December 7, 2017

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")
2018 Bickford Storage Pool Project
EB-2017-0363

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: N. Marconi
Z. Crnojacki
Regulatory Library

ONTARIO ENERGY BOARD

IN THE MATTER OF the Ontario Energy Board Act, 1998, S.O. 1998, c.15, Schedule B; and in particular sections 90 and 40(1) thereof.

AND IN THE MATTER OF an Application by Union Gas Limited to the Ministry of Natural Resources for licences to drill wells in the Bickford Storage Pool;

AND IN THE MATTER OF an Application by Union Gas Limited for leave to construct a natural gas pipeline and ancillary facilities in the Township of St. Clair in the County of Lambton.

UNION GAS LIMTED

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1. Union Gas Limited (the "Applicant or Union") is proposing to drill wells and construct gathering lines in the Bickford Storage Pool in the Township of St. Clair in the County of Lambton.

2. The Applicant is also applying for an Order for Leave to Construct approximately 530 metres of NPS 12 pipeline.

3. Pursuant to section 40(1) of the Act, the Applicant seeks a favourable report from the Board to the Ministry of Natural Resources to which Union has applied for licences to drill three (3) injection/withdrawal wells within the proposed designated storage areas of the Bickford Pool.

4. Attached hereto as Schedule "A" is a map showing the general locations of the Bickford Pool.

5. In order to meet the proposed in-service date of November 2018, the Applicant requests an approval by April 2018. The Applicant therefore applies to the Board for a timely approval of this Application.

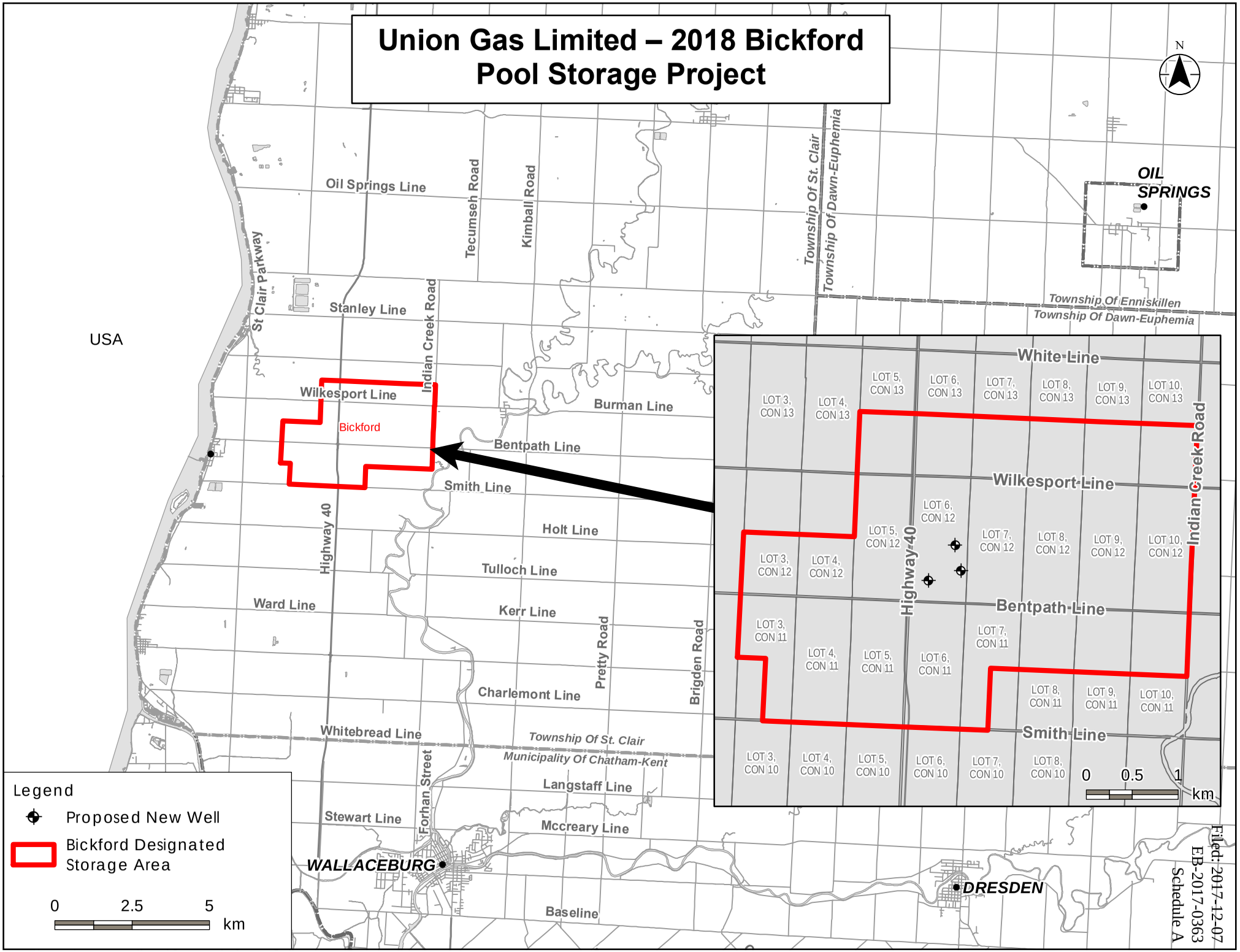
Dated at the Municipality of Chatham-Kent, Ontario this 7th day of December, 2017.

[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
Telephone: 519-436-5457
Fax: 519-436-4641
Email: bwachsmuth@uniongas.com
UNIONregulatoryproceedings@uniongas.com


Union Gas Limited – 2018 Bickford Pool Storage Project
N
OIL SPRINGS
Township Of Enniskillen
Township Of Dawn-Euphemia
Township Of St. Clair
Township Of Dawn-Euphemia
Oil Springs Line
Tecumseh Road
Kimball Road
St Clair Parkway
Stanley Line
Indian Creek Road
USA
Wilkesport Line
Bickford
Burman Line
Bentpath Line
Smith Line
Holt Line
Highway 40
Tulloch Line
Ward Line
Kerr Line
Pretty Road
Brigden Road
Charlemont Line
Whitebread Line
Township Of St. Clair
Municipality Of Chatham-Kent
Langstaff Line
Forhan Street
Stewart Line
Mccreary Line
WALLACEBURG
DRESDEN
Baseline
White Line
Wilkesport Line
Bentpath Line
Smith Line
Indian Creek Road
Highway 40
LOT 3, CON 13
LOT 4, CON 13
LOT 5, CON 13
LOT 6, CON 13
LOT 7, CON 13
LOT 8, CON 13
LOT 9, CON 13
LOT 10, CON 13
LOT 6, CON 12
LOT 5, CON 12
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LOT 8, CON 11
LOT 9, CON 11
LOT 10, CON 11
LOT 3, CON 10
LOT 4, CON 10
LOT 5, CON 10
LOT 6, CON 10
LOT 7, CON 10
LOT 8, CON 10
0 0.5 1 km
Legend
Proposed New Well
Bickford Designated Storage Area
0 2.5 5 km
Filed: 2017-12-07
EB-2017-0363
Schedule A

2018 Bickford Storage Pool Project

INDEX

SCHEDULES

PROJECT SUMMARY

1. Union Gas Limited ("Union") is proposing the 2018 Deliverability Project ("the Project"), in order to meet growing market demand for incremental deliverability.

2. The Project will increase the deliverability of the Bickford Storage Pool ("Bickford"). A map showing the pool can be found at Schedule 1.

3. The Project facilities include:
   a. three new injection/withdrawal ("I/W") wells in Bickford (Union Bickford 37, Union Bickford 38 and Union Bickford 39);
   b. construction of approximately 530 metres of NPS 12 pipeline within the Bickford Pool ("Proposed Pipeline"); and
   c. construction of roadways and drilling pads to facilitate access to the well locations.

4. Well drilling applications have been made to the Ontario Ministry of Natural Resources and Forestry ("MNRF") by Union. A favorable report from the Ontario Energy Board ("the Board") to the MNRF is needed before the Minister can issue a license to drill the wells.

5. Union is proposing the Project to meet the growing demand for high deliverability storages services in Ontario. Specifically, a natural gas fired generator has entered into a contract with Union to provide high deliverability storage services for the efficient operation of the facility.

6. This Project is a continuation of the 2017 Storage Enhancement Project (EB-2016-0322) which was approved by the Board in April 2017.

7. Union met with the MNRF on October 13, 2017 to discuss the Project. At that meeting, Union provided the MNRF with details of the Project and copies of the reports which were prepared for the Project.

8. Union will follow its standard construction and operating practices during construction and operation of the proposed facilities.

9. The Environmental Protection Plan ("EPP") has been prepared which outlines a number of environmental mitigation measures that, in conjunction with Union's standard well drilling specifications, will allow construction of the proposed facilities with minimal impact on the environment.

10. Union requires the following orders and reports from the OEB in order to construct the Proposed Facilities:

    - A Leave to Construct order allowing for construction of the Proposed Pipeline; and
    - A favourable report to the Ontario Ministry of Natural Resources and Forestry regarding the proposed well drilling.

11. In order to meet the proposed in-service date of the Project, a decision on the Project and a favourable report to the MNRF is respectfully requested by April 2018.

NEED FOR FACILITIES

12. There is a growing market demand for increased storage deliverability in Ontario. This Project has been designed to meet that need.

13. TransCanada Energy (" TCE") Napanee approached Union for service under a long term deliverability contract of 125,000 GJ per day. Union's 2017 Storage Enhancement Project was designed to provide 70,000 GJ per day. This Project is designed to increase the deliverability in Union's storage system by an additional 55,000 GJ per day. The deliverability created by these projects is being sold to TCE Napanee under a long-term contract to meet their contract demands.

14. The TCE, Napanee facility is located between the cities of Kingston and Napanee on the shore of Lake Ontario adjacent to the Lennox Generating Station. The facility is a 980 megawatt merchant power plant that will supply energy to the grid in response to demands from the Independent Electrical System Operator ("IESO"). A new transmission pipeline was not required to serve the new TCE facilities as there is sufficient capacity on the existing pipeline that serves the Lennox Generating Station. The TCE Napanee facility is currently under construction and it is expected to go into commercial operation in June 2018.

15. This Project is part of Union's unregulated storage business. As such, economics have not been completed for the Project.

GEOLOGY AND RESERVOIR ENGINEERING

Bickford Pool

16. The Bickford Storage Pool was discovered in 1954 with the drilling of the Imperial 421-Bickford 19 well and was converted to natural gas storage in 1972. A location map showing the Bickford Pool is shown at Schedule 1. Currently, the pool is operated and monitored using five injection/withdrawal wells, one Guelph observation well and five A1 Carbonate observation wells. The Bickford Storage Pool has a total capacity of 798,300 10^3m^3 and a working capacity of 633,800 10^3m^3. The pool operates between a cushion pressure of 2,132 kPaa and a maximum pressure of 9,000 kPaa.

17. The Bickford Storage Pool will continue to operate at the current working capacity and operating pressures.

18. A map showing the Bickford Storage Pool Guelph structure is included at Schedule 2. The geological interpretation was completed using 3D seismic data (acquired in 2016) and well information. The map is contoured in 10 m intervals and shows the reef reaching approximately 100 m above the regional Guelph surface. The locations of the proposed wells are also shown on Schedule 2.

19. A cross section illustrating the reef structure of the Bickford Storage Pool is provided at Schedule 3. The cross section illustrates the relationship of the pinnacle reef to the surrounding formations. The A2 Salt, A1 Carbonate and A1 Anhydrite pinch out against the flanks of the reef providing lateral seals. The A2 Anhydrite, A2 Shale, and A2 Carbonate drape over the

reservoir forming an effective caprock seal ranging in thickness from 27 m to 44 m. The A2 Anhydrite overlying the crest of the reef ranges in thickness from 1.5 m to 11.0 m.

20. New 3D seismic was required over the Bickford Storage Pool in order to select the well locations. The 3D seismic was acquired in December 2016 and processed/interpreted in the Spring of 2017.

21. The proposed well locations were selected based on seismic interpretations, petrophysical logs and the performance of existing wells. Each well is located to target high porosity zones in order to maximize deliverability.

MNRF Review

22. It is Union's understanding that the Board approvals will require the applicant to conform to CSA Z341.1-14 Storage of Hydrocarbons in Underground Formations to the satisfaction of the MNRF. In order to provide the MNRF with information about the Project, Union met with the MNRF on October 13, 2017 to discuss the Project.

23. At that meeting, Union provided the MNRF with a presentation that summarized the Project; this presentation can be found at Schedule 4.

24. Union provided the MNRF the following reports:

- A "What If" Analysis of Hazards and Operability Issues Report (HAZOP); and
- An Assessment of Neighbouring Activities.

25. An Engineering Assessment was not required for this Project since Union is not proposing to increase the maximum operating pressure of the Bickford Storage Pool.

26. Executive Summaries of the reports are provided at Schedule 5.

27. The MNRF informed Union that they would be participating in this hearing process including asking interrogatories and filing submissions.

28. It is Union's understanding that the MNRF will provide its comments on the Engineering and Geological studies and Union's compliance with code requirements as part of its final submissions.

PROPOSED FACILITIES

Description of Proposed Facilities

29. A total of three I/W wells will be drilled as part of this Project.

30. Approximately 530 metres of NPS 12 gathering lines are required to connect the wells to the existing gathering systems.

31. A drawing of the Proposed Facilities can be found at Schedule 6.

32. Union proposes to construct the facilities in accordance with its standard construction procedures and the environmental mitigation measures outlined in the EPP.

Wells

33. The development of the 2018 Storage Enhancement Project will include three new I/W wells (Union Bickford 37, Union Bickford 38, Union Bickford 39) in the Bickford Pool.

34. The locations of these wells are illustrated at Schedule 6. The well applications were submitted to the MNRF on November 27, 2017. A copy of the MNRF applications for Well License (Form 1) and survey maps are included at Schedule 7.

35. The wells will be drilled using cable tool and rotary drilling methods. Schedule 8 describes the drilling procedure that Union will employ for the drilling. Schedule 9 outlines the casing specifications for the proposed storage wells. All wells will be drilled and completed in accordance with CSA Z341.1-14 and the *Oil, Gas and Salt Resources Act ("OGSRA"), Provincial Operating Standards (Version 2.0).*

36. While emergency shutdown ("ESD's") valves are not required to be installed on these wells, Union will install them on the proposed I/W wells in the Bickford Storage Pool. The ESD valves will be commissioned and operated in accordance with CSA Z341.1-14 clause 9.3.3. ESD valves were previously installed on all existing I/W wells in the Bickford Storage Pool in 2015.

37. Temporary drilling pads will be constructed in the fall of 2017. The drilling pads will be 60 m x 80 m. The topsoil will be removed and stock piled prior to construction of the pads. When drilling is completed, the stored topsoil will be re-distributed to the landowners' satisfaction.

38. Access to the proposed wells will be provided by permanent all weather access roads as shown at Schedule 6.

39. In order to begin well drilling in 2018, materials were ordered in November 2017. A Project schedule which identifies the timing of well drilling can be found at Schedule 10.

Pipeline Facilities

40. The Project will require approximately 530 metres of NPS 12 gathering lines. The location of the pipelines can be found at Schedule 6. The proposed pipelines are designed to transport the expected flows to and from the new wells. These pipelines will be constructed during 2018 using the existing access road network.

41. Design and pipe specifications for the proposed storage gathering pipelines are outlined at Schedule 11. All the design specifications are in accordance with the Ontario Regulation 210/01 for Oil and Gas Pipeline Systems.

42. The Maximum Operating Pressure ("MOP") for the proposed gathering pipelines is 9,930 kPa.

43. The proposed pipelines are located primarily within a Class 1 location. For a pipeline within a Class 1 location, Union uses location factors of 0.9 for general locations, 0.75 for road crossings and 0.625 for pipe within a station. Union uses a design factor of 0.8 for Class 1 locations. For a pipeline within a Class 2 location, Union uses location factors of 0.9 for general locations, 0.625 for road crossings, and 0.625 for pipe within a station. Union also uses a design factor of 0.8 in Class 2 locations.

44. Union proposes to design the pipeline to meet or exceed Class 2 location requirements.

45. Schedule 12 describes the techniques and methods of construction that Union will employ for the construction of the proposed pipelines.

46. The pipelines will be installed in accordance with all applicable codes and Union's standard pipeline construction procedures.

ENVIRONMENTAL MATTERS

47. The EPP for this project is found at Schedule 13. The EPP has been completed to meet the intent of the Board's Environmental Guidelines. The EPP was sent to the Ontario Pipeline Coordinating Committee on November 17, 2017 for their review.

48. During construction, Union will follow its most current environmental mitigation measures. These mitigation measures have been used on past projects and have been proven to be successful at protecting the environmental features encountered during construction.

49. Prior to construction, Union will obtain all necessary permits that are required for the Project.

50. A program for environmental inspection will be implemented. An environmental inspector will ensure that Union complies with the recommendations in the EPP, any commitments made during the regulatory proceeding and any conditions of approval.

51. The post-construction reports will include:

- certification that Union has complied with the EPP, its evidence, the conditions of approval and obtained all necessary permits;
- a summary of Union's construction practices and the mitigation measures implemented during construction; and
- a log of any landowner complaints and how those complaints have been addressed.

52. The EPP indicates that the environmental and socio-economic effects associated with construction of the Project are generally short-term in nature and minimal. There are no significant cumulative effects as a result of the construction of the Project. By implementing the mitigation measures identified in the EPP and following Union's standard construction practices there will be no long term significant environmental impacts as a result of this Project.

LAND MATTERS

53. All of the Proposed Facilities will be constructed on lands owned in fee simple by Union.

Well Drilling, Gathering Pipelines and Roads

54. The location of the wells, roads and pipelines can be found at Schedule 6.

55. These roadways will accommodate vehicular traffic to the proposed well locations and will be used on an ongoing basis during and following construction. The access roads will be used where possible for construction and maintenance in order to minimize environmental disturbance. The location of the access roads are shown at Schedule 6.

Landowner Contacts

56. Union has implemented a comprehensive program to provide storage landowners with information regarding the Project. Project information was distributed through individual meetings.

Construction Monitoring and Follow-Up

57. During the construction phase, a Landowner Relations Agent will be available to ensure that commitments are fulfilled and to address questions or concerns of the landowners. In addition, any complaint received related to construction of the Project will be recorded and monitored to ensure follow-up. This process assists in resolving complaints and fulfilling commitments.

INDIGENOUS CONSULTATION

58. Union has an extensive database and knowledge of Indigenous and Métis Nation organizations in Ontario and consults with the Tribal organizations and the data bases of the Ontario Ministry of Natural Resource and Forestry, Ontario Ministry of Indigenous Affairs and Reconciliation, as well as Indigenous Affairs and Northern Development Canada to ensure consultation is carried out with the most appropriate groups.

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

60. In the 7th Edition of the Ontario Energy Board's Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, the requirements for Indigenous and Métis consultation were enhanced.

