releves Campsite on Floowerpot
Island, Georgian Bay, Ontario. Ontario Archaeology, Publication No. 35:
45-59.

Zaslow, Morris

1971 The Opening of the Canadian North, 1870-1914. Toronto: McClelland and
Stewart.

Additional Resources:

Ministry of Indian and Northern Affairs Canada: [http://pse5-esd5.ainc-
inac.gc.ca/FNP/Main/Search/FNMain.aspx?BAND_NUMBER=179&lang=e](http://pse5-esd5.ainc-inac.gc.ca/FNP/Main/Search/FNMain.aspx?BAND_NUMBER=179&lang=e)

Sagamok Anishnawbek entry in "Ontario Native Affairs Secretariat and Ministry of
Citizenship, (1992). Akwesasne to Wunnumin Lake – Profiles of Aboriginal Communities
in Ontario".

Robinson-Huron Treaty of 1850, Indian and Northern Affairs Canada ([http://www.ainc-
inac.gc.ca/al/hts/tgu/pubs/trob/rbt/rbt-eng.asp](http://www.ainc-inac.gc.ca/al/hts/tgu/pubs/trob/rbt/rbt-eng.asp))

Whitefish River First Nation entry in "Ontario Native Affairs Secretariat and Ministry of
Citizenship, (1992). Akwesasne to Wunnumin Lake – Profiles of Aboriginal Communities
in Ontario".

First Nations Detail – Whitefish River, Ministry of Indian and Northern Affairs Canada,
[http://pse5-esd5.ainc-
inac.gc.ca/FNP/Main/Search/FNMain.aspx?BAND_NUMBER=230&lang=eng](http://pse5-esd5.ainc-inac.gc.ca/FNP/Main/Search/FNMain.aspx?BAND_NUMBER=230&lang=eng) Taken July
22, 2011.

Statistics Canada. 2007. Whitefish River (Part) 4, Ontario (Code3552017) (table). 2006
Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa.
Released March 13, 2007.
[http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-
591/index.cfm?Lang=E](http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E)
(accessed July 22, 2011).



ATTACHMENT E

MNRF LETTER OF ADVICE

Ministry of Natural Resources and
Forestry
Sudbury District Office
Northeast Region
Regional Operations Division

3767 Highway 69 South, Suite 5
Sudbury, ON P3G 1E7
Tel: 705-564-7823
Fax: 705-564-7879

Ministère des Richesses naturelles et des
Forêts
Bureau de district Sudbury
Région Nord-est
Division des opérations régionales

3767 Route 69 Sud, bureau 5
Sudbury, ON P3G1E7
Tel : 705-564-7823
Télé : 705-564-7879



April 13, 2016

SUD-LOA-004-16

Stephen Monet
City of Greater Sudbury
200 Brady Street, P.O. Box 5000
Sudbury, ON P3A 5P3

Dear Mr. Monet,

RE: Proposed Notre Dame Interchange and the *Endangered Species Act, 2007*

The Ministry of Natural Resources & Forestry (MNRF) has reviewed the information that you provided on your proposed Notre Dame Interchange to assess the potential impacts of the proposal on species at risk and their protected habitat. From the information provided, it is our understanding that the proposed project falls within these parameters:

- a) The project involves the construction of an interchange at Notre Dame Avenue and the future Maley Drive extension, as indicated in the contract drawings submitted to our office via email on April 12, 2016.
- b) Surveys for Eastern Whip-poor-will and Blanding's Turtle (both provincially threatened species) were conducted by FRi Ecological Services in 2015 in the area of the proposed project. Based on the results of these surveys it was determined that both species, and subsequently their protected habitat, were absent from this location.
- c) Based on a review of the above information, MNRF staff have determined that the activities associated with the project, as currently proposed, **will likely not contravene** section 9 (species protection) and/or section 10 (habitat protection) of the *Endangered Species Act, 2007* (ESA) for Eastern Whip-poor-will and Blanding's Turtle.

Should any of the project parameters change please notify the MNRF Sudbury District office immediately to obtain advice on whether the changes may require authorization under the ESA. Also, if any protected species and/or habitats are observed on the property, please stop all work and contact the District office as soon as possible.

It is important to be aware that changes may occur in both species and habitat protection. The ESA applies to species listed on the Species at Risk in Ontario List (<http://www.ontario.ca/environment-and-energy/species-risk-ontario-list>).