61. The Board, working closely with the Ontario Ministry of Energy ("MOE"), revised the Indigenous consultation requirements to streamline and clarify the roles and obligations of the MOE, the Board and Union.

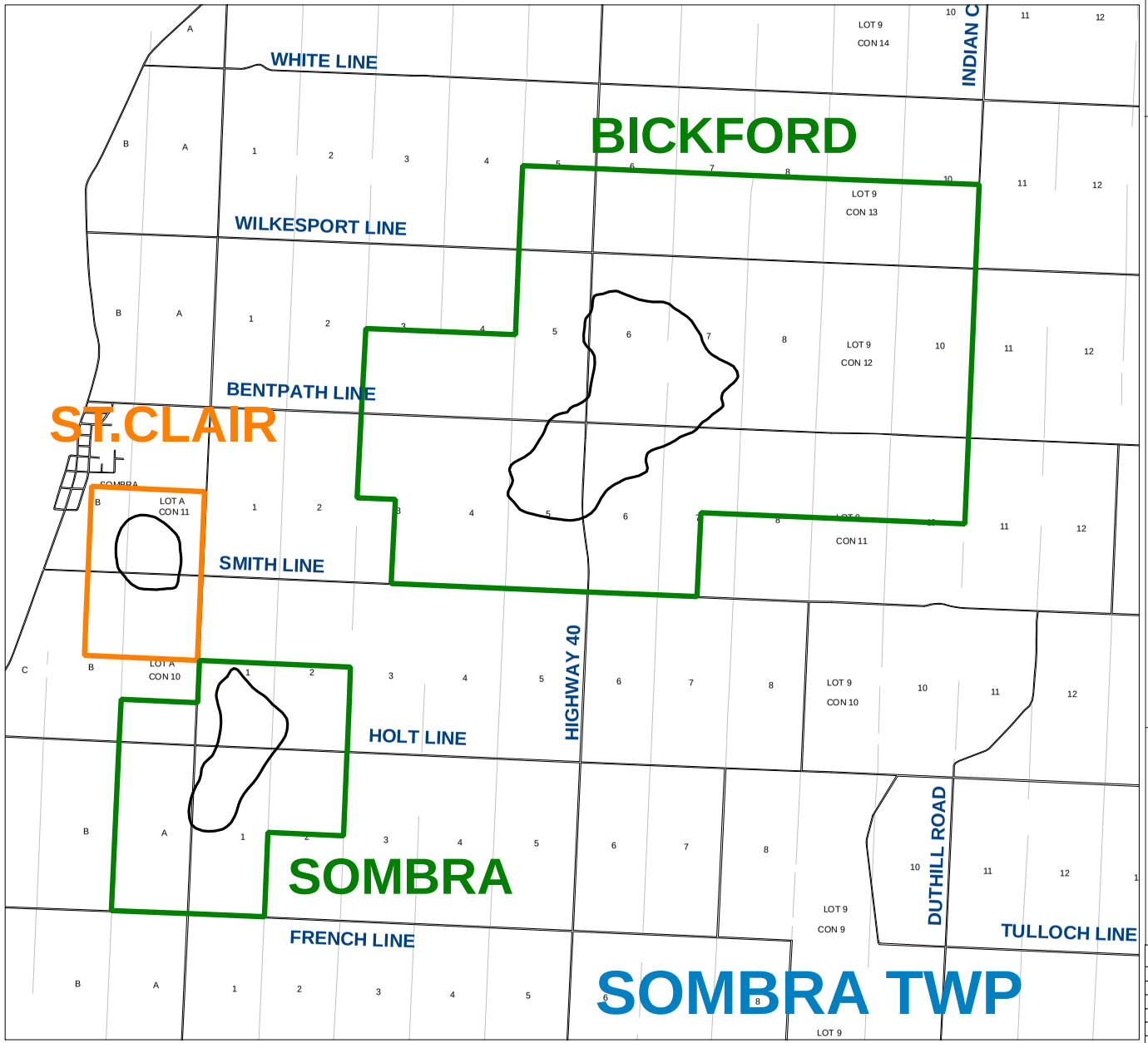
62. Included in the Indigenous Consultation Report is a letter from Union to the MOE, providing the MOE with a project description and requesting the MOE identify any Indigenous communities who may be impacted by the Proposed Project.

63. Included in the Indigenous Consultation Report is a letter from the MOE to Union identifying which Indigenous communities will be impacted by the Project and formally delegating to Union the responsibility to conduct consultation activities.

64. Attached at Schedule 14 is a copy of Union's Indigenous Consultation Report for the Project. The Indigenous Consultation Report includes:

- A summary of all meetings with Indigenous communities;
- A summary of the concerns that were identified by the Indigenous communities and how the concerns were addressed and/or accommodated; and
- A complete record of all consultation activities.

65. Schedule 15 provides a copy of MOE's review and confirmation of adequacy of Union's Indigenous Consultation Report.



LEGEND

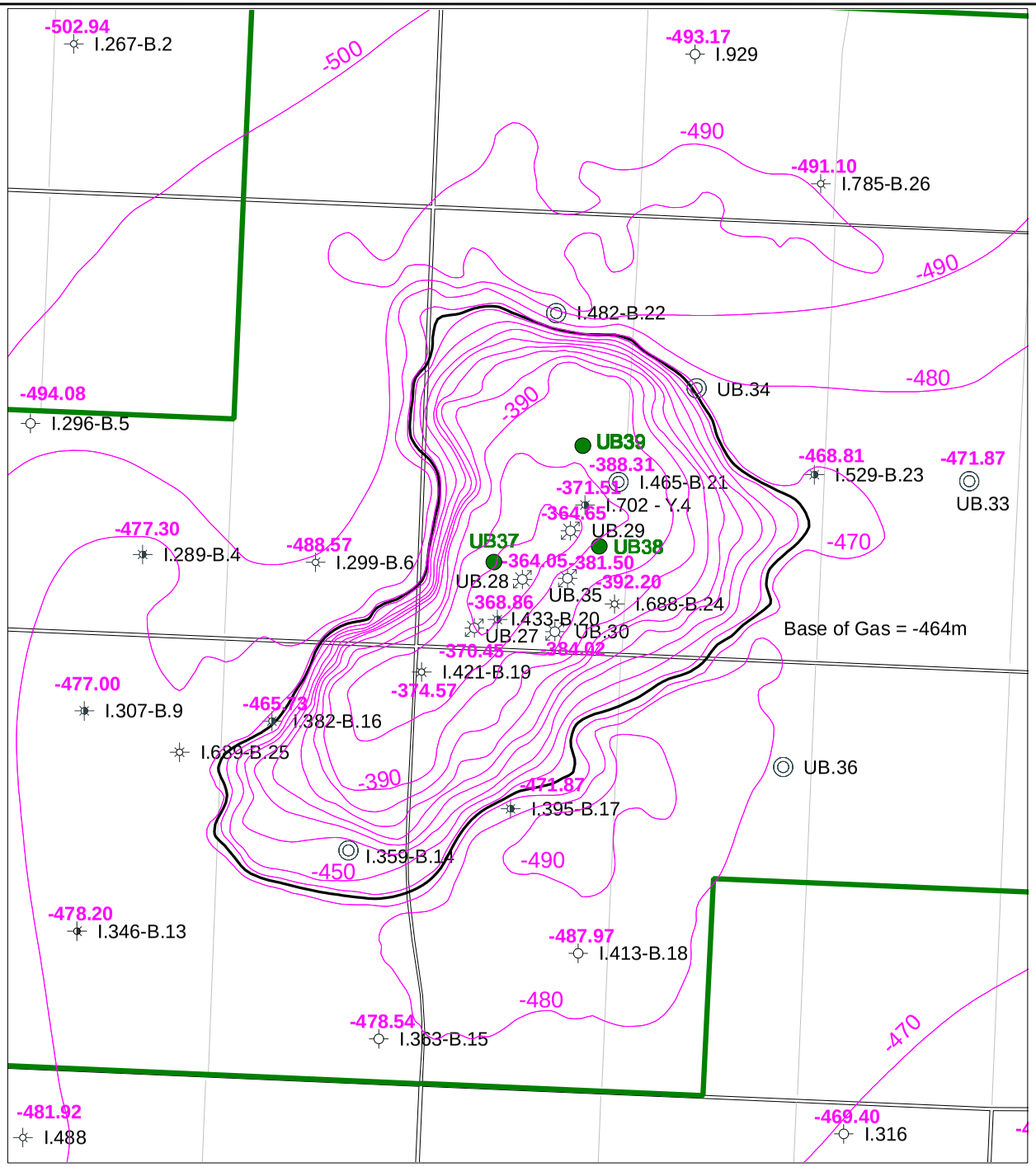
- Reef Footprint
- DSA - Union Gas
- DSA - Market Hub Partners Canada

SCALE

750 0 750 1500 2250 m

REMARKS	BICKFORD POOL
	LOCATION MAP
DRAWN BY	DATE 2017 SCALE AS SHOWN
CHECKED BY	DATE PROJECT CODE

Filed: 2017-12-07
EB-2017-0363
Schedule 1



LEGEND

- PROPOSED WELL LOCATION
- -450 GUELPH SUBSEA ELEVATION
- BASE OF GAS
- GUELPH CONTOUR
- DSA - UNION GAS
- DRY HOLE, ABANDONED
- GAS PRODUCER, ABANDONED
- GAS PRODUCER, OIL SHOW, ABANDONED
- GAS SHOW, ABANDONED
- NATURAL GAS STORAGE
- OBSERVATION
- OIL SHOW, GAS SHOW, ABANDONED

SCALE

250 0 250 500 750 m

REMARKS

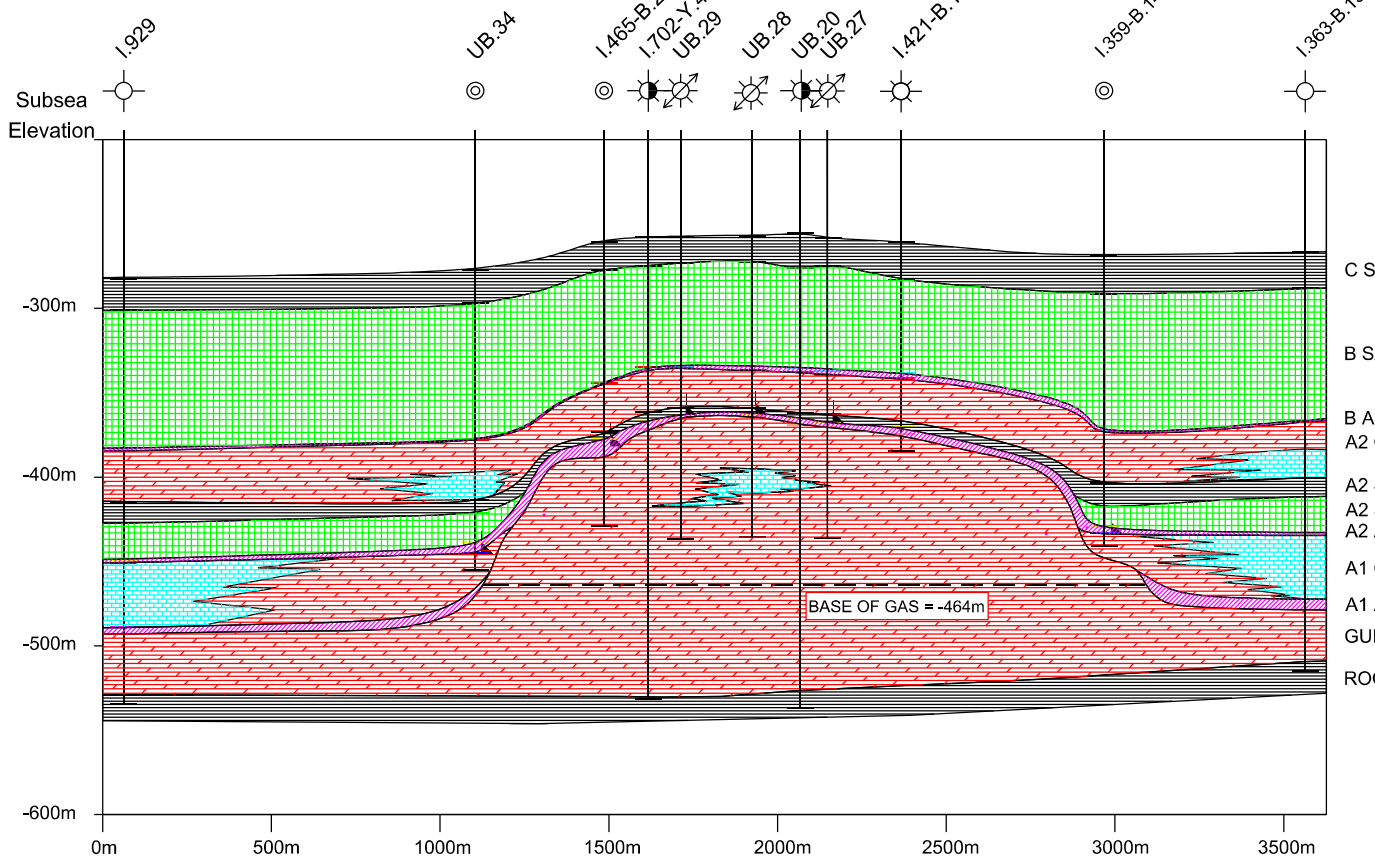
BICKFORD POOL

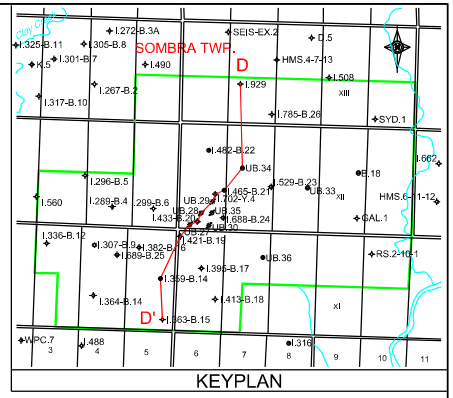
GUELPH STRUCTURE MAP

DRAWN BY | DATE 2017 | SCALE AS SHOWN

CHECKED BY | DATE | PROJECT CODE

Filed: 2017-12-07
EB-2017-0363
Schedule 2





LEGEND

- GAS PRODUCER, SUSP/ABD
- GAS PRODUCER, OIL SHOW, SUSP/ABD
- OBSERVATION
- DRY HOLE, ABANDONED
- INJECTION/WITHDRAWAL

Salt | Limestone | Dolomite | Anhydrite | Shale

REMARKS
- VERTICAL EXAGGERATION = 5
- HORIZONTAL SCALE AS SHOWN
- CASING SET POINT
- A2 SHALE ASSUMED FOR I.421-B.19
- A1C LITHOLOGY ASSUMED FOR I.359-B.14
- BOTTOM OF ROCHESTER NOT RECORDED

BICKFORD POOL

CROSS SECTION D-D'

DRAWN BY	DATE	SCALE
S.A.C.	OCT17	AS SHOWN
CHECKED BY	DATE	AC/DRAW CODE
		BICXSDD-2017

2018 Deliverability Project

Ministry of Natural Resources and Forestry

October 13, 2017

Project Scope

- Increase deliverability by 55,000 GJ/day by drilling wells in the Bickford Pool
  - Complete 3D Seismic
  - Drill three new wells (UB.37, UB.38, and UB.39)
  - Install ESV's on new wells
  - All existing I/W wells had ESV's installed during the 2015 Delta Pressuring Project
  - Construct approximately 400 m of NPS 12 pipeline

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3D Seismic Design

Source stations – 1215
Receiver stations - 4750
90 g dynamite at 6m depth
7.2 km^2

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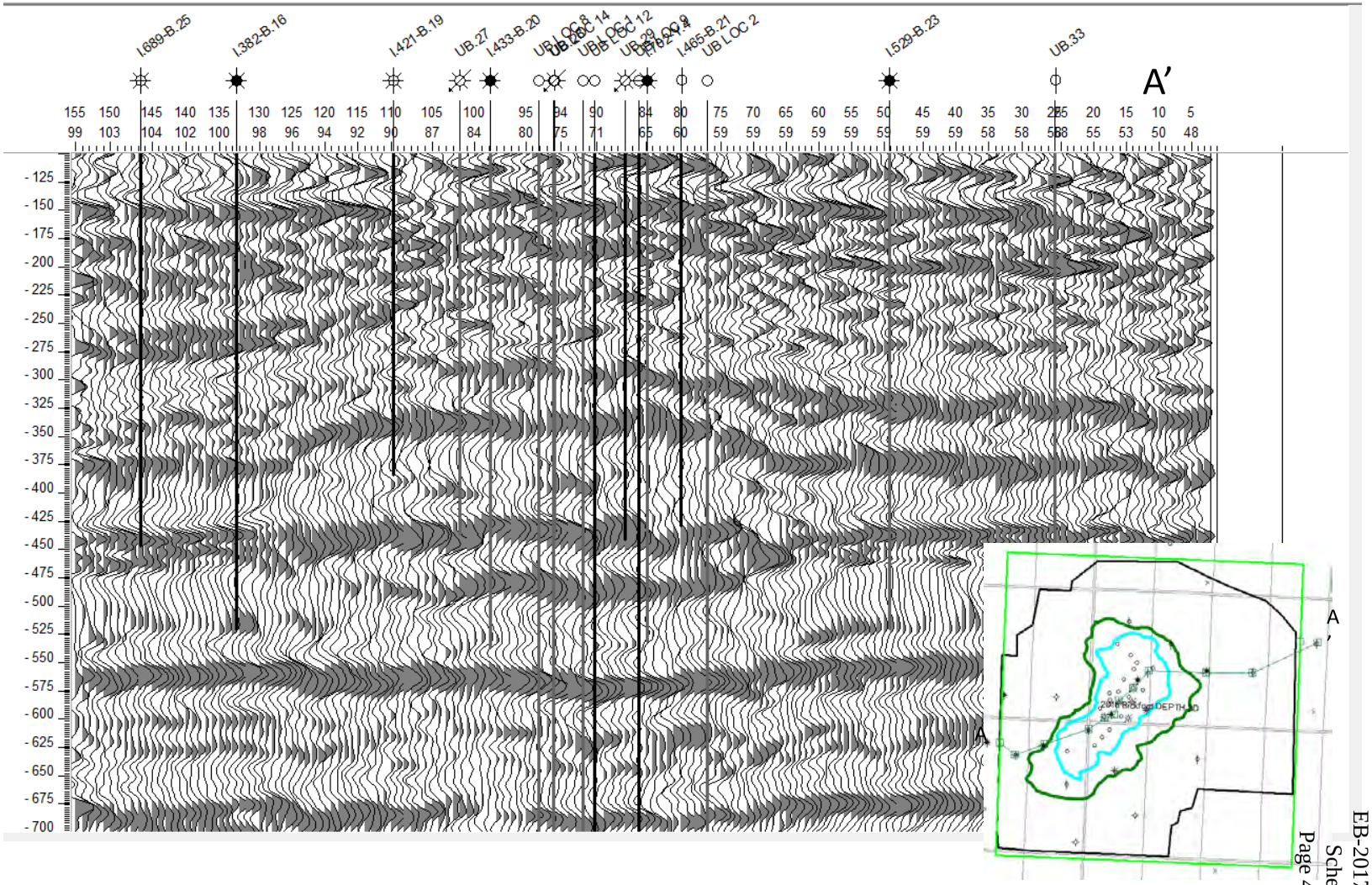
Cross Section A-A' Uninterpreted



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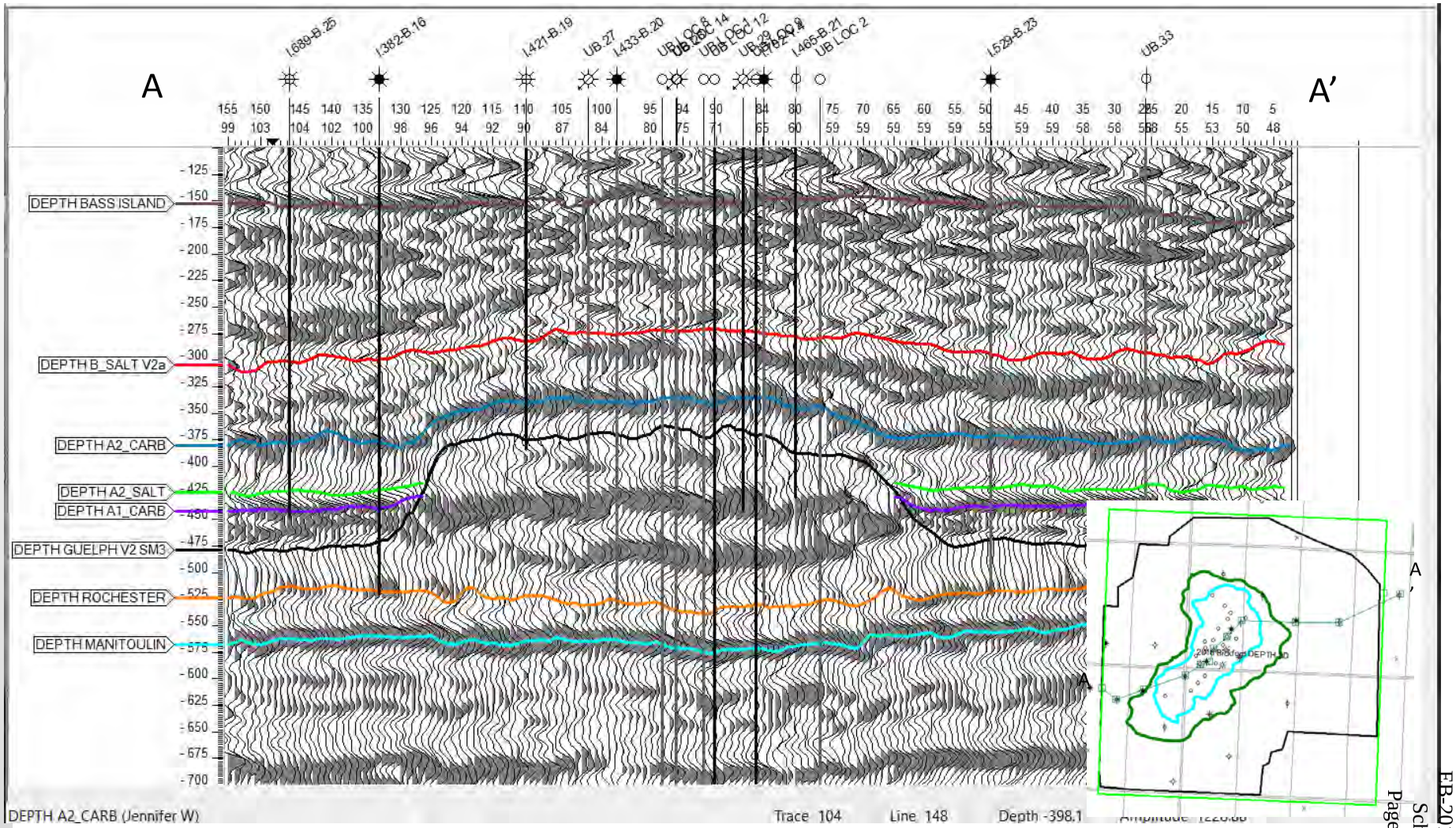
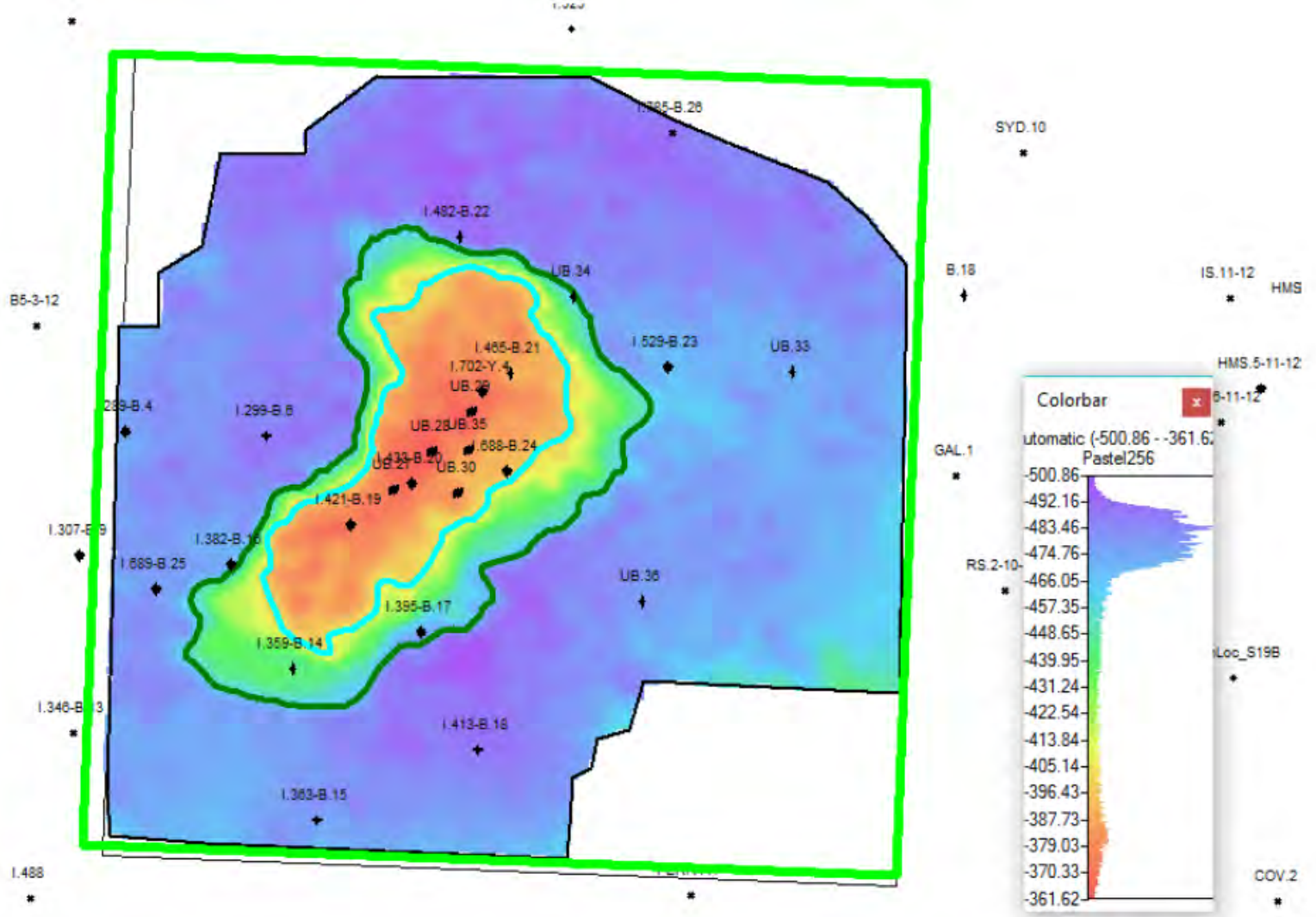
Cross Section A-A' Interpreted



Guelph Structure



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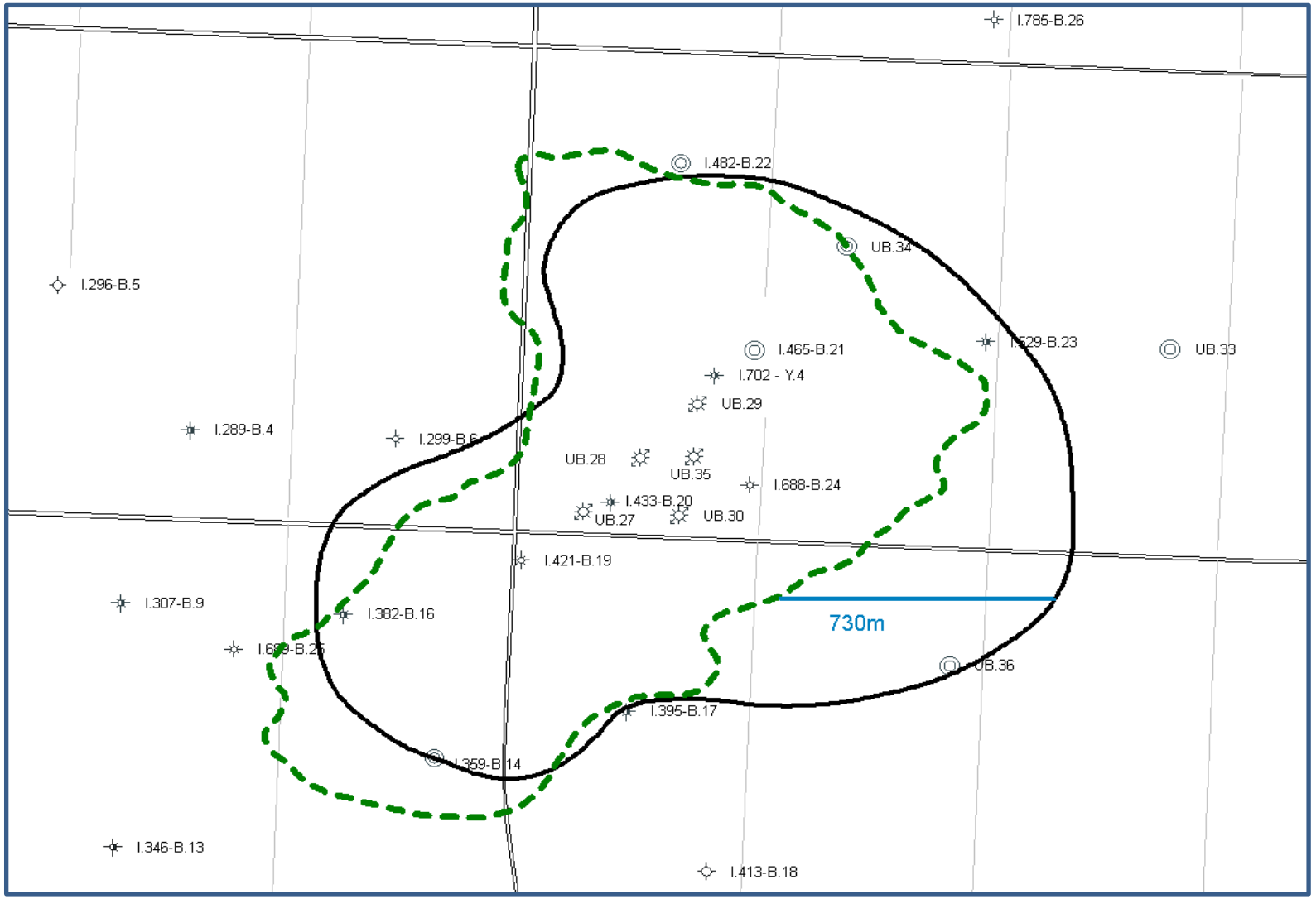
Bickford Reef Footprint



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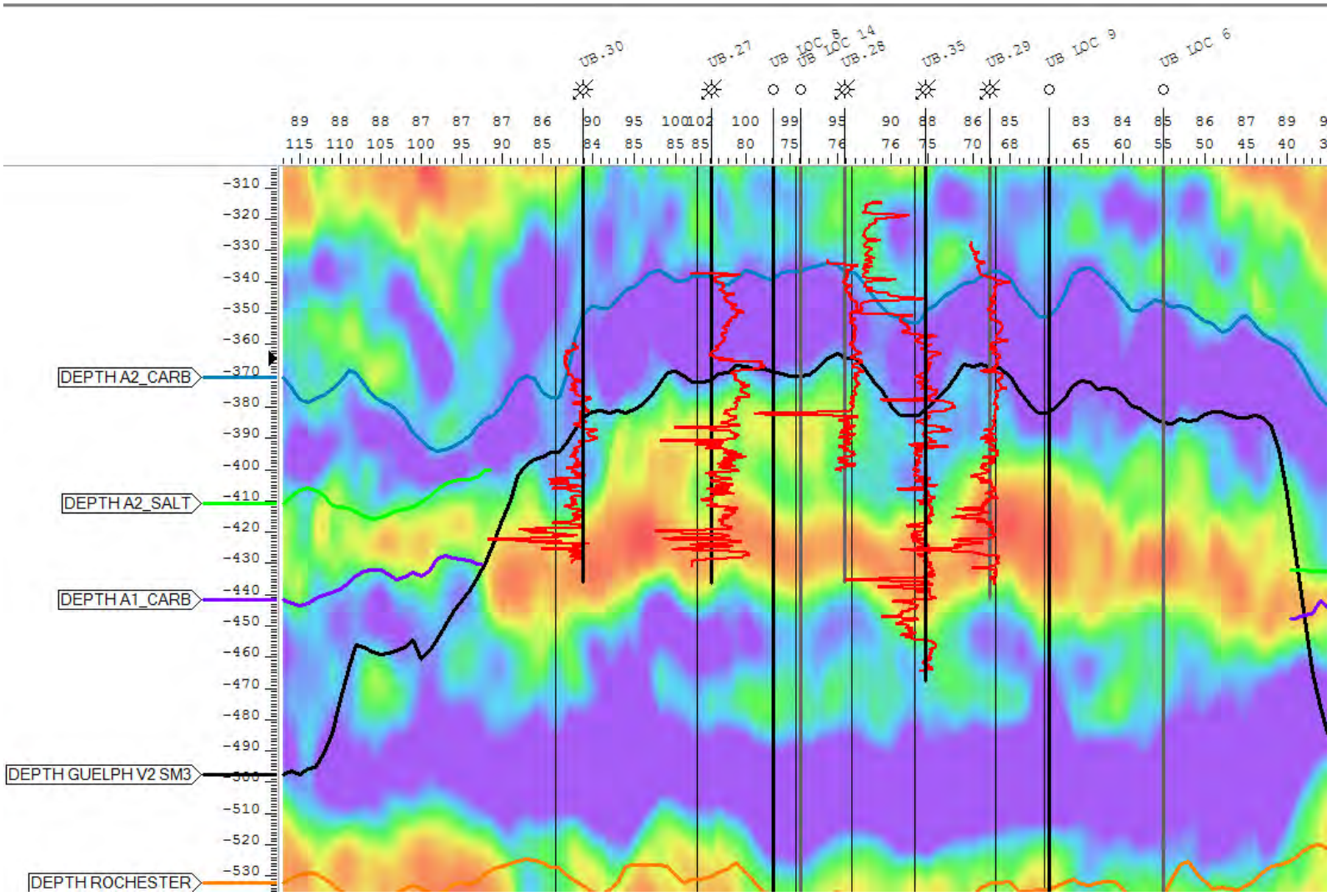
Line Through Well Locations



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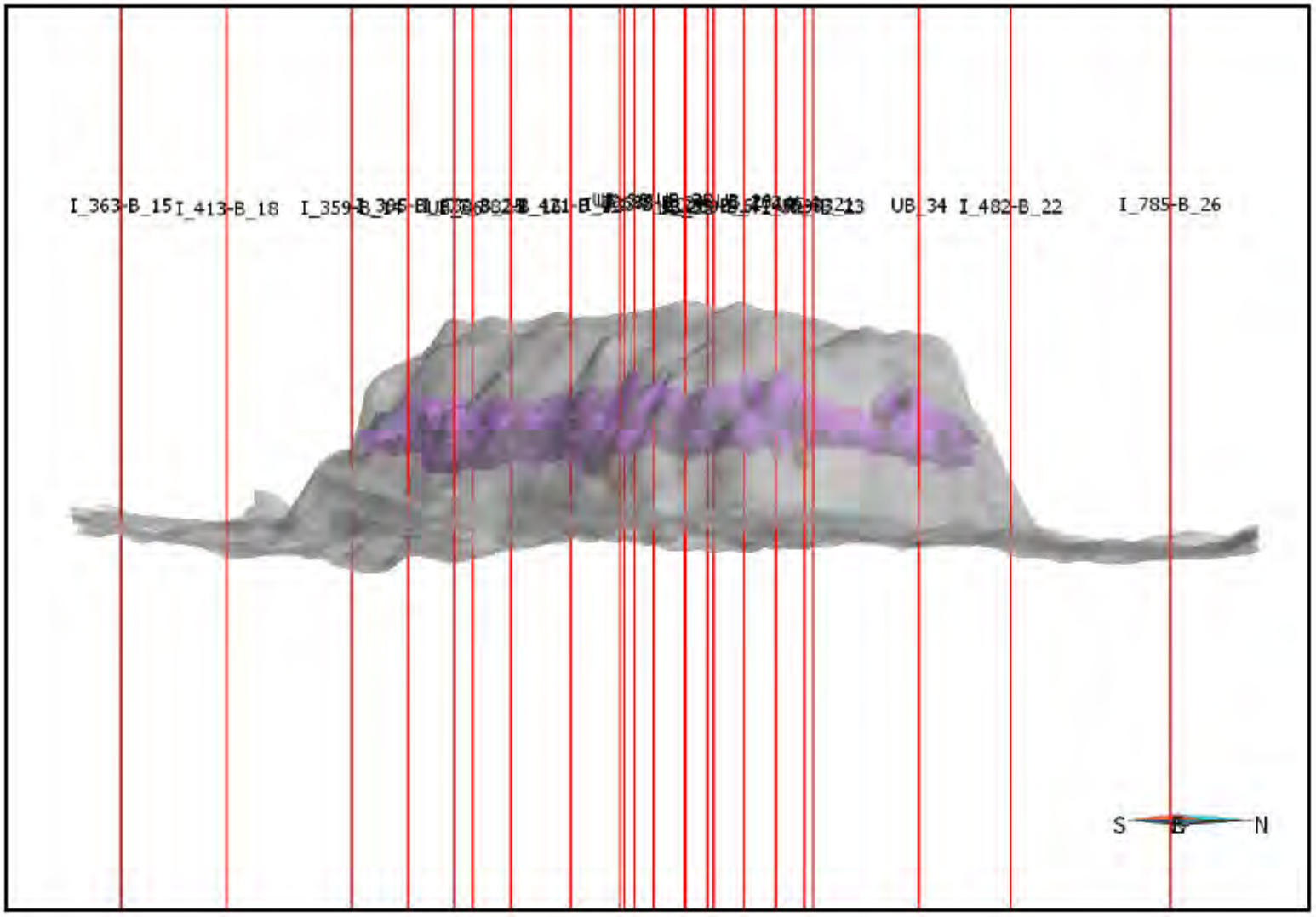
East Side View of Geobody