The Committee on the Status of Species at Risk in Ontario (COSSARO) meets regularly to evaluate species for listing and/or re-evaluate species already listed. As a result, species' designations may change that could in turn change the level of protection they receive under the ESA. Also, habitat protection provisions for a species may change e.g. if a species-specific habitat regulation comes into effect. The regulation would prescribe the area that is the habitat of the species.

Please be advised that it is also your responsibility to be aware of and comply with all other relevant provincial or federal legislation, municipal by-laws, other MNRF approvals or required approvals from other agencies.

If you have any questions or concerns, please contact Mike Hall, Management Biologist at 705-564-7862 or at mike.hall@ontario.ca.

Sincerely,



Mike Hall, Management Biologist
MNRF Sudbury District Office

Cc: Nikki Boucher, Fish & Wildlife Technical Specialist (ESA Authorizations),
Sudbury District MNRF
Todd Copeland, Regional Species at Risk Specialist, Northeast Regional
Resources Section, MNRF
Rod Bilz, Environmental Specialist, FRi Ecological Services
Ted Archuticz, Senior Engineer – Transportation, Aecom

APPENDIX 3
GENERIC SEDIMENT
CONTROL PLANS

HORIZONTAL DIRECTIONAL DRILL
DAM AND PUMP

Measures to Protect Fish and Fish Habitat when Horizontal Directional Drilling

The measures that must be implemented to protect the viability of anadromous and estuarine fish and fish habitat when horizontal directional drilling (HDD) is used to install a new gas pipeline are discussed in this paper. The measures are based on the findings of a study conducted by the U.S. Environmental Protection Agency (EPA) and the U.S. Fish and Wildlife Service (FWS) in 1995. The study was conducted in response to a request from the U.S. Department of the Interior (DOI) for the EPA and FWS to conduct a study on the potential impacts of HDD on fish and fish habitat. The study was conducted in the Great Lakes region of the United States. The study found that HDD can have significant impacts on fish and fish habitat. The impacts can be categorized into three main areas: physical impacts, chemical impacts, and biological impacts. Physical impacts include the destruction of fish habitat, the disruption of fish migration, and the potential for fish to be injured or killed. Chemical impacts include the release of drilling fluids into the environment, which can be toxic to fish and other aquatic organisms. Biological impacts include the potential for the introduction of non-native species into the environment. The study also found that the impacts of HDD can be minimized by implementing certain measures. These measures include: (1) conducting a pre-drilling assessment to identify potential impacts; (2) using the least disruptive drilling method possible; (3) implementing measures to prevent the release of drilling fluids; and (4) implementing measures to protect fish and fish habitat during the drilling process. The measures that must be implemented to protect fish and fish habitat when HDD is used to install a new gas pipeline are discussed in this paper. The measures are based on the findings of the study and are intended to minimize the potential impacts of HDD on fish and fish habitat.

Fluorinated and Ozone-Depleting (FOD) is responsible for protecting fish and fish habitat across Canada. Under the Fisheries Act, no one can carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADO) of fish habitat. Unless it has been authorized by the DFO. By following the conditions and measures set out in the Stream Crossing Review and this Overlay, you will be in compliance with subsection 33(1) of the Fisheries Act.

This plan sets out the measures that will be taken by Urban Gas Limited (company) and its contractors in order to avoid, minimize impacts to fish habitat during horizontal directional drill (HDD) work. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the DFO.

Measures to Protect Fish and Fish Habitat when Horizontal Directional Drilling

The company must, moreover, construct practices, mitigation techniques and monitoring or operations or every worker increasing in order to prevent an unauthorized H400 or the impairment of water quality. The following requirements apply to any permanent or intermittent wetland (stream, river, pond) and once adjacent to it.

- The line from the leading support derrick to the rear support derrick must be kept taut. Ensure the derrick pull points are far enough from the bowes of the water course to have minimal impact on these areas.
- The company will notify the appropriate federal or provincial agencies related to watercourse crossings.
- The company will notify the appropriate federal or provincial agencies related to watercourse crossings.
- Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbances to the riparian vegetation.
- Sediment trucks must be installed between the work site and the watercourse. Ensure all fencing is properly placed to the ground.
- Prior to removal of the wet vegetation cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the total extent of disturbance to the minimum and within the road or utility right-of-way. Delay grubbing to immediately prior to the crossing operation.
- Materials removed or stockpiled during construction must be deposited in a manner to ensure sediment does not enter into a waterbody. This material must be protected with appropriate erosion and sediment controls devices (sediment fencing, strawbales).
- All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any waterbody.
- The company is to adhere to the Great Canadian Watershed Plan for Temporary Vehicle Crossings. The plan is endorsed by the DFO.
- Relining and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substances to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available.
- Monitor the watercourse to observe signs of surface migration (fret-cuts) or drilling mud during all phases of construction.
- There are no in-stream timing restrictions on the work.
- The company will be held responsible for implementation of this plan.