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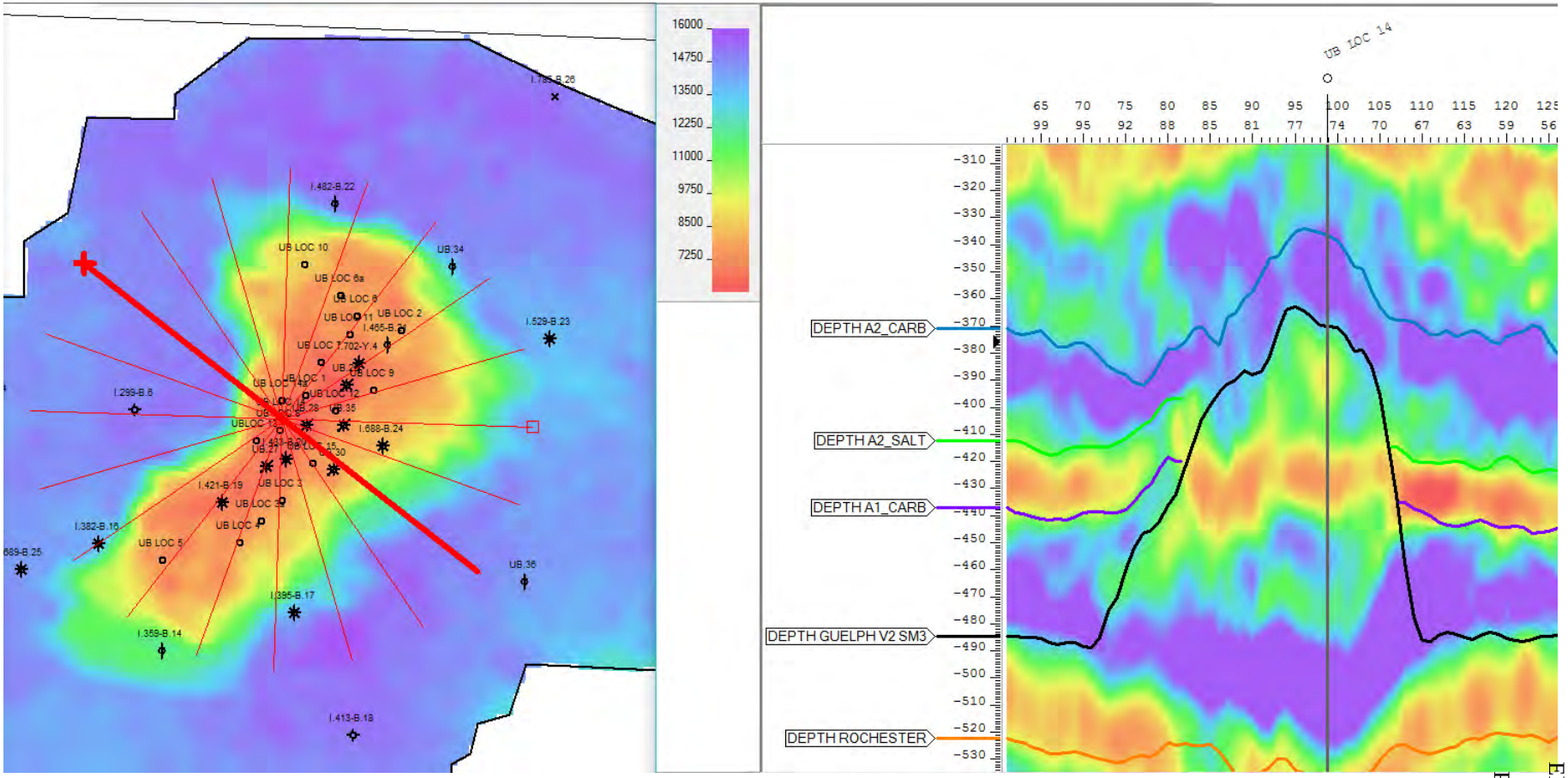
UB.37


16000
14750
13500
12250
11000
9750
8500
7250
UB LOC 14
DEPTH A2_CARB
DEPTH A2_SALT
DEPTH A1_CARB
DEPTH GUELPH V2 SM3
DEPTH ROCHESTER
UB LOC 10
UB.34
UB LOC 6a
UB LOC 2
I.529-B.23
UB LOC 1
UB LOC 9
UB LOC 12
I.299-B.8
I.688-B.24
I.421-B.19
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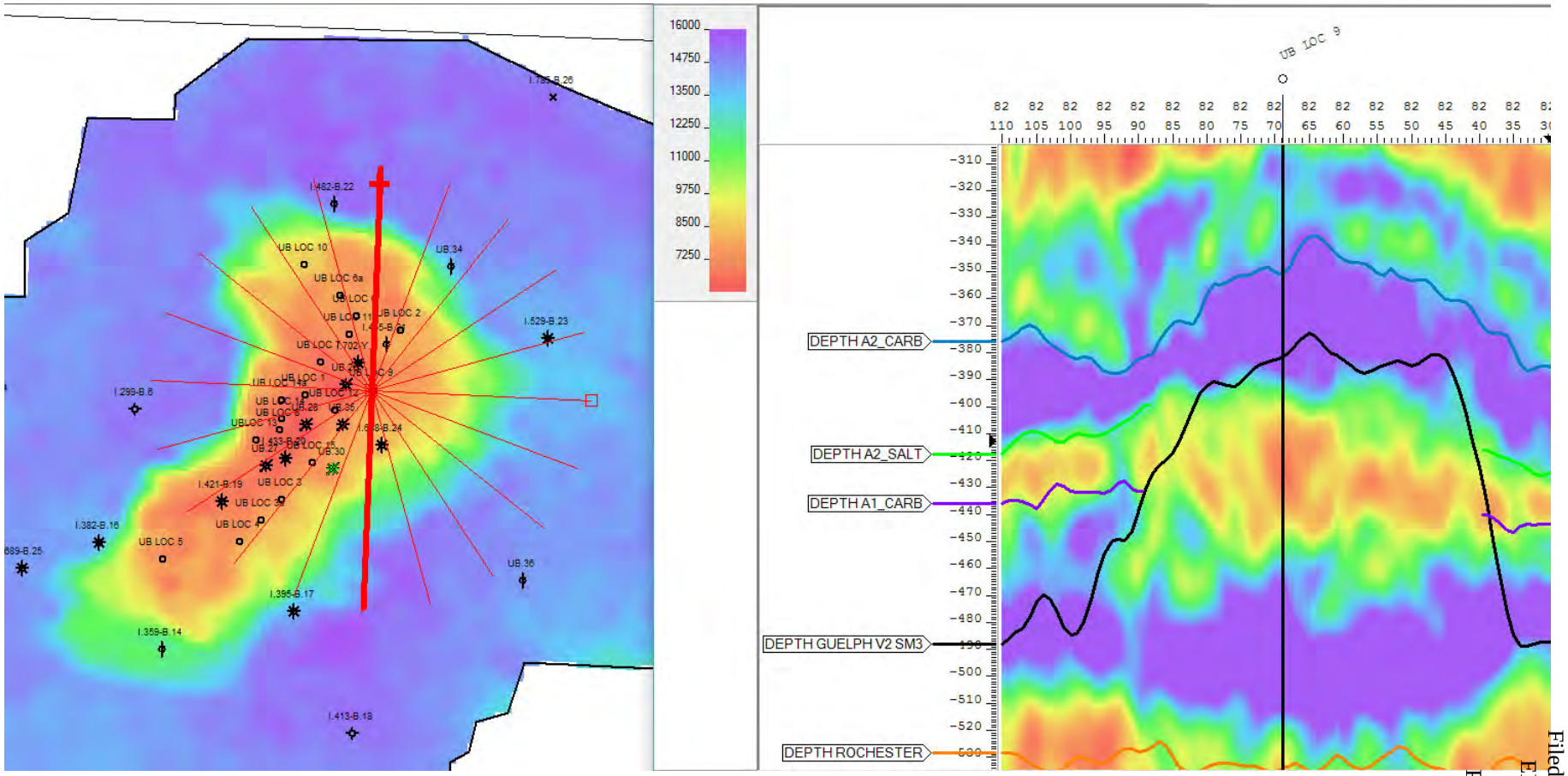
I.413-B.18

UB.38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DEPTH A2_SALT
DEPTH A1_CARB
DEPTH GUELPH V2 SM3
DEPTH ROCHESTER
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UB LOC 6a
UB LOC 2
UB LOC 1
UB LOC 12
UB LOC 3
UB LOC 4
UB LOC 5
UB.34
UB.36
I.529-B.23
I.299-B.8
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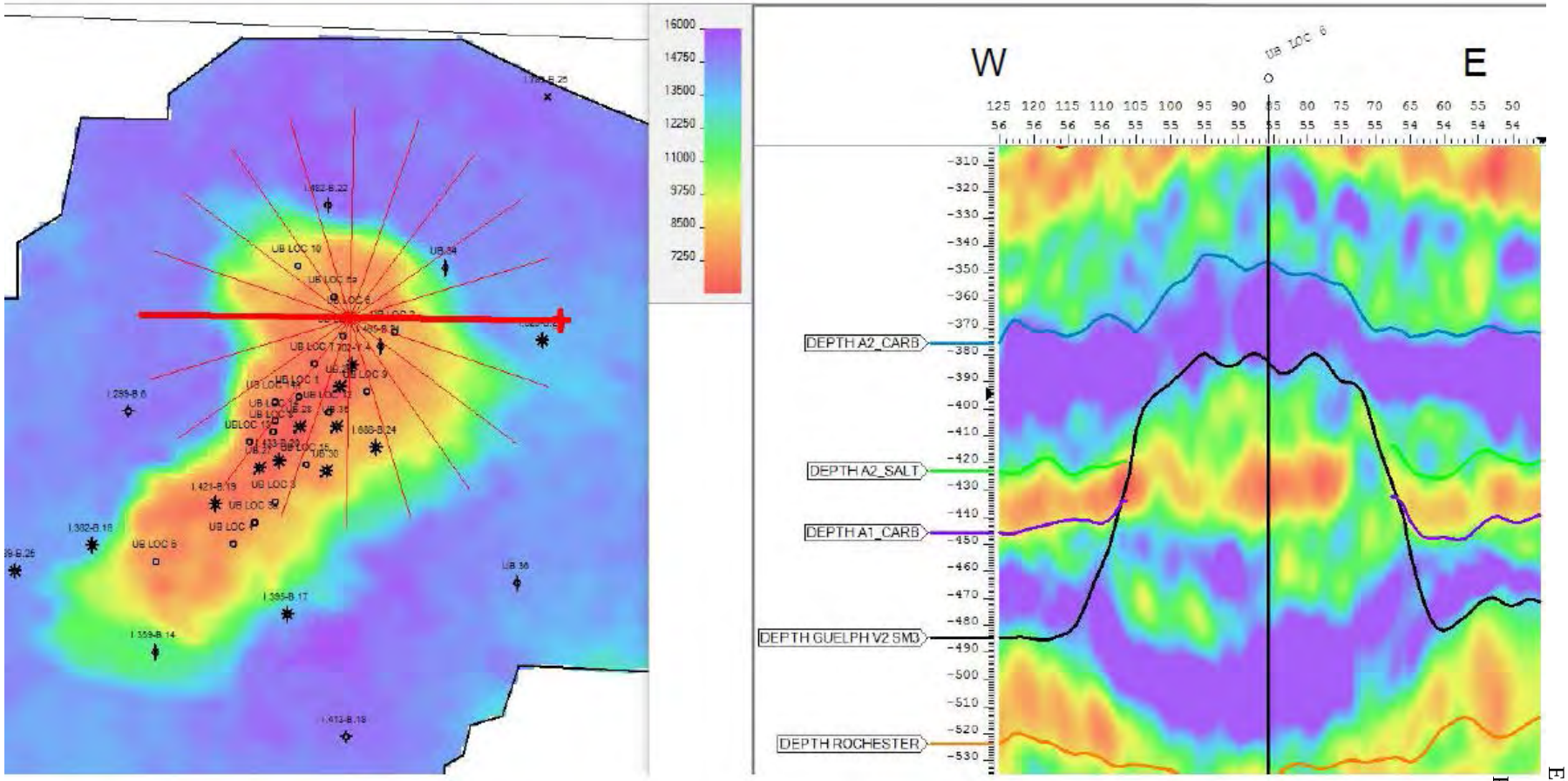
UB.39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UB LOC 6
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50
56 56 56 56 55 55 55 55 55 55 55 55 54 54 54 54
-310
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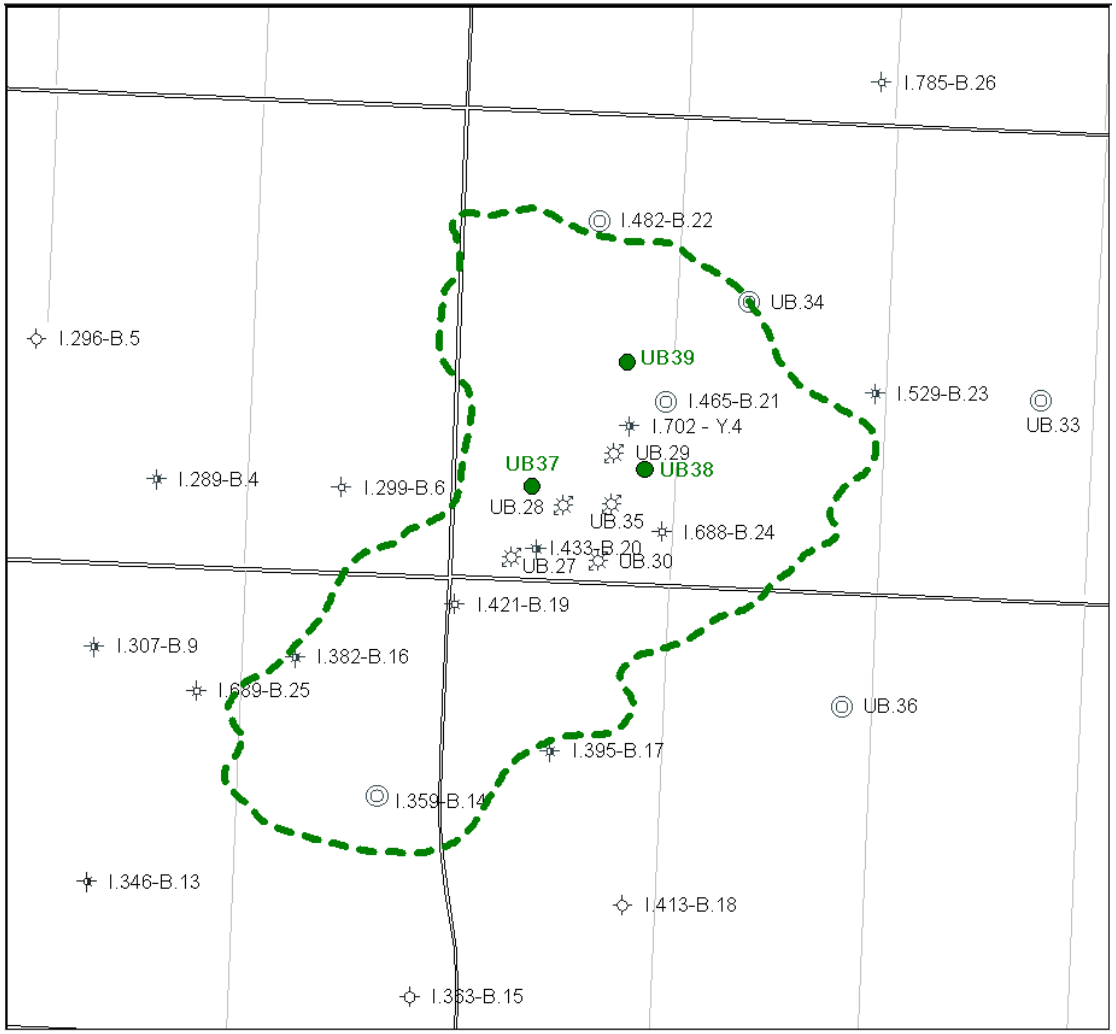
-450
-460
-470
-480
-490
-500
-510
-520
-530
DEPTH A2_CARB
DEPTH A2_SALT
DEPTH A1_CARB
DEPTH GUELPH V2 SM3
DEPTH ROCHESTER

New Well Locations



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Data and Reports

- Updated reports for the Bickford Pool were generated for this project:
  - Risk Assessment – “What If” Analysis of Hazards and Operability Issues Report (“HAZOP”)
  - Assessment of Neighbouring Activities

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“What If” Analysis of Hazards and Operability Issues (Hazop)

- A “What If” analysis identifies hazards, hazardous situations, and specific accidents that could arise and discusses the likelihood, consequences and mitigation of scenarios that are identified
- The sessions records and risk rankings indicate “acceptable risk” with respect to well drilling at the Bickford Pool
- The sessions did not indicate further mitigation or actions

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Assessment of Neighbouring Activities

- The report included:
  - Reservoir History and Geology
  - Existing and abandoned wells within 1 kilometre of the base of gas
  - Subsurface operations within 5 kilometres of the base of gas
  - Wells penetrating the storage zone
- The report did not identify any areas of concerns

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Current Status

- Notifying surrounding landowners by letter
- Negotiating well locations with affected landowners
- An Environmental Assessment will be completed for the areas where the wells and the pipelines will be located
- Initiated consultation with the First Nations
- Provide MNRF with information necessary to review project

Next Steps

- Submit drilling applications for the proposed wells to the MNRF
- File Ontario Energy Board application in the beginning of November 2017
- MNRF will be notified when application is submitted
- Request MNRF to intervene and participate in the process
- OEB wants MNRF's view of the project as part of the MNRF's final submission

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Report Summary

Title: Assessment of Neighbouring Activities
2018 Well Drilling – The Bickford Pool
Author: Union Gas Ltd.

The "Assessment of Neighbouring Activities" report has been completed to comply with the requirements of Clause 7.2 of Standard CSA Z341.1-14 – Storage of Hydrocarbons in Underground Formations – Reservoir Storage ("CSA Z341.1-14") in support of an increase in the deliverability in the Bickford Pool.

Union Gas Limited (Union) proposes to increase the deliverability of the Bickford Pool by drilling three new Injection/Withdrawal (I/W) wells, Union Bickford 37, Union Bickford 38 and Union Bickford 39.

The Bickford Pool is protected by a Designated Storage Area ("DSA") which was approved by the Ontario Energy Board ("OEB") in 1962 (Ontario Regulation 330), However, storage operations didn't begin until 1972. The DSA is comprised of approximately 1,320.5 hectares. Union is confident that the DSA adequately protects the Bickford Pool. In addition, the Oil, Gas and Salt Resources Act provides protection for the reservoir with a 1.6 km buffer zone surrounding each DSA.

The report reviews the geology, existing and abandoned wells within 1 kilometre of the storage zone, subsurface operations within 5 kilometres of the storage zone, and wells penetrating the storage zone.

Well drilling records from the Oil, Gas, and Salt Resources Library (OGSRL) indicate that fifteen wells have been drilled within 1 km of the base of gas of the Bickford Pool. Union conducted a review of these wells and is satisfied that they have not had any "impact on the integrity of the storage facility" as required by CSA Z341.1-14 Clause 7.2(a).

A review of records from the OGSRL for subsurface activities within 5 km of the Bickford Pool indicates that there are five natural gas storage reservoirs. There is no communication between the Bickford Pool and any of the subsurface operations. The operations listed have not had any "impact on the integrity of the storage zone" as required by the CSA Z341.1-14 Clause 7.2(b).

Twelve wells penetrate the Bickford Pool storage zone. Eight of the wells are associated with the operation of the Bickford Pool, the other 4 wells are abandoned production wells. The integrity of each well that penetrates the storage zone, including casing, cement, and the hydraulic isolation of the storage zone from any overlying porous zones was reviewed. Union Gas Limited is satisfied that the wells penetrating the Bickford Pool meet the requirements of CSA Z341.1-14.

In conclusion, the Bickford Pool has been safely operated as a natural gas storage pool for the past forty-five years and is protected by an approved DSA. The technical information reviewed, indicates that there is minimal risk regarding the potential migration of gas between any known existing or abandoned wells within 1 km, and existing operations within 5 km, of the Bickford Pool. All active wells that penetrate the storage zone within the Bickford Pool are associated with storage operations. The wells and facilities are operated, and maintained in accordance with CSA Z341.1-14 Storage of Hydrocarbons in Underground Formations and in accordance with the Oil, Gas and Salt Resources Act, its regulations and Provincial Operating Standards.

Executive Summary

Title: "What If" Analysis of Hazards and Operability Issues
Deliverability Project 2018 – Bickford Pool
Author: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Bickford Pool with regards to the 2018 Deliverability Project and the drilling of three new wells Union Bickford 37 (UB.37), Union Bickford 38 (UB.38), and Union Bickford 39 (UB.39). It describes the "What if" session of hazard assessment that took place over a one day period held on Wednesday, August 31, 2017.

The sessions were attended by the "What if" Leader and five technical experts. The preparation for the sessions, selection of the project scope systems, subsystems, session conduction, and reporting function for the "What if" analysis was performed by U G M Engineering Ltd., using PHA Pro 8.0 software for recording, organizing and reporting functions. Mr. Gordon W. Cowan, P.Eng., of U G M Engineering Ltd. (UGM), was team leader.

Risk ranking was performed in sessions for each "What if". A total of 120 "What if" entries concerning the Bickford Pool were generated from the scope of the CSA Z341.1-14, and examined in the session. As part of the evaluation a 5x5 risk matrix was used to express the risk. Risk is a qualitative expression made up of the session group's assignment of values for likelihood and severity (Risk = Likelihood x Severity). Likelihood refers to the "What if" being examined, and how often the "What if" might occur. For Consequences, the group considered the worst case scenario, the worst consequence of the entire listing of consequences outlined, for Severity assignment. Therefore, only one combination of Likelihood and Severity is provided per What if, which is composed of the highest Likelihood and Severity that arises from the subject "What if". All "What ifs" were ranked. The sessions team could enter new "What ifs" in addition to the pre-entered "What ifs," at any point in session time.

While the operability, storage and drilling aspects of the project were of primary concern; safety, environmental, public impact, and personnel protection issues were also addressed. For all the systems examined, the group as a whole determined whether the system/question/topic had been covered in adequate depth.

After consideration, it was concluded that the session was a complete study of the Bickford Pool Deliverability Project within the scope of the CSA Z341.1-14 regulation. It was agreed that the session had examined safety, operability and technical integrity in a responsible and diligent manner.

In conclusion, the "What if" sessions records and risk rankings, coupled with consideration of the Bickford Pool Deliverability Project development location, indicate "Acceptable Risk."

2018 BICKFORD POOL

Filed: 2017-12-07
EB-2017-0363
Schedule 6

PROPERTY SKETCH
SHOWING APPROXIMATE LOCATION OF
PROPOSED FACILITIES FOR
PT LT 6 CON 12 SOMBRA AS IN L640678 & PT 1, 25R404; ST. CLAIR
UNION GAS COMPANY OF CANADA; UNION GAS LIMITED;

LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WORK SPACE

No.	DATE	BY	APP'D	REMARKS
	REVISIONS			

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PROPOSED FACILITIES
BICKFORD POOL

DRAWN BY: T. James	DATE: 2017/11/22	PLOT SPEC: 1/2500
CHECKED BY	DATE	FILE REVISION DATE
APPROVED BY	DATE	DISTRICT: LONDON
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: PL2104-02

Ontario

Oil, Gas and Salt Resources Act

Application for a Well Licence

Form 1 — To the Minister of Natural Resources — v.2015-12-15

The undersigned operator applies for a well licence under the Oil, Gas and Salt Resources Act and the Regulations thereunder and submits the following #

North
West

1. WELL NAME Union Bickford 37, Sombra 7-6-XII — Target Formation Guelph

Purpose of Proposed Well (Well Type) Natural Gas Storage

2. OPERATOR Union Gas Limited — Tel # 519 436-4600 — Fax # 519 436-4560

Street Address 50 Keil Drive North — City Chatham — Prov. On — Postal Code N7M 5M1

Mailing Address — City — Prov. — Postal Code

Contact Name Mike Learn — Contact Tel # 519-436-4600 x5002815

Email mllearn@uniongas.com

3. LOCATION County Lambton — Township Dawn

Tract 7 — Lot 6 — Concession 12 — Offshore: Block — Tract — Licence/Lease No.

Surface location, metres from Lot Boundaries: 222.05 m North [X] South [ ] — 406.7 m East [ ] West [X]

Latitude 42°44'41.045" N — Longitude 82°10'16.124" W

Bottom-hole Lat. 42°44'41.045" N — Bottom-hole Long. 82°10'16.124" W

Within 1.6 km of Designated Storage Area? Yes [X] No [ ]

Off-target? Yes [X] No [ ]

4. WELL PARTICULARS Vertical [X] Horizontal [ ] Directional [ ] Deepening [ ] Re-entry [ ] Lateral [ ]

Rig Type: Rotary [X] Cable [X] — Well to be cored? Yes [ ] No [X] — Formation at TD Guelph

Ground Elevation 184.7 — Proposed Depth 635.0 — Proposed Depth TVD 635.0 — Proposed Start Date March, 2017

5. POOLING

Pooling of the Spacing Unit or unitization of the Unit Area shown on the attached well location plan has been completed (see Ont. Reg. 245/97 definitions for "pooled spacing unit" and "unitize") Yes [X] No [ ]

6. DRILLING CONTRACTOR Not Available — Tel #

Address — City — Prov. — Postal Code

7. PROPOSED CASING AND CEMENTING PROGRAM

Hole Size (mm)	Casing O.D. (mm)	Weight (kg/m)	Grade	New, Used or in-hole	Setting Depth TVD	Setting Formation	CASING SETTING INFORMATION		
							How Set	Cement Type	Cement Top KB / RF
482.6	508.00	0.00	Line pipe	New	292.1	Kettle Point / Bedrock	Driven	N/A	N/A
482.6	406.40	96.73	H-40	New	476.2	Kettle Point / Bedrock	Cemented	0:1:0	1.9
374.4	298.50	69.94	K-55	New	384.0	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
269.9	219.10	35.72	K-55	New	559.0	A-2 Anhydrite	Cemented	0:1:0	1.9

8. BLOW-OUT PREVENTION EQUIPMENT

Diverter,Annular Preventer; Blind Rams, Pipe Rams

9. WELL SECURITY Name of Trustee 1236596 Ontario Limited — Total # Unplugged Wells 215 — Current Balance $70,000

Harrison Pensa & Associates

10. REMARKS

11. ENCLOSURES Fee [X] — Location Plan [X] (Land wells only) — Drilling Program [X]

12. NOTICE OF COLLECTION

The Ministry of Natural Resources and Forestry is collecting your personal information under the authority of the *Oil, Gas and Salt Resources Act*. Any personal information provided on this application will be used for licensing and law enforcement purposes only and will be protected in accordance with the Freedom of Information and Protection of Privacy Act.

If you have questions about use of your personal information, please contact the Policy and Program Officer, Petroleum Operations Section, Ministry of Natural Resources and Forestry, 659 Exeter Road, London N6E1L3, 519-873-4638.

13. AUTHORITY

The undersigned certifies that the information provided herein is complete and accurate, the operator has the right to drill or operate a well in the above location, and he/she has authority to bind the operator.

Date (d/m/y) 12-Oct-17 — Name Mike Learn — Signature

Company Union Gas Limited — Title Principal Drilling and Reservoir Engineer

Ontario

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Street Address 50 Keil Drive North — City Chatham — Prov. On — Postal Code N7M 5M1

Mailing Address — City — Prov. — Postal Code

Contact Name Mike Learn — Contact Tel # 519-436-4600 x5002815

Email mllearn@uniongas.com

3. LOCATION County Lambton — Township Dawn

Tract 5 — Lot 6 — Concession 12 — Offshore: Block — Tract — Licence/Lease No.

Surface location, metres from Lot Boundaries: 345.7 m North [X] South [ ] — 69.8 m East [ ] West [X]

Latitude 42°44'41.045" N — Longitude 82°10'16.124" W

Bottom-hole Lat. 42°44'41.045" N — Bottom-hole Long. 82°10'16.124" W

Within 1.6 km of Designated Storage Area? Yes [X] No [ ] — Off-target? Yes [X] No [ ]

4. WELL PARTICULARS Vertical [X] Horizontal [ ] Directional [ ] Deepening [ ] Re-entry [ ] Lateral [ ]

Rig Type: Rotary [X] Cable [X] — Well to be cored? Yes [ ] No [X] — Formation at TD Guelph

Ground Elevation 184.5 — Proposed Depth 635.0 — Proposed Depth TVD 635.0 — Proposed Start Date March, 2017

5. POOLING

Pooling of the Spacing Unit or unitization of the Unit Area shown on the attached well location plan has been completed (see Ont. Reg. 245/97 definitions for "pooled spacing unit" and "unitize") Yes [X] No [ ]

6. DRILLING CONTRACTOR Not Available — Tel #

Address — City — Prov. — Postal Code

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Hole Size (mm)	Casing O.D. (mm)	Weight (kg/m)	Grade	New, Used or in-hole	Setting Depth TVD	Setting Formation	CASING SETTING INFORMATION		
							How Set	Cement Type	Cement Top KB / RF
482.6	508.00	0.00	Line pipe	New	400.7	Kettle Point / Bedrock	Driven	N/A	N/A
482.6	406.40	96.73	H-40	New	124.3	Kettle Point / Bedrock	Cemented	0:1:0	1.9
374.4	298.50	69.94	K-55	New	381.0	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
269.9	219.10	35.72	K-55	New	567.0	A-2 Anhydrite	Cemented	0:1:0	1.9

8. BLOW-OUT PREVENTION EQUIPMENT

Diverter,Annular Preventer; Blind Rams, Pipe Rams

9. WELL SECURITY Name of Trustee 1236596 Ontario Limited — Total # Unplugged Wells 215 — Current Balance $70,000

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Company Union Gas Limited — Title Principal Drilling and Reservoir Engineer

Ontario

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Contact Name Mike Learn — Contact Tel # 519-436-4600 x5002815

Email mllearn@uniongas.com

3. LOCATION County Lambton — Township Dawn

Tract 5 — Lot 6 — Concession 12 — Offshore: Block — Tract — Licence/Lease No.

Surface location, metres from Lot Boundaries: 622.1 m North [X] South [ ] — 135.3 m East [ ] West [X]

Latitude 42°44'41.045" N — Longitude 82°10'16.124" W

Bottom-hole Lat. 42°44'41.045" N — Bottom-hole Long. 82°10'16.124" W

Within 1.6 km of Designated Storage Area? Yes [X] No [ ]

Off-target? Yes [X] No [ ]

4. WELL PARTICULARS Vertical [X] Horizontal [ ] Directional [ ] Deepening [ ] Re-entry [ ] Lateral [ ]

Rig Type: Rotary [X] Cable [X] — Well to be cored? Yes [ ] No [X] — Formation at TD Guelph

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Hole Size (mm)	Casing O.D. (mm)	Weight (kg/m)	Grade	New, Used or in-hole	Setting Depth TVD	Setting Formation	CASING SETTING INFORMATION		
							How Set	Cement Type	Cement Top KB / RF
482.6	508.00	0.00	Line pipe	New	672.1	Kettle Point / Bedrock	Driven	N/A	N/A
482.6	406.40	96.73	H-40	New	184.8	Kettle Point / Bedrock	Cemented	0:1:0	1.9
374.4	298.50	69.94	K-55	New	383.0	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
269.9	219.10	35.72	K-55	New	570.0	A-2 Anhydrite	Cemented	0:1:0	1.9

8. BLOW-OUT PREVENTION EQUIPMENT

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9. WELL SECURITY Name of Trustee 1236596 Ontario Limited — Total # Unplugged Wells 215 — Current Balance $70,000

Harrison Pensa & Associates

10. REMARKS

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Date (d/m/y) 12-Oct-17 — Name Mike Learn — Signature

Company Union Gas Limited — Title Principal Drilling and Reservoir Engineer

DRILLING PROCEDURE

Union Bickford 37, Sombra 7-6-XII

CONDUCTOR HOLE

1. Underground Storage to notify M.N.R. 48 hours prior to spud.
2. Move in and rig up cable tool drilling rig.

Note: All depths referenced to 4.6 mKB

3. Drill and drive 508 mm conductor pipe 1 m into Kettle Point / Bedrock (71 mKB) with a 482.6 mm bit. Ensure that fresh water is shut off before proceding.

Note: Record fresh water interval

4. Record conductor casing OD, weight, grade and set depth.

SURFACE HOLE

5. Drill 15.5 m into Kettle Point / Bedrock (85.5 mKB) with a 482.6 mm bit.

Note: One sample shall be collected every 3 m once Kettle Point / Bedrock is reached.

6. Hold Safety Meeting
7. Run 406 mm surface casing to bottom (85.5 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 5960 N-m (4390 ft-lb) and the maximum makeup torque is 7460 N-m (5490 ft-lb).
8. Record surface casing OD, weight, grade, placement of cementing hardware and set depth.
9. Raise surface casing 0.5 m off bottom and set in slips. Cement 406 mm surface casing to surface as per cementing program.
10. Wait on cement (W.O.C.) for 24 hours.
11. Record cement top in casing.
12. Rig out cable tool rig.

INTERMEDIATE HOLE - ROTARY

13. Rig in rotary drilling rig (**ASSUME KB = 4.6 m**).
14. Pressure Test entire BOP system and surface casing to 1225 kPag for 10 minutes and record results in log according to OGSRA Operating Standards v 2.0 sec. 4.5.2.1
15. Drill out cement with 374.4 mm bit.
16. Drill 0.5 m of new formation.
17. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
18. Drill until at the top of F Shale formation (379 mKB) with Hole Size mm bit, surveying every 30 m.

Note: Geologist must be on site to verify top of F Shale.

19. Drill 5.5m into the F Shale formation to 384.5m with 374.4 mm bit or as directed by company personnel.
20. Hold safety meeting. Run the 298.5 mm intermediate casing to bottom (mKB) with a float collar at top of bottom joint. Centralizers should be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. A cement basket should be placed above Detroit River formation. Threadlock guide shoe on bottom.
    The optimum makeup torque is 6480 N-m (4770 ft-lb) and the maximum makeup torque is 8090 N-m (5960 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
21. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
22. Prepare to cement 298.5 mm intermediate casing to surface.
23. Hold safety meeting with all on-site personal.
24. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Bickford 37, Sombra 7-6-XII

25. Pump citric acid followed by fresh water pre-flush. Cement to surface as per cementing program. Ensure cement returns to surface. Take a minimum of four cement samples. Record all circulating pressures and volumes.
26. W.O.C. for 48 hours.
27. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
28. Pressure Test Pipe Rams to 1400 kPag for ten minutes. Pressure Test the entire BOP system to 7000 kPag for 10 minutes and record results in log according to OGSRA Operating Standards. (This also pressure tests the casing and casing bowl requirement of 5,500 kPag.)

Production Hole

29. Drill a maximum of 0.5 m of new formation with 269.9 mm bit.
30. Prepare for Pressure Integrity Test (P.I.T.). Using a low volume, high pressure pump, pressure test the formation at a pressure equivalent to a gradient of 18 kPa/m for 10 min using an incompressible fluid.
31. Drill 0.5 m into the A-2 Anhydrite (559.5m) with 269.9 mm bit. Survey every 30m

Note: Geologist will be onsite to verify top of A-2 Anhydrite formation.

32. Run 219.1 mm production casing to 559mKB with insert float at top of bottom joint. Centralizers to be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. Tack weld guide shoe on bottom. The optimum makeup torque is 5660 N-m (4170 ft-lb) and the maximum makeup torqueis 7080 N-m (5210 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed
33. Record the production casing OD, weight, grade, placement of cementing hardware and set depth.
34. Hold safety meeting.
35. Prepare to cement 219.1 mm production casing to surface.
36. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
37. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program - 219.1 mm PRODUCTION CASING. Displace cement with fresh water. Ensure cement returns to surface or arrange for remedial cementing from surface. Take a minimum of four cement samples to verify setup time and density. Record all circulating pressures and volumes.
38. Lift BOP and set casing slips.
39. Rig out Rotary Drilling Rig.
40. Set primary seals. Cut off casing to proper height. Install casing spool.
41. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*

Main Hole

Note: Reservoir pressure must be below 700p.s.i. before proceding to next step. Union to notify Contractor when pressure is below 700 p.s.i.

41. Rig in Cable Tool Rig.
42. W.O.C. for 48 hours.
43. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
44. Install orbit valve and BOP.
45. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with Pressure Test Program- Production Casing - Pressure Test.
46. Drill rat hole when convenient before Guelph formation is reached.
47. Bail hole dry.
48. Drill out cement and shoe

DRILLING PROCEDURE

Union Bickford 37, Sombra 7-6-XII

49. Rig up lubricator and tool trap.
50. Drill 0.5m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Integrity Test
51. Bail hole dry.
52. Drill under lubricator to 635 m with a 193.7 mm bit
53. Record daily pressure prior to drilling. Record drilling times in Guelph formation.
54. Hold safety meeting. Open Hole Logging See *LOGGING PROGRAM* , Log Run #3
55. Rig out cable tool drilling rig
56. Install blind flange on top of master valve.
57. Underground Storage to notify M.N.R. within 48 hours after TD

DRILLING PROCEDURE

Union Bickford 38, Sombra 5-6-XII

CONDUCTOR HOLE

1. Underground Storage to notify M.N.R. 48 hours prior to spud.
2. Move in and rig up cable tool drilling rig.

Note: All depths referenced to 4.6 mKB

3. Drill and drive 508 mm conductor pipe 1 m into Kettle Point / Bedrock (56 mKB) with a 482.6 mm bit. Ensure that fresh water is shut off before proceding.