Crossing Procedures

- Sediment fences are to be established between the entry and exit points and the wetlands (potential for sediment to enter wetlands)

- * At a minimum the entry and exit points must be located as identified on this plan.
- * Mud pump pits are to be excavated at the entry and exit points of the drill to contain drilling fluids to prevent sediment and erosion control material from being washed into the watercourse. These pits must be excavated prior to backfilling and erosion control measures to prevent drilling fluid from entering the watercourse. These pits must be excavated prior to backfilling.
- * All drilling fluids are to be contained during the entire drilling process and promptly removed as sump pits are filled and/or when the drill is completed.
- * All access material is to be removed from the construction site to an approved location.
- * Monitoring of the watercourse must be completed during all phases of the crossing cleanup.

Emergency Frac-out Response and Contingency Planning

- Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a fire-out.
- The drilling procedure will be closely monitored throughout the crowing attempt to limit the extent of a "fire-out".
- If the plot drill results in a "fire-out" (flame enters the steam head or steam burner), the drilling should be stopped immediately and the procedures outlined in the Environmental Compliance section should be followed.
- Measures must be taken to contain the drilling mud and prevent its further migration into the watercourse. Measures to contain the drilling mud will include, stopping the drill, the use of vacuum trucks, excavation of relief pits (dry land) and any other measure deemed appropriate by the company.
- Prioritize cleanup activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
- Ensure clean up measures do not result in greater damage to the benthic and watercourse than from leaving the drilling mud in place.

Environmental Compliance

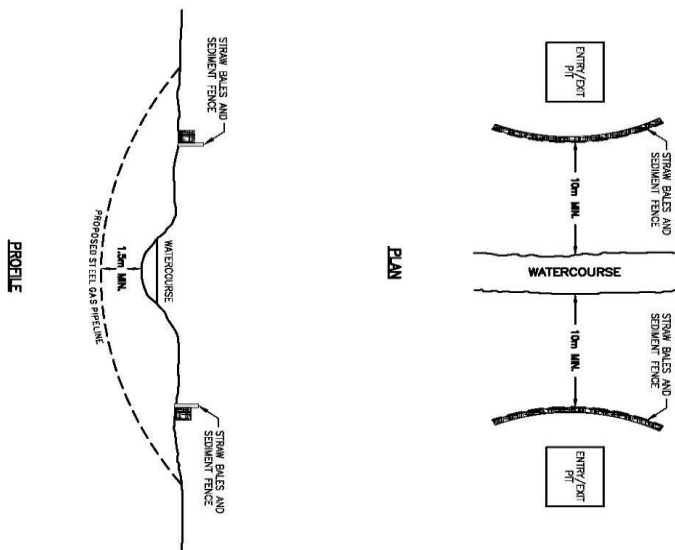
Contractor

- In the event that diffusing fluids enter the watercourses or turbidity is generated by air migration, the Ministry of the Environment (MOE) should be contacted by the contractor in compliance with their spill policy
- Such an incident is to be phoned into the MOE Spills Action Centre at 1-800-268-6050 by the contractor. The Spills Action Centre will require the following information:
 - The nature of the incident (what happened and what materials were involved),
 - Approximate volume of material involved,
 - The incident location (lat. co-ordinates, township, county and/or city),
 - Actions that have or will be taken,
 - The name and telephone number of the person calling.
- The incident should be monitored:

Company

- * In the event that filling, spills, either the wastewater or turbidity is generated by or migration, the Department of Fisheries and Game or local Conservation Authority (CA) shall be contacted by the Company Inspector. PRD contact information is provided in the Stream Crossing Review and CA contact information can be found on the permit.
- * When this has been completed, Utah's Environmental Planning Department or Lands Department staff shall also be notified.
- * All calls identified above are mandatory and are to be completed immediately after the incident has occurred.

Minimum Horizontal Directional Drill Setback and Depth



- STRAW BALES AND SEDIMENT FENCE TO BE SET UP A MINIMUM OF 10m FROM WATERCOURSE.
- HORIZONTAL DIRECTIONAL DRILL TO BE SET UP BEHIND STRAW BALES AND SEDIMENT FENCE.
- MINIMUM OF 1.5m COVER FROM TOP OF PIPE TO BED OF WATERCOURSE.
- ALL DISTURBED AREAS TO BE RESTORED TO PRE-CONSTRUCTION CONDITIONS OR AS CLOSE AS POSSIBLE.