Note: Record fresh water interval

4. Record conductor casing OD, weight, grade and set depth.

SURFACE HOLE

5. Drill 15.5 m into Kettle Point / Bedrock (70.5 mKB) with a 482.6 mm bit.

Note: One sample shall be collected every 3 m once Kettle Point / Bedrock is reached.

6. Hold Safety Meeting
7. Run 406.4 mm surface casing to bottom (70.5 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 5960 N-m (4390 ft-lb) and the maximum makeup torque is 7460 N-m (5490 ft-lb).
8. Record the surface casing OD, weight, grade, placement of cementing hardware and set depth.
9. Raise surface casing 0.5 m off bottom and set in slips. Cement 406.4 mm surface casing to surface as per cementing program.
10. Wait on cement (W.O.C.) for 24 hours.
11. Record cement top in casing.
12. Rig out cable tool rig.

INTERMEDIATE HOLE - ROTARY

13. Rig in rotary drilling rig (**ASSUME KB = 4.6 m**).
14. Pressure Test entire BOP system and surface casing to 1225 kPag for 10 minutes and record resultsin log according to OGSRA Operating Standards v 2.0 sec. 4.5.2.1
15. Drill out cement with 374.4 mm bit.
16. Drill 0.5 m of new formation.
17. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
18. Drill until at the top of F Shale formation (376 mKB) with Hole Size mm bit, surveying every 30 m.

Note: Geologist must be on site to verify top of F Shale.

19. Drill 5.5m into the F Shale formation to 381.5m with 374.4 mm bit or as directed by company personnel
20. Hold safety meeting. Run 298.5 mm intermediate casing to bottom (381.5 mKB) with float collar at top of bottom joint. Centralizers should be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. Cement basket should be placed above Detroit River formation. Threadlock guide shoe on bottom. The optimum makeup torque is 6480 N-m (4770 ft-lb) and the maximum makeup torque is 8090 N-m (5960 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
21. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
22. Prepare to cement 298.5 mm intermediate casing to surface.
23. Hold safety meeting with all on-site personal.
24. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Bickford 38, Sombra 5-6-XII

25. Pump citric acid followed by fresh water pre-flush. Cement to surface as per cementing program. Ensure cement returns to surface. Take a minimum of four cement samples. Record all circulating pressures and volumes.
26. W.O.C. for 48 hours.
27. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
28. Pressure Test Pipe Rams to 1400 kPag for ten minutes. Pressure Test the entire BOP system to 7000 kPag for 10 minutes and record results in log according to OGSRA Operating Standards
    (This pressure test also tests the casing and casing bowl requirement of 5,500 kPag.)

Production Hole

29. Drill a maximum of 0.5 m of new formation with 269.9 mm bit.
30. Prepare for Pressure Integrity Test (P.I.T.). Using a low volume, high pressure pump, pressure test the formationat a pressure equivalent to a gradient of 18 kPa/m for 10 min using an incompressible fluid.
31. Drill 0.5 m into the A-2 Anhydrite (567.5m) with 269.9 mm bit. Survey every 30m

Note: Geologist will be onsite to verify top of A-2 Anhydrite formation.

32. Run 219.1 mm production casing to 567mKB with insert float at top of bottom joint. Centralizers are to be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. Tack weld guide shoe on bottom. The optimum makeup torque is 5660 N-m (4170 ft-lb) and the maximum makeup torque is 7080 N-m (5210 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed
33. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
34. Hold safety meeting.
35. Prepare to cement 219.1 mm production casing to surface.
36. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
37. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program - 219.1 mm PRODUCTION CASING. Displace cement with fresh water. Ensure cement returns to surface or arrange for remedial cementing from surface. Take a minimum of four cement samples to verify setup time and density. Record all circulating pressures and volumes.
38. Lift BOP and set casing slips.
39. Rig out Rotary Drilling Rig.
40. Set primary seals. Cut off casing to proper height. Install casing spool.
41. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*

Main Hole

Note: Reservoir pressure must be below 700p.s.i. before proceding to next step. Union to notify Contractor when pressure is below 700 p.s.i.

41. Rig in Cable Tool Rig.
42. W.O.C. for 48 hours.
43. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
44. Install orbit valve and BOP.
45. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with Pressure Test Program- Production Casing - Pressure Test.
46. Drill rat hole when convenient before Guelph formation is reached.
47. Bail hole dry.

DRILLING PROCEDURE

Union Bickford 39, Sombra 5-6-XII

CONDUCTOR HOLE

1. Underground Storage to notify M.N.R. 48 hours prior to spud.
2. Move in and rig up cable tool drilling rig.

Note: All depths referenced to 4.6 mKB

3. Drill and drive 508 mm conductor pipe 1 m into Kettle Point / Bedrock (51 mKB) with a 482.6 mm bit. Ensure that fresh water is shut off before proceding.

Note: Record fresh water interval

4. Record conductor casing OD, weight, grade and set depth.

SURFACE HOLE

5. Drill 15.5 m into Kettle Point / Bedrock (65.5 mKB) with a 482.6 mm bit.

Note: One sample shall be collected every 3 m once Kettle Point / Bedrock is reached.

6. Hold Safety Meeting
7. Run 406.4 mm surface casing to bottom (65.5 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 5960 N-m (4390 ft-lb) and the maximum makeup torque is 7460 N-m (5490 ft-lb).
8. Record surface casing OD, weight, grade, placement of cementing hardware and set depth.
9. Raise surface casing 0.5 m off bottom and set in slips. Cement 406.4 mm surface casing to surface as per cementing program.
10. Wait on cement (W.O.C.) for 24 hours.
11. Record cement top in casing.
12. Rig out cable tool rig.

INTERMEDIATE HOLE - ROTARY

13. Rig in rotary drilling rig (**ASSUME KB = 4.6 m**).
14. Pressure Test entire BOP system and surface casing to 1225 kPag for 10 minutes and record results in log according to OGSRA Operating Standards v 2.0 sec. 4.5.2.1
15. Drill out cement with 374.4 mm bit.
16. Drill 0.5 m of new formation.
17. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
18. Drill until at the top of F Shale formation (378 mKB) with Hole Size mm bit, surveying every 30 m.

Note: Geologist must be on site to verify top of F Shale.

19. Drill 5.5m into the F Shale formation to 383.5m with 374.4 mm bit or as directed by company personnel
20. Hold safety meeting. Run the 298.5 mm intermediate casing to bottom (383.5 mKB) with a float collar at top of bottom joint. Centralizers should be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. Cement basket should be placed above Detroit River formation. Threadlock guide shoe on bottom.
    The optimum makeup torque is 6480 N-m (4770 ft-lb) and the maximum makeup torque is 8090 N-m (5960 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
21. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
22. Prepare to cement 298.5 mm intermediate casing to surface.
23. Hold safety meeting with all on-site personal.
24. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Bickford 39, Sombra 5-6-XII

25. Pump citric acid followed by fresh water pre-flush. Cement to surface as per cementing program. Ensure cement returns to surface. Take a minimum of four cement samples. Record all circulating pressures and volumes.
26. W.O.C. for 48 hours.
27. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
28. Pressure Test Pipe Rams to 1400 kPag for ten minutes. Pressure Test the entire BOP system to 7000 kPag for 10 minutes and record results in log according to OGSRA Operating Standards
    (This pressure test also tests the casing and casing bowl requirement of 5,500 kPag.)

Production Hole

29. Drill a maximum of 0.5 m of new formation with 269.9 mm bit.
30. Prepare for Pressure Integrity Test (P.I.T.). Using a low volume, high pressure pump, pressure test the formation
    at a pressure equivalent to a gradient of 18 kPa/m for 10 min using an incompressible fluid.
31. Drill 0.5 m into the A-2 Anhydrite (570.5m) with 269.9 mm bit. Survey every 30m

Note: Geologist will be onsite to verify top of A-2 Anhydrite formation.

32. Run 219.1 mm production casing to 570mKB with insert float at top of bottom joint. Centralizers to be placed 2 m above shoe, at joints 2, 4 and 5 and every 5th joint to surface. Tack weld guide shoeon bottom. The optimum makeup torque is 5660 N-m (4170 ft-lb) and the maximum makeup torque is 7080 N-m (5210 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed.
33. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
34. Hold safety meeting.
35. Prepare to cement 219.1 mm production casing to surface.
36. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
37. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program - 219.1 mm PRODUCTION CASING. Displace cement with fresh water. Ensure cement returns to surface or arrange for remedial cementing from surface. Take a minimum of four cement samples to verify setup time and density. Record all circulating pressures and volumes.
38. Lift BOP and set casing slips.
39. Rig out Rotary Drilling Rig.
40. Set primary seals. Cut off casing to proper height. Install casing spool.
41. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*

Main Hole

Note: Reservoir pressure must be below 700p.s.i. before proceding to next step. Union to notify Contractor when pressure is below 700 p.s.i.

41. Rig in Cable Tool Rig.
42. W.O.C. for 48 hours.
43. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
44. Install orbit valve and BOP.
45. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with Pressure Test Program- Production Casing - Pressure Test.
46. Drill rat hole when convenient before Guelph formation is reached.
47. Bail hole dry.

CASING PROGRAM

Union Bickford 37, Sombra 7-6-XII

CONDUCTOR CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	
Top	0.0	mKB	0.0	
Bottom	71.0	mKB	232.9	ftKB
Outside Diameter	508.00	mm	20.000	inches
Weight		kg/m	0.0	lb/ft
Drift Diameter		mm	0.000	inches
Inside Diameter	489.00	mm	19.252	inches
Grade	Line pipe		Line pipe	
Thread	N/A		N/A	
Coupling	Welded		Welded	
Burst	N/A		N/A	psi
Collapse	N/A	kPa	N/A	psi
Pipe Body Yield Strength	N/A	daN	N/A	lb-f
Joint Strength	N/A	daN	N/A	lb-f
Torque - Optimum	N/A	N-m	N/A	ft-lb
Torque - Maximum	N/A	N-m	N/A	ft-lb
Condition	New			
Float Equipment	None			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

SURFACE CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	85.0	mKB	278.9	ftKB
Outside Diameter	406.00	mm	15.984	inches
Weight	96.73	kg/m	65.0	lb/ft
Drift Diameter	382.60	mm	15.063	inches
Inside Diameter	387.40	mm	15.252	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,310	kPa	1,640	psi
Collapse	4,340	kPa	630	psi
Pipe Body Yield Strength	327,400	daN	736,000	lb-f
Joint Strength	195,300	daN	439,000	lb-f
Torque - Optimum	5,960	N-m	4,390	ft-lb
Torque - Maximum	7,460	N-m	5,490	ft-lb
Condition	New			
Float Equipment	None			
Centralizers	Joints 2, 4 and 8			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

CASING PROGRAM

Union Bickford 37, Sombra 7-6-XII

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	384.0	mKB	1259.8	ftKB
Outside Diameter	298.50	mm	11.752	inches
Weight	69.94	kg/m	47.0	lb/ft
Drift Diameter	275.40	mm	10.843	inches
Inside Diameter	279.40	mm	11.000	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,170	kPa	3,070	psi
Collapse	10,410	kPa	1,510	psi
Pipe Body Yield Strength	327,800	daN	737,000	lb-f
Joint Strength	226,400	daN	509,000	lb-f
Torque - Optimum	6,480	N-m	4,770	ft-lb
Torque - Maximum	8,090	N-m	5,960	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Cement Basket	Run above Detroit River formation			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

PRODUCTION CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	559.0	mKB	1834.0	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	47.68	kg/m	32.0	lb/ft
Drift Diameter	202.49	mm	7.972	inches
Inside Diameter	205.66	mm	8.097	inches
Grade	K-55		K-55	
Thread	8 RD		8 RD	
Coupling	LT & C		LT & C	
Burst	27,100	kPa	3,930	psi
Collapse	17,440	kPa	2,530	psi
Pipe Body Yield Strength	223,700	daN	503,000	lb-f
Joint Strength	201,000	daN	452,000	lb-f
Torque - Optimum	5,660	N-m	4,170	ft-lb
Torque - Maximum	7,080	N-m	5,210	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

CASING PROGRAM

Union Bickford 38, Sombra 5-6-XII

CONDUCTOR CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**345.7**
Top	0.0	mKB	0.0	69.8
Bottom	56.0	mKB	183.7	ftKB
Outside Diameter	508.00	mm	20.000	inches
Weight		kg/m	0.0	lb/ft
Drift Diameter		mm	0.000	inches
Inside Diameter	489.00	mm	19.252	inches
Grade	Line pipe		Line pipe	
Thread	N/A		N/A	
Coupling	Welded		Welded	
Burst	N/A		N/A	psi
Collapse	N/A	kPa	N/A	psi
Pipe Body Yield Strength	N/A	daN	N/A	lb-f
Joint Strength	N/A	daN	N/A	lb-f
Torque - Optimum	N/A	N-m	N/A	ft-lb
Torque - Maximum	N/A	N-m	N/A	ft-lb
Condition	New			
Float Equipment	None			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

SURFACE CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	70.0	mKB	229.7	ftKB
Outside Diameter	406.40	mm	16.000	inches
Weight	96.73	kg/m	65.0	lb/ft
Drift Diameter	382.60	mm	15.063	inches
Inside Diameter	387.40	mm	15.252	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,310	kPa	1,640	psi
Collapse	4,340	kPa	630	psi
Pipe Body Yield Strength	327,400	daN	736,000	lb-f
Joint Strength	195,300	daN	439,000	lb-f
Torque - Optimum	5,960	N-m	4,390	ft-lb
Torque - Maximum	7,460	N-m	5,490	ft-lb
Condition	New			
Float Equipment	None			
Centralizers	Joints 2, 4 and 8			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

CASING PROGRAM

Union Bickford 38, Sombra 5-6-XII

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	381.0	mKB	1250.0	ftKB
Outside Diameter	298.50	mm	11.752	inches
Weight	69.94	kg/m	47.0	lb/ft
Drift Diameter	275.40	mm	10.843	inches
Inside Diameter	279.40	mm	11.000	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,170	kPa	3,070	psi
Collapse	10,410	kPa	1,510	psi
Pipe Body Yield Strength	327,800	daN	737,000	lb-f
Joint Strength	226,400	daN	509,000	lb-f
Torque - Optimum	6,480	N-m	4,770	ft-lb
Torque - Maximum	8,090	N-m	5,960	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Cement Basket	Run above Detroit River formation			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

PRODUCTION CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	567.0	mKB	1860.2	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	47.62	kg/m	32.0	lb/ft
Drift Diameter	202.49	mm	7.972	inches
Inside Diameter	205.66	mm	8.097	inches
Grade	K-55		K-55	
Thread	8 RD		8 RD	
Coupling	LT & C		LT & C	
Burst	27,100	kPa	3,930	psi
Collapse	17,440	kPa	2,530	psi
Pipe Body Yield Strength	223,700	daN	503,000	lb-f
Joint Strength	201,000	daN	452,000	lb-f
Torque - Optimum	5,660	N-m	4,170	ft-lb
Torque - Maximum	7,080	N-m	5,210	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

CASING PROGRAM

Union Bickford 39, Sombra 5-6-XII

CONDUCTOR CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	51.0	mKB	167.3	ftKB
Outside Diameter	508.00	mm	20.000	inches
Weight		kg/m	0.0	lb/ft
Drift Diameter		mm	0.000	inches
Inside Diameter	488.95	mm	19.250	inches
Grade	Line pipe		Line pipe	
Thread	N/A		N/A	
Coupling	Welded		Welded	
Burst	N/A		N/A	psi
Collapse	N/A	kPa	N/A	psi
Pipe Body Yield Strength	N/A	daN	N/A	lb-f
Joint Strength	N/A	daN	N/A	lb-f
Torque - Optimum	N/A	N-m	N/A	ft-lb
Torque - Maximum	N/A	N-m	N/A	ft-lb
Condition	New			
Float Equipment	None			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

SURFACE CASING SUMMARY (Cable Tool: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	65.0	mKB	213.3	ftKB
Outside Diameter	406.40	mm	16.000	inches
Weight	96.73	kg/m	65.0	lb/ft
Drift Diameter	382.60	mm	15.063	inches
Inside Diameter	387.40	mm	15.252	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,310	kPa	1,640	psi
Collapse	4,340	kPa	630	psi
Pipe Body Yield Strength	327,400	daN	736,000	lb-f
Joint Strength	195,300	daN	439,000	lb-f
Torque - Optimum	5,960	N-m	4,390	ft-lb
Torque - Maximum	7,460	N-m	5,490	ft-lb
Condition	New			
Float Equipment	None			
Centralizers	Joints 2, 4 and 8			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

CASING PROGRAM

Union Bickford 39, Sombra 5-6-XII

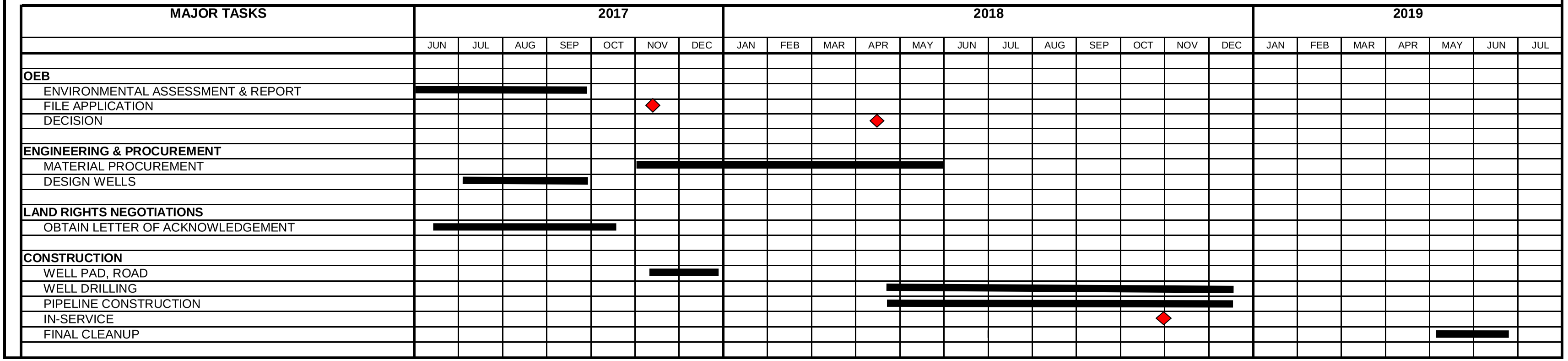
INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	383.0	mKB	1256.6	ftKB
Outside Diameter	298.50	mm	11.752	inches
Weight	69.94	kg/m	47.0	lb/ft
Drift Diameter	275.40	mm	10.843	inches
Inside Diameter	279.40	mm	11.000	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,170	kPa	3,070	psi
Collapse	10,410	kPa	1,510	psi
Pipe Body Yield Strength	327,800	daN	737,000	lb-f
Joint Strength	226,400	daN	509,000	lb-f
Torque - Optimum	6,480	N-m	4,770	ft-lb
Torque - Maximum	8,090	N-m	5,960	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Cement Basket	Run above Detroit River formation			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

PRODUCTION CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	570.0	mKB	1870.1	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	47.62	kg/m	32.0	lb/ft
Drift Diameter	198.00	mm	7.795	inches
Inside Diameter	201.20	mm	7.921	inches
Grade	K-55		K-55	
Thread	8 RD		8 RD	
Coupling	LT & C		LT & C	
Burst	27,100	kPa	3,930	psi
Collapse	17,440	kPa	2,530	psi
Pipe Body Yield Strength	223,700	daN	503,000	lb-f
Joint Strength	201,000	daN	452,000	lb-f
Torque - Optimum	5,660	N-m	4,170	ft-lb
Torque - Maximum	7,080	N-m	5,210	ft-lb
Condition	New			
Float Equipment	Float Collar (Top of 1st joint)			
Centralizers	Joints 2,4 & 5; every 5th joint & 10 m from surface			
Shoe	Guide			
Threadlock	Threadlock guide shoe on bottom joint of casing			

2018 Bickford Storage Project - Proposed Schedule



2018 DAWN DELIVERABILITY – BICKFORD STORAGE POOL
MINIMUM DESIGN AND PIPE SPECIFICATIONS

Design Specifications: NPS 12

Design Class Location	-	Class 3
Design Factor	-	0.8
Location Factor (General)	-	0.7
Location Factor (Road)	-	0.625
Maximum Design Pressure	-	9930 kPa
Maximum Operating Pressure	-	9930 kPa
Test Medium	-	Water
Test Pressure	-	13902 kPa
Valves/Fittings	-	PN 100
Minimum Depth of Cover (General)	-	1.2 m
Minimum Depth of Cover (Road)	-	1.2 m

Pipe Specifications:

Size	-	NPS 12
Outside Diameter	-	323.9 mm
Wall Thickness	-	9.5 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, Yellow Jacket
% SMYS	-	48%

GENERAL TECHNIQUES AND METHODS OF CONSTRUCTION

1. Union Gas Limited ("Union") will ensure adequate inspection staff is onsite 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 can be divided into several crews that create a mobile assembly line. Each crew can perform a different function, with a finished product left behind when the last crew has completed its work.

3. Union's contract specifications and the use of Book 7 TCP, 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.

Stringing

8. 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

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

Burying

10. Pipe may be buried using either the trench method or the trenchless method. All utilities that will be crossed or paralleled by the pipeline are located by the appropriate utility prior to installing the pipeline. Prior to trenching, all such utilities will be hand-located or hydro vacuumed.

Trench Method: Trenching is done by using a trenching machine or hoe 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. Next, the pipe is lowered into the trench. For steel pipe, the pipe coating is 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, if the soil that was excavated from the trench is suitable for backfill, it is backfilled. If the soil is not suitable for backfill the trench is backfilled with suitable material such as sand. After the trench is backfilled, drainage tile is repaired.

Rock Excavation: Rock in solid beds or masses will be removed by “Hoe Ram”, where practical. Where rock that is too hard to “Hoe Ram” is encountered, blasting will be permitted in accordance to 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.

Trenchless Method: Trenchless methods are alternate methods used to install sections of pipelines under railways, roads, sidewalks, trees and environmentally sensitive areas.. These methods involve setting up a receiving hole and an exit hole to allow room for the equipment to be operated and the pipe to be installed along the desired path and at the proper elevation . These sections of pipeline may be ‘pre-tested’ as per Unions testing specifications prior to install.

Tie-Ins

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

Tile Repair

12. After the trench is backfilled, any cut cross-easement tile is repaired. Union undertakes that it is responsible for the tile repair resulting from construction and will stand good for the tile repairs at any further date after construction of the pipeline. Union retains the services of a tile consultant to determine if it is better to repair individual tiles crossing the easement or install a header system.

Cleaning and Testing

13. To complete the construction, the pipeline is cleaned, tested in accordance with Union’s specifications using water.

Restoration

14. 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.
15. The clean-up crew is the last crew on the property. On farmland, it prepares the subsoil on the stripped portion of the easement by subsoiling or deep chisel ploughing to break up compaction and picking all stones down to 100 millimetres in diameter. The trench line is crowned with enough subsoil to allow for trench settlement. Excess subsoil is removed to an acceptable location on the landowner's property or hauled to a disposal site. Topsoil is then replaced using a drag line or backhoe and small bulldozers to minimize compaction. The working side of the easement is then chisel ploughed and stone picked. The clean-up crew will also repair fences, pick up debris, replace sod in landscaped areas and reseed sensitive areas such as woodlots, ditch banks and stream crossings.
16. When the clean-up is completed, the landowner is asked by a Company representative to sign a clean-up acknowledgement form if satisfied with the clean-up. This form, when signed, allows release of payment for the clean-up to the contractor. This form in no way releases the Company from its obligation for tile repairs, compensation for damages and/or further clean-up as required due to erosion or subsidence directly related to pipeline construction.

2018 DAWN DELIVERABILITY PROJECT ENVIRONMENTAL PROTECTION PLAN

Prepared By: Union Gas Limited
Environmental Planning
November 2017

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2018 Dawn Deliverability Project
Environmental Protection Plan

Appendices

1.0 INTRODUCTION

This Environmental Protection Plan (EPP) has been prepared for the development of the 2018 Dawn Deliverability Project ("the Project"), as proposed by Union Gas Limited ("Union Gas"). The Project involves work in the Bickford Storage Pool to increase the deliverability of the pool.

This report will document a plan for the protection of the environment during the completion of the following activities: drilling of three new injection/withdrawal (I/W) wells (Union Bentpath (UB) 37, UB 38, and UB 39), installation of approximately 400 m of NPS 12 inch pipeline, and construction of roadways and drilling pads to facilitate access to the well locations.

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; and
- Describe the public consultation opportunities.

Three well drilling applications have been submitted to the Ministry of Natural Resources and Forestry (MNRF) by Union Gas. As Union Gas is the operator of the Bickford Storage Pool, all aspects of the Project will be completed by Union Gas. This includes determining the locations of the new well, developing and adhering to well drilling specifications, operating and maintaining the facilities, and identifying and mitigating any environmental concerns.

In addition to providing a formal plan for the protection of the environment, this report provides government agencies detailed documentation of the various environmental protection measures that will be implemented by Union Gas during the development of the Project. This report will also be included with Union Gas's evidence filed with the Ontario Energy Board.

2.0 PROJECT BACKGROUND

The Bickford Pool was discovered by Imperial Oil Limited in 1954 with the drilling of the Imperial 421 – Bickford 19 (I.421-B.19) well. Union Gas converted the pool to natural gas storage in 1972. The Bickford Designated Storage Pool is located on parts of Lots 3-10 of Concessions 11-13 in the Township of St. Clair (formerly Sombra Township). The area is primarily agricultural and forested with scattered residential dwellings. The proposed well drilling, pipeline installations, and associated works are located on Lot 6, Concession 12 in the Township of St. Clair. A location map showing the Bickford Designated Storage Area is shown in Appendix A.

The drilling of three new injection/withdrawal wells and installation of approximately 400 m of NPS 12 inch pipeline is necessary to increase the deliverability of the Storage Pool to meet the demands of the new TCE Napanee power plant.

3.0 PROJECT DESCRIPTION

The Project will include:

- Drilling of three new I/W wells (UB 37, UB 38, and UB 39)
- Installation of approximately 400 m of NPS 12 inch gathering pipeline to connect the new wells to the existing gathering system
- Construction of access roadways and drilling pads

Please see Appendix A for a detailed map of the proposed facilities located in the Bickford Storage Pool.

4.0 PLANNING PROCESS

4.1 Key Activities

The following is a summary of the key activities for the development of the 2018 Dawn Deliverability Project:

Determine well locations	Summer 2017

Complete EPP for the Project	Fall 2017
Submit Applications:	
MNRF	Fall 2017
Ontario Energy Board	Fall 2017
Ontario Energy Board Hearing	Winter 2018
Ontario Energy Board Decision	Spring 2018
Construction:	
Access Road Construction	Fall/Winter 2017
Drilling Pad Construction	Fall/Winter 2017
Well Drilling	Spring 2018
Pipeline Installation	Spring 2018

5.0 LANDOWNER INPUT

The proposed construction will be located on land owned by Union Gas. The adjacent landowners will be informed of the Ontario Energy Board application and will have the opportunity to participate in the hearing process.

If the Project is approved, Union Gas will implement a Landowner Relations Program. This program provides the adjacent landowners with quick access to Union Gas personnel in the event there are concerns or complaints. This program also includes a complaint tracking system to ensure that complaints and commitments are documented and resolved as quickly as possible.

6.0 PROJECT DEVELOPMENT

6.1 Access Road Construction

Union Gas proposes to use existing access roads where possible. However, it will also be necessary to construct new "all weather" access roads within the storage pool to allow Union Gas access to the new wellheads. Permanent access roads allow Union Gas to perform routine maintenance such as dead weight testing, corrosion logging, well stimulations and pressure tests without disturbing soils and vegetation.

The procedure for construction of an access road is as follows:

- Determine the locations of the access roads
- Topsoil is stripped from the road right-of-way
- Geotextile material is laid down on the road right-of-way
- Granular material is placed on the geotextile material to a depth of approximately

A cross section of a typical access road is shown in Appendix B and the locations of the existing and proposed access roads are shown in Appendix A.

The stripped topsoil for the permanent access roads will be hauled to another location on the property or will be taken to an approved site.

6.2 Drilling Pad Construction and Well Drilling

The new well locations were determined by Union Gas's Underground Storage Department using existing well data, geophysical logs and operational data.

Both cable tool and rotary rigs will be used for drilling which will take place on a temporary granular drilling pad approximately 75 m by 75 m in size. Topsoil from this area will be stripped and stockpiled adjacent to the drilling pad and geotextile material will be overlain by crushed granular. Once the drilling pad is removed the topsoil will be replaced.

Tanks will be placed adjacent to the rig to collect drilling fluids and cuttings. The tanks will be monitored and emptied as required. Fluids will be recirculated during the drilling process and the drilling fluids/cuttings will be disposed of at an approved location after drilling has been completed.

Drilling will proceed on a 12 or 24 hour basis throughout the drilling process, and is expected to take two to three months to complete, per well.

The following is a summary of the activities associated with well drilling:

- Establishing the well site location is generally the first activity associated with well drilling. Locations are selected based on interpretation of the geological information, a review of the surface features associated with that location and landowner input.
- Once the location of the well is determined, access roads and drilling pads centred on the well location are topsoil stripped. Following topsoil stripping, the entire work area is overlain with geotextile and granular material to ensure the site has adequate equipment bearing capabilities.
- Typical well site layouts for cable tool and rotary drilling rigs are shown in Appendix B.
- During drilling, a number of vehicles must service the rig including cement trucks, water trucks and other service vehicles.
- When drilling has been completed, the rig is moved off the site, the granular drilling pad is reduced to approximately 12 m by 12 m surrounding the wellhead, and the topsoil is replaced. Areas disturbed by drilling are restored by chisel ploughing, discing or subsoiling during dry conditions.

As there will be roads to the new well locations, there will be no limitations to accessing the wells during wet soil conditions.

6.3 Pipeline Construction

Once the new wells have been drilled, they will be connected to the existing gathering system by NPS 12 inch gathering pipelines. The proposed routes of the new pipelines were determined by Union Gas.

The following is a summary of activities associated with pipeline construction:

Clearing and Grading
This prepares the right-of-way to allow the construction of the pipeline. Brush, trees and grass are cut or 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 coating.

Trenching
To install the pipeline a trench will be dug. The trench is usually dug using an excavator. The width of the trench is approximately 0.6 m and the depth will be a minimum of 1.5 m. 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.

Cleaning and Testing
To complete construction, the pipeline is cleaned and pressure tested in accordance with CZA Z662-15.

Restoration
It is Union Gas's policy to restore the affected areas to "as close to original" condition as practicable. To ensure the quality of the restoration, pictures of the construction area will be taken before the work commences.

6.4 Operation and Maintenance Practices

Like any system, once the storage pools are operational they have to be maintained and serviced on a regular basis. The following paragraphs will describe the most common work to be performed by Union Gas personnel after storage pools are in operation.

Locates
Union Gas 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 a locate, 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 ENVIRONMENTAL FEATURES AND PROPOSED MITIGATION

This Environmental Protection Plan for the Project, as prepared by Union Gas, describes the environmental features that can be found in the area of the storage pool. This report also discusses the net and cumulative effects that can be expected from this type of project.

Union Gas believes that with the implementation of Union Gas's standard mitigation measures and the mitigation measures described in the Species at Risk Report completed by Neegan Burnside Ltd. the project will have limited impact on the surrounding environment and will result in no significant cumulative impacts.

Table 1 summarizes the general environmental impacts and proposed mitigation measures associated with well drilling and pipeline construction in the storage pool. These impacts and mitigation measures have been identified by Union Gas to address concerns relating to well drilling and pipeline construction.

In addition to, and to provide greater detail than that summarized in Table 1, the following describes the more significant environmental features that may be impacted, the activities that may have an impact on the environmental features, and the mitigation measures proposed to protect these features during the Project.

Water Well Monitoring

Water wells may be impacted by well drilling and pipeline construction. These activities could impact the groundwater in the area if they are not completed properly.

Union Gas will retain a consultant hydrogeologist to review the proposed well drilling locations and conduct a standard water well monitoring program. Water well monitoring will establish existing groundwater conditions for comparative purposes should groundwater interference complaints arise as a result of well drilling activities. The monitoring program will include the collection of groundwater samples and the samples will be submitted for general chemistry, metal, anions and methane analysis. Individual results will be presented in a letter to each resident.

Drilling Fluids

Drilling fluids will be used during well drilling operations. These fluids, fresh water and brine, if not contained, could impact the surrounding environment. The drilling fluids will be stored in steel tanks adjacent to the drilling rigs. The fluids will be recycled and disposed of at approved locations. The tanks will be monitored on a regular basis to ensure the fluids remain contained at a safe level.

Cultural Heritage and Archaeological Resources

Union Gas retained the services of Stantec Consulting Limited's (Stantec) Cultural Heritage Specialists to determine if the Project will have any impacts to cultural heritage landscapes and/or built heritage resources and to develop appropriate mitigation measures if required. No potential cultural heritage resources were identified within the Project Area.

Union Gas retained the services of Timmins Martelle Heritage Consultants Inc. to complete a Stage I and Stage II Archaeological Assessment in accordance with the Ministry of Tourism, Culture and Sport (MTCS) guidelines to identify known or potential archaeological planning constraints within the Project study area. The Stage II Archaeological Assessment was completed in September 2017 and no archaeological planning constraints were identified. The MTCS reviewed and entered the Stage I – II

Archaeological Assessment Report into the Ontario Public Register of Archaeological Reports on September 28, 2017. Please see Appendix C for the MTCS approval letter.

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

Noise

Noise will occur during well drilling. Well drilling will take place during daylight hours for the initial portion of the Project and will take place 24 hours a day for the remaining drilling period.

To minimize inconveniences brought on by excessive noise, all engines associated with the Project should be equipped with mufflers. Landowners will also be notified of the drilling schedule.

Tree Clearing

It will be necessary to remove trees and shrubs to facilitate the proposed well drilling as well as access road, gravel drilling pad, and pipeline construction.

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 bird nests and eggs. 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.

Union Gas has committed to implementing a Tree Replacement Program, whereby trees removed during construction are replaced at a 2:1 area basis at 1000 seedlings/acre. Union Gas has made a commitment to the County of Lambton and the Township of St. Clair that the trees will be re-planted in the Township and the planting plans will be made available to both the County and the Township.

Species at Risk

Union Gas retained Neegan Burnside Ltd. to review the Project study area for potential species at risk (SAR) and determine if any species will be impacted by construction activities. Regulated habitat for Eastern Foxsnake was identified within the Project Area, and Neegan Burnside Ltd. developed mitigation measures to ensure Eastern Foxsnakes are protected during construction. Union Gas will adhere to the mitigation measures proposed by Neegan Burnside Ltd. throughout the duration of construction. Please see Appendix D for the SAR report and a full description of the proposed mitigation measures.

8.0 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 the Project will result in both minor positive and negative cumulative effects. There may be cumulative impacts between this project and other projects in the area, although Union Gas is unaware of any projects that would interact with this proposal.

Additional noise, dust, and traffic could be an issue should construction occur concurrently with a separate project; however, the benefits of the new well and pipeline will be a positive impact in the long term as it is being constructed to maintain the deliverability in the Bickford Storage Pool.

9.0 SUMMARY AND RECOMMENDATIONS

This Environmental Protection Plan (EPP) provides a strategy for the protection of the environment during the 2018 Dawn Deliverability Project. This EPP has been developed by identifying environmental features in the area and the potential impacts of

construction. The EPP also recommends mitigation measures to minimize the environmental impacts of the proposed Project.

Union Gas's complaint tracking system will also be implemented for this Project. This process ensures that landowners and tenants have access to Union Gas personnel to address any concerns that may arise during construction.

With the implementation of the recommended mitigation measures, and ongoing landowner communication, the 2018 Dawn Deliverability Project is not anticipated to have any significant adverse environmental or socio-economic effects.