Restoration

- The following conditions should be obtained for the restoration of the construction site and adjacent lands:
 - Ensure the entry and exit pits are cleaned of drifting liquids and the fluids are disposed of in an approved location.
 - Any disturbed areas adjacent to the watercourses will be seeded, covered with erosion control matting or equivalent and mulched as close as possible to preconstruction conditions.
 - Vegetation on watercourse banks will either remain in place or will be replanted following construction.
 - All seeding and vegetation replacement will be with native species to Ontario.
 - If post construction monitoring reveals erosion problems, remedial work will be undertaken as quickly as possible.
 - If post construction monitoring reveals erosion problems, remedial work will be undertaken as quickly as possible.
 - All debris/garbage shall be removed from the construction site to an approved location.
 - If there is insufficient time remaining in the grading season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and revegetated the following spring.
 - Monitor effective sediment and erosion control measures until revegetation of disturbed areas is obtained.

Contingency Plan


If, for any reason, the attempt to cross this watercress by means outlined above is not successful, the Environmental Planner will be contacted to discuss an alternative crossing method. It should be noted that under no circumstances shall an alternative crossing method be attempted for any crossing without prior notification. Any changes to this Strain Crossing Review may require permit amendments or governmental agency approval.

Environmental events causing the strategies set forth in this plan to be insufficient or inappropriate to meet the objectives, the crossing of this watercress may be attempted by other means. If all other means are exhausted, the crossing may be attempted by other means. The crossing may be attempted by other means on fish or fish habitat that may result. DFO or CA is to be notified as soon as practical.

Still monitoring procedures established by MOE shall be used to report any unexpected discharge of air or sediment or other deleterious substance at the water crossing. By MOE shall be used to report any unexpected discharge of air or sediment or other deleterious substance at the water crossing. The spill/incident shall also be reported to the DFO or CA as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approval from DFO for implementation by the company.

DATE	BY	REVISION	BY	DATE

 A Synergia Energy Company	
PROJECT	UNION GAS LIMITED CONSTRUCTION PROGRAM
LOCATION	ALL HORIZONTAL, DIRECTIONAL DRILL CROSSINGS IN ONTARIO
DRILLING TIME	GENERIC STAMEN CONTROL PLAN HORIZONTAL DIRECTIONAL DRILL
SCALE	NITS
FILE NO.	DATE MAY 18/12
DESIGN	PROJECT NO.
QTH	DRILLING
CHECKED	4 of 4
REVIEWED	0
APPROVED	

Generic Sediment Control Plan – Dam & Pump Crossing

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors to control sediment and silt from the construction of dam and pump type crossings. The condition and techniques set out on this plan are to be followed unless otherwise approved by the Department of Fisheries and Oceans (DFO).

General Measures

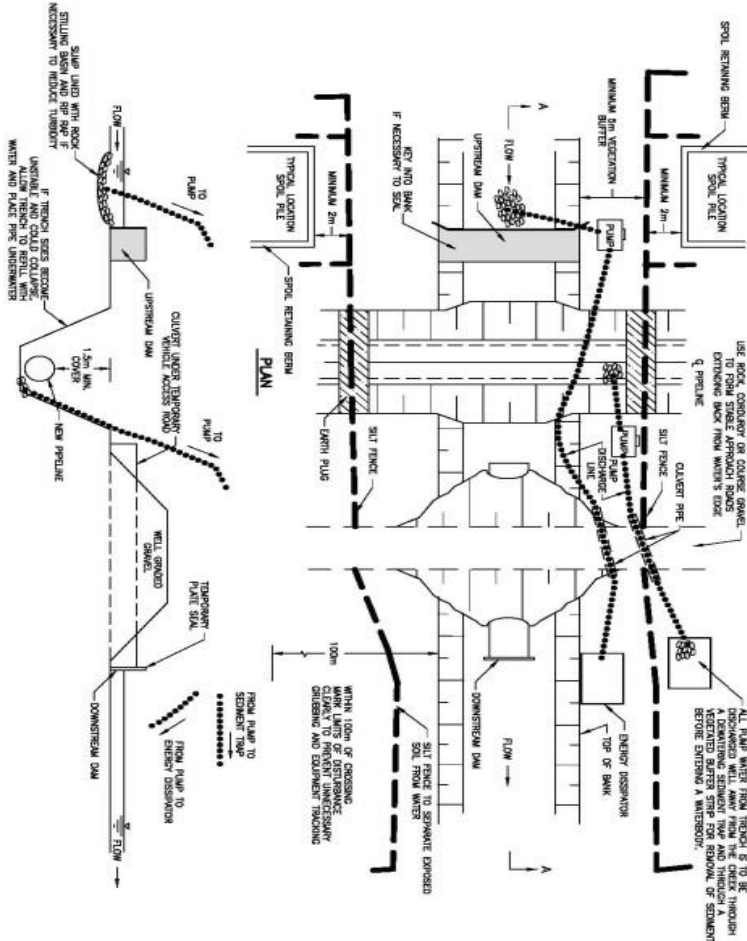
- The company must use methods of construction practices, mitigation techniques and methods of operations of any water crossing in order to prevent the uncontrolled harmful alteration, degradation or destruction of fish habitat or the river, pond and areas adjacent to it. The following requirements apply to any permanent or intermittent waterbody (stream, river, pond) and areas adjacent to it.
- The company will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
- The company will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
- In-stream work will occur during the appropriate time windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
- Prior to removal of the low vegetation cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the total extent of disturbance to the minimum needed for construction and daily grubbing to immediately prior to grading operations.
- All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the waterbody. This flagging will be set back a minimum of 5m from the waterbody and will be based on site specific conditions. Extra work not required of watercourse crossing will be situated away from the waterbody outside of the minimal disturbance zone (MDZ).
- Materials removed or stockpiled during construction (e.g., excavated soil, boulders, material) must be deposited in a manner to ensure sediment does not enter a waterbody. Appropriate erosion and sediment controls (e.g., revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fences or other appropriate mitigation measures) will be installed around spoil or stockpiles, to prevent sediment from stockpiles runoff from entering a waterbody.
- All vehicles, machinery and other construction equipment shall not enter the water. There must be no turning of any stream.
- Except during construction of the crossing, the company will not obstruct any watercourse so as to impede the free movement of flow.
- Flow shall be maintained at all times downstream of the watercrossing.
- All exposed soil must be stabilized (e.g., graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
- The company is to observe the Generic Sediment Control Plan for Temporary Vehicle Crossings.
- All aquatic materials (e.g., pit, trench, filter cloth, polyethylene liners, granular material, rip rap, dam material) and installation equipment (e.g., pump, hoses, pump hoses, generators, hoses, every discharger) will be on-site on a good working order prior to construction.
- Prior to connecting watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forecasted. In-stream activity will be delayed if there are in flood stage and until weather conditions are predictable.
- If there is any flow in the creek, the company is to install pumps to maintain stageflow around the blocked off section of channel. An energy dissipater is to be built to dissipate pump discharge and prevent accelerated or catastrophic erosion.
- Adequate pump capacity will be on site to handle anticipated water flows and any potential increases in flow during the construction period. Backup pumps with adequate capacity to handle 100% of the downstream flow must be on site and ready for immediate replacement, should the primary operating pump(s) fail.
- Water intakes used in fish bearing waters will be screened in accordance with the DFO Freshwater Intake Filter Screening Guidelines (1995).
- Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit conditions. See detailed construction sequences for timing of fish recovery operations.
- In-stream activities in all watercourses (e.g., trenching, pipe installation, bouldering) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
- In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for some dry installation.
- Reluctant and reluctant of equipment will be conducted in areas that will allow any accidental spill of deleterious substances to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available on site.
- The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
- Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
- The company will be held responsible for implementation of this plan.
- All use of all fence, rock check dams and dewatering traps shall be constructed/installed in accordance to the most up to date company specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the waterbody, additional mitigation measures will be implemented to prevent sediment from entering the waterbody.

Contingency Plan

If unforeseen events (e.g., bedrock in trench, dam method) cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, the company is expected to respond in a timely manner with all reasonable resources available. The company will be held responsible for any effects on fish or fish habitat that may result. DFO is to be notified as soon as possible.

Spill response procedures established by MOC shall be used to report any unexpected discharge of oil or sediment or other contaminants at the water crossing. The spill shall also be reported to the DFO as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approved from DFO for implementation by the company.



Detailed Construction Sequence – Dam and Pump Crossings

- In general terms, the following sequence of construction and mitigation measures will be followed at all 'dam and pump' type water crossings.
 - Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install pre-work sediment control measures, including all fences and measures to contain excavated spoil and boulders. All necessary equipment and materials to build the dams and to pump water must be on site or readily available prior to commencing in-water construction. Pipe shall be strong, welded and coated ready for installation prior to watercourse trenching.
 - Install pumps in natural pool upstream of the excavation. Excavate temporary pump within right-of-way if no natural pool exists. Check pump operation to equalize flow and ensure water intakes used in fish bearing waters are screened in accordance with DFO guidelines. Rip rap, silt trap, filter cloth, gravel filters or other mitigation measures will be used at the upstream side of the pump to prevent suspension of sediment from pumping when necessary. Rip rap and rock check dams will be used when necessary to prevent sediment from entering the waterbody. Pump discharge lines will be installed to keep pumped water from coming in contact with soil on the construction site.
 - Dams are to be made of steel plate, interlocking rubber dam (caudam), prestressed bags, cobble, well graded coarse gravel fill or other suitable material. Dams must be constructed in a manner that allows them to be dismantled and removed from the site if necessary to control seepage flow. Dams may need laying into the banks and strengthened. Initial downstream dam only if needed to keep the trench one dry. Dewater the area between dams and for fish bearing streams, conduct fish removal of sediment entering the waterbody.
 - Excavate trench through plugs and strengthened as quickly as possible, re-positioning discharge hoses as necessary. Lower the pipe in the trench and boulder immediately. During this operation, try to maintain pumping as much as possible. The top 300 mm of the trench boulders is to be clean rock, cobble material or native attached material. The company is to use granular boulders if the native material is not suitable. Any excess material is to be disposed of above the high water mark in an approved location and stabilized to prevent entry into the waterbody. Work is to be completed as quickly as possible.
 - Restore, stabilize and maintain bank and banks of waterbody to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., 'do not use erosion control matting in the boulder channel' coarse gravel or rip rap) to the maximum extent possible between dams. If rip rap material is used, the completed face is to be washed off and the turbid water pumped to the dewatering sediment trap. All construction material (e.g., dams, rip rap, silt trap, gravel) must be placed in the high water mark in an approved location. Removal of all materials will be done in a manner that will not introduce sediment to the waterbody. The downstream dam shall be removed first, keep pump running until normal flow is resumed. Complete bank forming and erosion protection. If pre-stone bags are used for the dams, place and remove by hand to avoid equipment breaking bags.
 - Site stabilization, which includes control of stormwater drainage using combinations of all fences, erosion boulders, diversion batters and check dams etc., is to be completed within 10 days of trench backfilling. If stabilization is delayed, short term erosion control measures shall be used to prevent sediment entering the water. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stabilized.
 - Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
 - If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.

NOTES

Union Gas is responsible for the construction of the crossing and the implementation of the measures set out in this plan. The condition and techniques set out on this plan are to be followed unless otherwise approved by the Department of Fisheries and Oceans (DFO).

For more information on this plan, please contact:
Doug Schmidt,
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Union Gas Limited,
1-800-371-8446, ext. 2895

PROJECT		UNION GAS LIMITED	
CONSTRUCTION PROGRAM		A Special Pump Crossing	
LOCATION		ALL DAM AND PUMP WATER CROSSINGS IN ONTARIO	
DRAWING TITLE		GENERIC SEDIMENT CONTROL PLAN DAM AND PUMP WATER CROSSINGS	
SCALE	NTS	DATE	JAN 1/08
FILE NO.	PROJECT NO.		
DRAWN	CHECKED	DRAWING	REV
01H		2	3
APPROVED			

APPNDIX 4

BLASTING SPECIFICATIONS

Specification for Rock Excavation

3.10.1 Application

This specification applies to all solid rock (in its original formation) encountered in trenching for pipelines that must be removed. Throughout this specification, all sections applicable to rock excavation using **cartridge based rock breakers** are identified with the statement “applicable to **cartridge based rock breakers**.”

3.10.2 References

- **C&M Manual Section 3.17, “Specification for Backfill”**

3.10.2.1 EHS References

- Construction Regulations, Sections 196-206

3.10.3 General Requirements

Exercise great care to prevent damage to underground structures such as cables, conduits and pipelines, and water wells, springs and other underground water courses. Consult Environmental Construction Permitting when blasting near water courses. If the techniques of the contractor appear to be injurious to these installations or formations, the company maintains the right to require the cessation of work.

Solid rock will be removed to a depth of 100 mm below the standard ditch depth to allow for padding between the rock and the pipe. The excavated ditch will be padded to a minimum thickness of 100 mm with earth, sand (free from rock), or other protective material **per C&M Manual Section 3.17, “Specification for Backfill”**. The padding material is to be placed in the trench in such a manner as to protect the pipe and the pipe coating from any hard points of rock. Use rockshield in locations **where appropriate**.

Applicable to **cartridge based rock breakers** - all operators must be certified and must carry proof of such certification while operating this equipment.

3.10.4 Use of Explosives

3.10.4.1 General

The **District** Engineer will be notified of the contractor’s intention to use any explosive and may give consent to such use only after careful examination of the particular site. After careful inspection of the site, if there is an existing pipeline within 30 m of any proposed blasting, Blasting Information Request (Form 2707) is to be filled out for blasting approval. When it is necessary to use explosives, blasting will not be done until occupants of nearby buildings, stores, houses, places of business, and landowners have been notified in writing by the contractor sufficiently

in advance to protect property and livestock. The Qualified Individual will be present during blasting.

Take every precaution to protect the public and its workers from any injury or harm which might arise from the use of explosives. Only **qualified** workers in handling explosives will be permitted to supervise, handle, haul, load, or detonate explosives.

Blasting is not permitted within 5 m of an existing operating pipeline without a consultant's recommendation and Pipeline Engineering's written approval. However, in no event will any explosives be used at a point where, in the opinion of **Pipeline** Engineering, the use of such explosives would be dangerous to the existing pipeline(s) of the company. A minimum of **72** hours notice must be given to the company so that mainline valves may be inspected for accessibility and operability before blasting.

Where specified, furnish the necessary equipment to employ air bubble curtains at water crossings for the protection of fish and wildlife during blasting operations.

3.10.4.2 Blasting Consultant

The contractor will employ, at its expense, the services of a blasting specialist to advise on drilling, loading patterns, and vibration levels, as **deemed** necessary.

3.10.4.3 Storage and Handling

Under no circumstances will detonating caps be stored with explosives. Store detonating caps in a separate place according to applicable codes and regulations. Do not prime or fuse explosives until just before use. Under no circumstances are loaded and fused holes to be left overnight.

3.10.4.4 Flyrock and Matting

Blanket all shots using heavy duty rubber blasting mats in good condition (e.g., joined tires). Do not use mats that have suffered a significant loss of rubber laminations. Do not use overburden material and sandfill as matting material.

Keep all flyrock to an absolute minimum and do not allow flyrock to be deposited outside the right-of-way. If flyrock is scattered over the right-of-way or adjacent property, clean up such flyrock to the satisfaction of the landowner and his tenants. Haul the flyrock to a satisfactory location for disposal. If, in the opinion of the Qualified Individual, the amount of rock scattered over the right-of-way or adjacent property is unwarranted, the company maintains the right to require the cessation of work.

Notwithstanding the above requirements, place the mats over the blast area with the following minimum laps:

1. Within 50 metres of any house, building, structure, hydro tower, overhead wire, or parked car, the mats will be double layered with lapped joints.
2. Use a 25% (minimum) lap at each abutting mat elsewhere.

Specification for Rock Excavation

Lay additional mats, as necessary, to control flyrock and to protect seismographic equipment at blast monitoring locations.

3.10.4.5 Warning Signals

Give distinct warning signals with an air horn during all blasting.

- Give five short signals to warn of pending detonation and need to clear the area.
- Give three short signals immediately before the blast.
- Give one long signal after the blast to indicate the safe completion of the blast.

3.10.4.6 Blasting

Do not blast before 8:00 a.m. or after 7:00 p.m., nor on Sundays and statutory holidays. In addition, do not start loading for any blast unless the loading can be completed and the blast matted and detonated no later 7:00 p.m.

3.10.4.7 Vibration Limits

During all blasting operations, the contractor will limit the ground vibration operated by each blast to the following limits:

- Where blasting is occurring within 30 m of an existing operating pipeline, the vibration will be controlled to a maximum peak particle velocity (PPV) of 50 mm/s above the pipeline.
- Where blasting is occurring within 200 m of any structure and any other sites as required by the company, the peak particle velocity will not exceed 50 mm/s.
- In ground adjacent to concrete or grout in place less than 60 hours, the peak particle velocity will not exceed 10 mm/s.

The above limits refer to the intensity of the ground vibrations generated by blasting in any of the three mutually perpendicular planes, measured at the nearest point above a line to the location of the blasting. Vibration monitoring shall be supplied by the contractor at its expense.

The contractor must submit revised blasting patterns to the company as set out in this specification, if unable to maintain satisfactory levels of vibration during blasting.

3.10.4.8 Monitoring Procedures for Blasting Near Existing Pipeline

The blasting contractor will retain the services of a blasting consultant to monitor vibration levels on existing company pipelines during each blast if:

- The pipeline is greater than NPS 12; or
- The pipeline, at the time of blasting, is operating at a pressure greater than 1,723 kPa; or
- The maximum explosive charge per delay values exceed those given in Table 3.10.1.

The blasting consultant will also monitor the vibration and air overpressure levels at any nearby houses and structures within a minimum of 200 m from the blast and any other sites as required by the company.

The monitoring equipment will consist of a portable seismograph capable of producing on-site printouts that include the following information:

- Ground vibrations up to 200 millimetres per second (mm/s) of peak particle velocity (PPV) in the three mutually perpendicular directions.
- Frequency of all three mutually perpendicular directions.

Set up the transducers at the nearest point above a line to the location of the blasting.

The contractor will assist the blasting consultant in setting up the equipment, in the event that monitoring is required on an existing pipeline. All excavation in the vicinity of existing pipelines will be carried out in the presence of a Qualified Individual and only after the pipe location has been established by electronic means.

The printout of each seismographic reading will be given to the Qualified Individual immediately after each blast.

Table 3.10.1

Stand-off distance from facility (m)	Maximum Explosive Charge (kg per delay)
5	1.00
6	1.44
7	1.96
8	2.56
9	3.24
10	4.00
12	5.76
14	7.84
16	10.24
18	12.96
20	16.00
22	19.36
24	23.04
26	27.04
28	31.36
30	36.00

3.10.4.9 Excessive Vibration Readings

If there is any one seismographic reading in excess of the limits set out above, the following will apply:

1. Should any two consecutive seismographic readings fall between 50 and 80 mm/s PPV, the blasting contractor will cease all further blast hole loading other than those required for a third reading. The pipe will be exposed and a third reading will be taken on the pipe.
 - ♦ If this third reading is below 50 mm/s PPV, blasting may continue.
 - ♦ If the third reading exceeds 50 mm/s PPV, the blasting contractor will cease all blasting in the area and move to a new area and continue blasting. The blasting contractor will then submit a revised loading pattern to the company for review in the area where blasting has been discontinued.
2. Should any one seismographic recording be in excess of 80 mm/s PPV, the contractor will cease all further blast hole loading other than those required for one subsequent reading. The pipe will be exposed and the subsequent reading will be taken on the pipe.
 - ♦ If this reading is below 50 mm/s PPV, blasting may continue.
 - ♦ If this reading exceeds 50 mm/s PPV, the contractor will cease all blasting in the area and move to a new area and continue blasting. The contractor will then submit a revised loading pattern to the company for review in the area where blasting has been discontinued.
3. In any area where blasting has been discontinued, blasting may only be resumed when permitted by the Qualified Individual.

3.10.4.10 Excavating and Backfill

When excavating loose rock from the trench after blasting, the contractor must keep loose rock separate from any overburden that has previously been stripped. This can either be done by piling the overburden on the "spoil" side of the trench and the loose rock on the "work" side of the trench to be hauled out, or by piling both the overburden and the loose rock separately on the spoil side of the trench. The method to be used will depend upon the amount of overburden, width of the trench, and the type of terrain. The Qualified Individual will decide the preferred method and the material to haul away.

After backfilling operation is complete, the contractor will remove excess material from the right-of-way. The material will be disposed of at a location satisfactory to the Engineer. This is also applicable to **cartridge based rock breakers**.

3.10.4.11 Permits

Any permits necessary for blasting will be obtained by and at the expense of the contractor (unless specified in the work description in the construction contract) to comply with all legal requirements in connection with the use, storage, and transportation of explosives, including but not limited to the Canadian Explosives Act. Proper notification will be made to the authority having jurisdiction when required and conformance with all legal requirements will be made.

3.10.5 Damages

The contractor will take all necessary precautions not to damage any structure owned by others. If damage should occur, the owner of the damaged structure will be contacted jointly by representatives of the company and the contractor and the repairs will be made at the contractor's expense under the direction and to the satisfaction of the owner. This also includes damage to company pipelines. This is also applicable to **cartridge based rock breakers**.

3.10.6 Measurements

Rock removed for the clearing of right-of-way will not be considered as rock excavation.

A record of the location and quantities of all trench excavation classified as solid rock will be made for each property by the Inspector. This record will be submitted to the contractor for acceptance and signature, after acceptable trench has been completed across the property. When signed by authorized representatives for both parties, this record will form the basis for calculating the compensation due to the contractor for trenching in solid rock.

All areas to be considered as loose rock requiring removal by backhoe must be authorized by the Qualified Individual at the time the trench is being dug. No other areas will be considered loose rock excavation. This is also applicable to **cartridge based rock breakers**.