TABLE 1

MITIGATION SUMMARY - WELL DRILLING AND PIPELINE CONSTRUCTION

TABLE 1: MITIGATION SUMMARY WELL DRILLING AND PIPELINE CONSTRUCTION		
Activity	**Potential Impact**	**Mitigation**
a) Access Roads	Vehicular traffic during and after drilling and pipeline installation (i.e. Well operations and maintenance vehicles) may cause soil rutting, compaction or mixing, particularly if soils are wet.	• Existing laneways will be utilized where possible. • Access roads and granular work areas will be limited in size to the greatest extent possible. • All traffic will be limited to the access roads or granular work area to the greatest extent possible. • Culverts may be used in the construction of access roads to ensure existing drainage patterns are maintained. • Geotextile fabric will be used for access roads and work areas to provide additional stability, minimize compaction and eliminate soil mixing with granular material.
b) Noise	Noise from the drilling rig, pipeline equipment and/or service vehicles may disrupt nearby residents.	• Noise will be controlled to the greatest extent possible to minimize the disruption to nearby residents. • Will ensure all equipment is properly muffled.
c) Site Restoration	Improper site restoration may permanently affect soil productivity and vegetative growth.	• Areas disrupted by drilling and pipeline construction will be restored to pre-construction conditions. • A native seed mixture will be used on disturbed areas to ensure vegetative growth
d) Fuel Storage and Handling	Improper fuel storage and handling may cause spillage and possible contamination of soil.	• Fuel will not be stored near watercourses (i.e. within 50 metres). • Fuel storage areas will be clearly marked. • Containment dykes and protective plastic ground matting will be used in fuel storage areas to protect against spillage and leakage. • Spill clean-up materials will be stored on site and available in the event of a spill. Spills or leakage will be reported to the appropriate authority immediately (Ministry of the Environment and Climate Change (MOECC) Spills Action Centre at 1-800-268-6060), if necessary.
e) Liquid and Solid Waste	Drilling fluids, solid wastes and lubricants must be properly handled, stored and disposed of to avoid the possible contamination of surrounding soil or water.	• Liquid and solid wastes will be properly stored, handled and disposed of in an approved location. • Work areas will remain clear of debris and litter during and after construction. • Drilling fluids will be properly contained in waste tanks and disposed of after drilling in an appropriate location. • The level of drilling fluids will be frequently monitored to avoid possible overflow of the tank.
f) Landowner	Disruption to landowners and	• Union Gas will provide the adjacent landowners with

TABLE 1: MITIGATION SUMMARY WELL DRILLING AND PIPELINE CONSTRUCTION		
Activity	**Potential Impact**	**Mitigation**
Concerns	tenants.	the telephone numbers of Company personnel. • A Landowner Relations Program will be established to track complaints during construction.
g) Road Side Ditches	Water quality concerns.	• Will ensure ditches are returned to pre-construction conditions or better, as quickly as possible.
h) Nuisance Dust	Disruption to landowners and tenants.	• Control dust as required.
i) Underground Utilities	Disruption of services	• Obtain "locates" from all utilities. • If utilities are damaged, repair as soon as possible.
j) Archaeology, Cultural Heritage Landscapes and Built Heritage Resources	Disturbance of heritage resources	• An archaeological assessment has been completed prior to construction • Stop construction if artifacts are encountered and notify Ontario Ministry of Tourism, Culture and Sport • A Cultural Heritage consultant will determine if impacts to cultural heritage landscapes and/or built heritage resources are anticipated and will develop a mitigation plan if required.
k) Water Wells	Disruption to water supply	• If water quality/quantity problems occur as a result of construction activities, the Company will supply potable water until the situation has been corrected. • Union Gas will implement its standard well monitoring program.
l) Trees	Damage to Trees Disturbance to wildlife	• Trees to be removed outside of avian nesting window. • Union Gas will implement their Tree Replacement Program where trees removed during construction are replaced at a 2:1 area basis at 1000 seedlings/acre. • The trees will be replanted in the Township of St. Clair and the planting plans will be made available to the Township and the County of Lambton.
m) Natural Areas	Sedimentation run-off	• Ensure sediment barriers such as straw bales/sediment fencing are used where there is a potential for run-off.
n) Vegetative Cover	Loss of vegetative cover leading to soil erosion	• Restore cover by means of seeding or hydro-seeding as soon as possible.
o) Contaminated Soils	Dealing with contaminated materials Public safety issue	• No contaminated soil sites are anticipated, however; if suspect soils are uncovered, work should stop immediately and the Union Gas Environmental Department should be contacted. • Clean up contaminated material following Company and MOECC procedures.

APPENDIX A

PROJECT MAPPING

2018 DAWN DELIVERABILITY - BICKFORD STATION

PROPERTY SKETCH
SHOWING APPROXIMATE LOCATION OF
PROPOSED TEMPORARY LAND USE RIGHTS FOR
PT LT 6 CON 12 SOMBRA AS IN L640678 & PT 1, 25R404; ST. CLAIR
UNION GAS COMPANY OF CANADA; UNION GAS LIMITED;

LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WORK SPACE

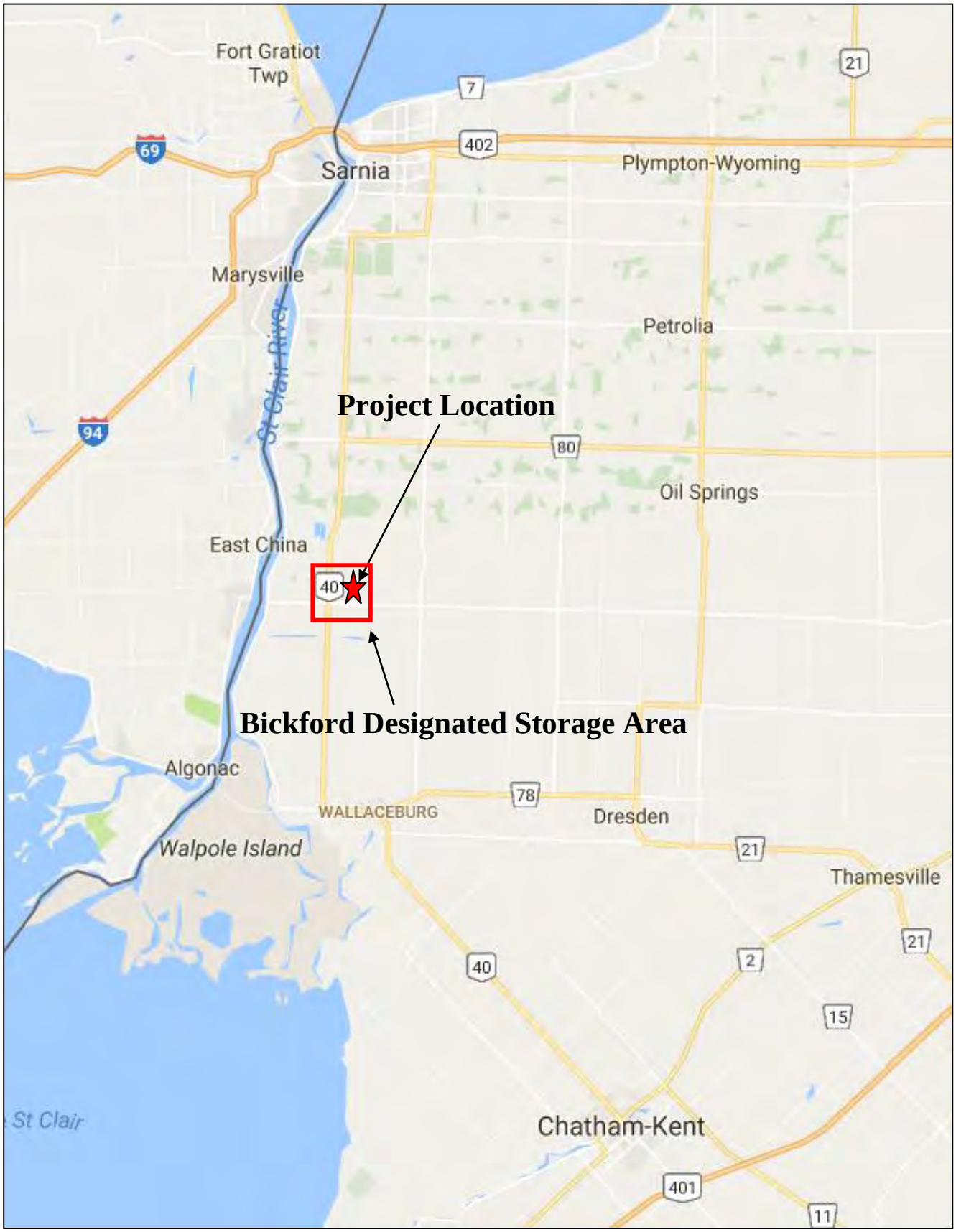
No.	DATE	BY	APP'D	REMARKS
	REVISIONS			

uniongas
An Enbridge Company

PROPOSED FACILITIES
BICKFORD POOL

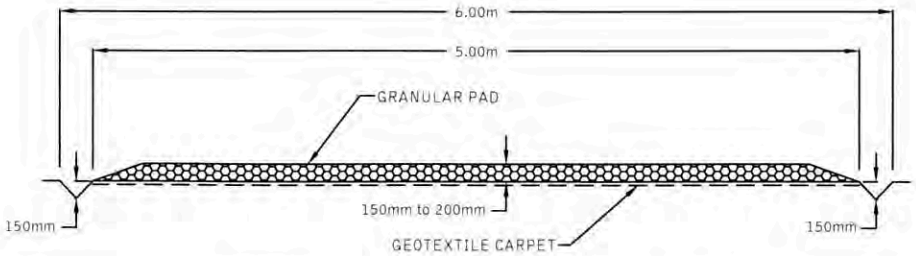
DRAWN BY: T. James	DATE: 2017/11/08	PLOT SPEC: 1/2500
CHECKED BY	DATE	FILE REVISION DATE
APPROVED BY	DATE	DISTRICT: LONDON
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: ST2121-02

GENERAL PROJECT LOCATION

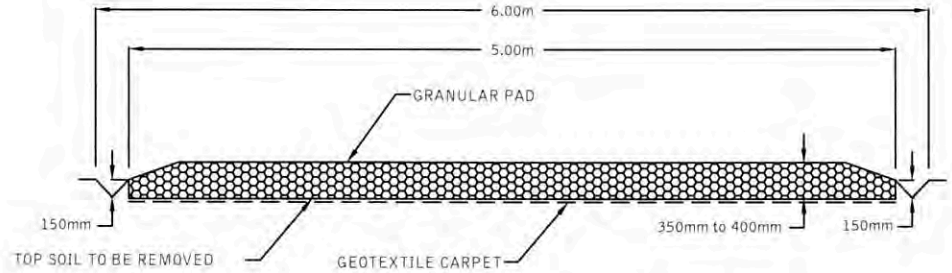


APPENDIX B

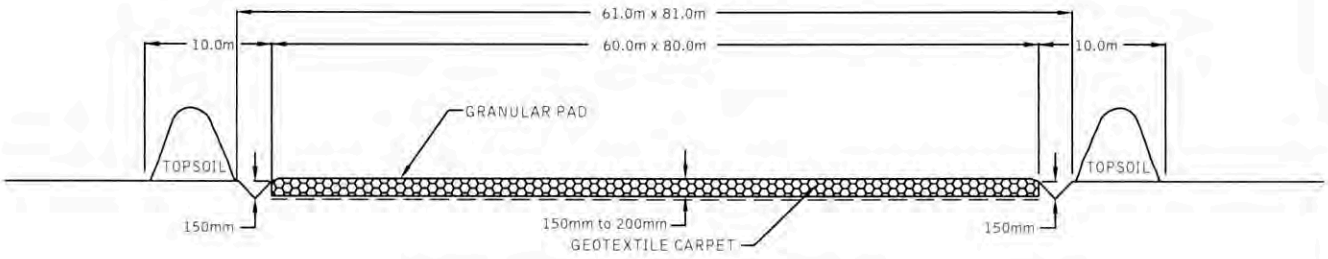
TYPICAL DRAWINGS



TYPICAL TEMPORARY ACCESS ROAD



TYPICAL PERMANENT ACCESS ROAD



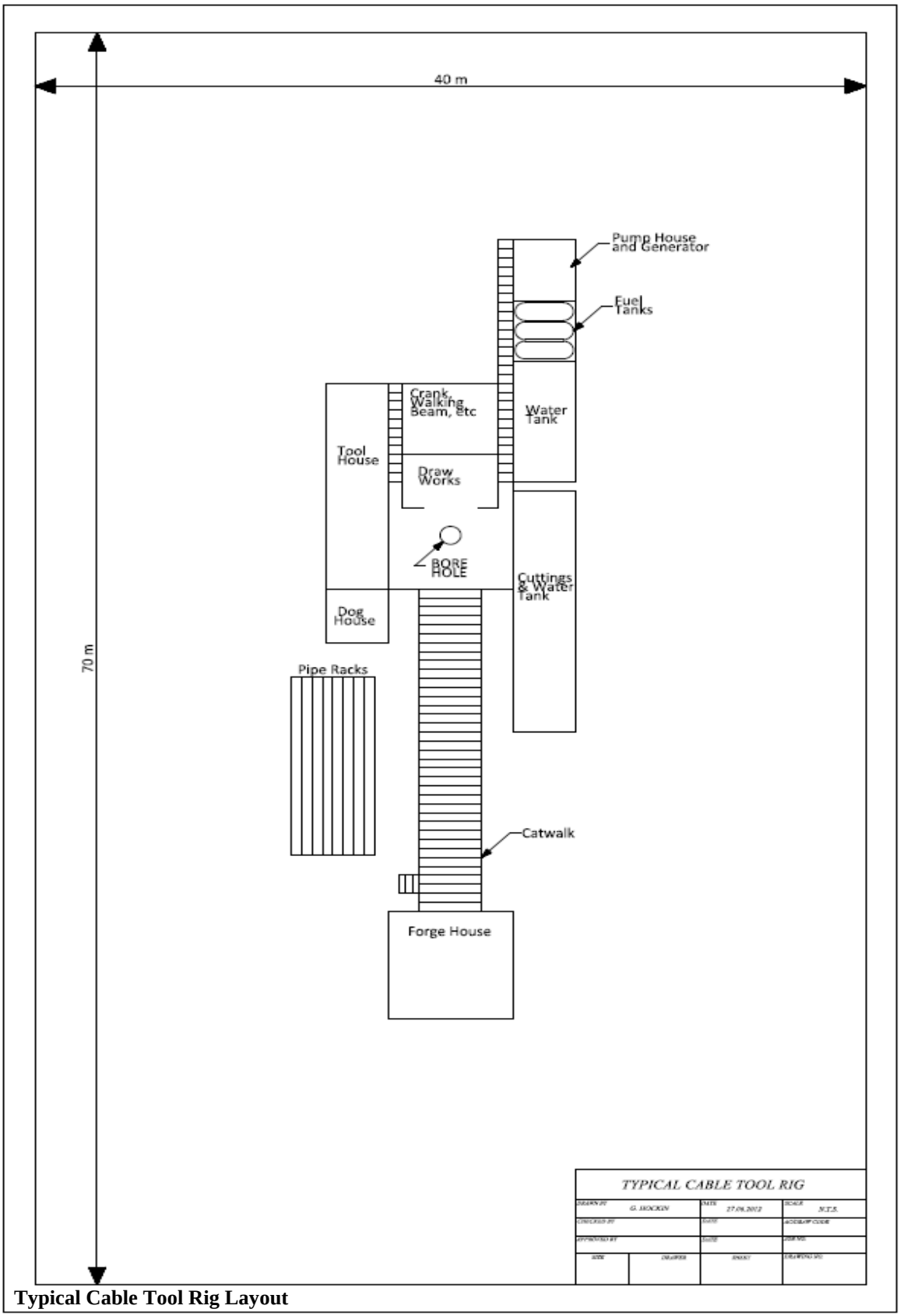
TYPICAL WELL DRILLING WORK AREA

uniongas
A Spectra Energy Company

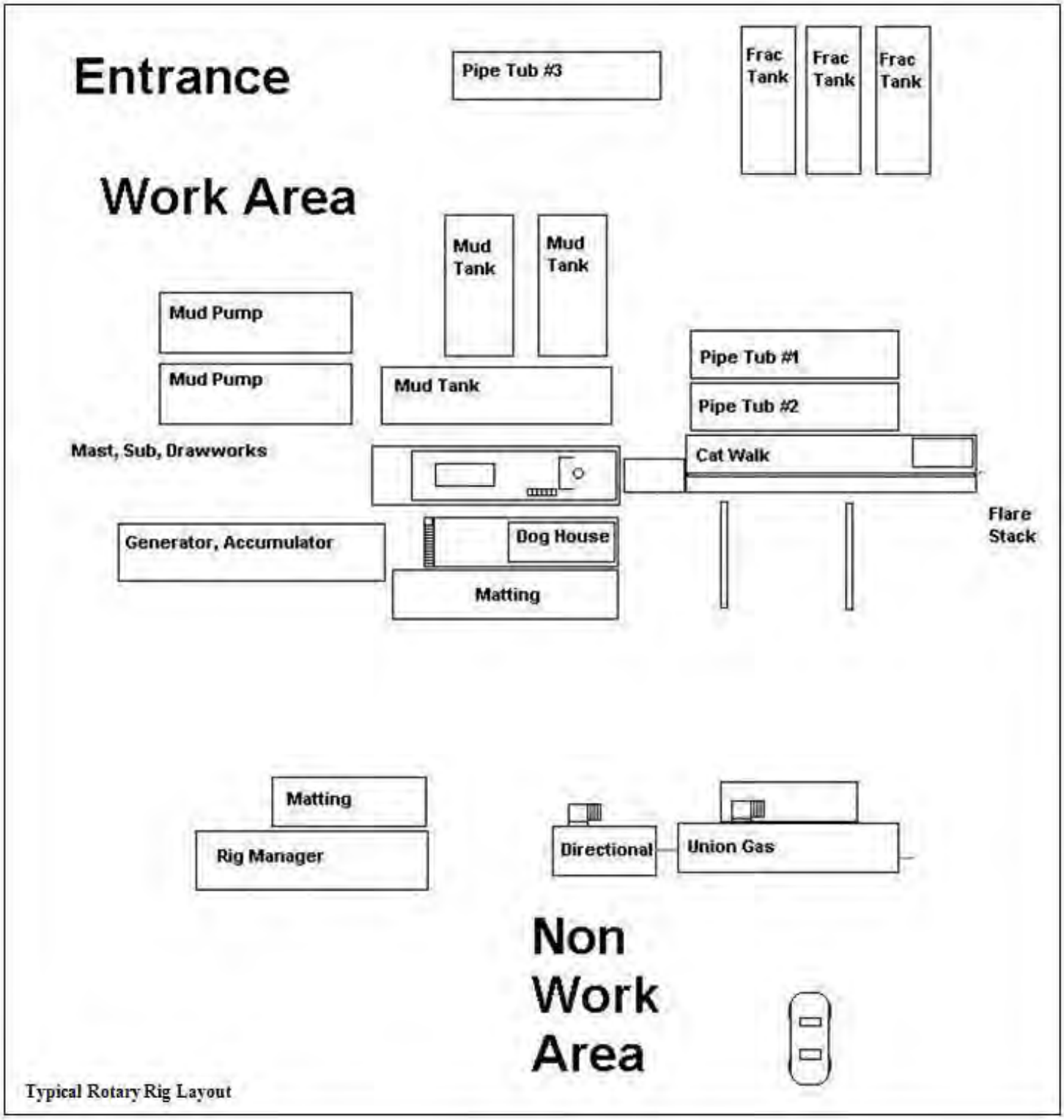
TYPICAL ACCESS ROAD AND WORK AREA DETAIL

UNION GAS PIPELINE CONSTRUCTION TYPICAL

DRAWN BY	DATE	SCALE	SIZE	FILE REVISION DATE
Gary Hanuszak	2013-03-23	N.T.S.	A	2013-00-00
APPROVED BY	DATE	DRAWING NUMBER		REVISION
George Adams	2013-03-23	PL-30-13-05		A
AC/DRAW CODE				
PL-30-13-05.dwg				



Typical Cable Tool Rig Layout



Typical Rotary Rig Layout

APPENDIX C

ARCHAEOLOGY APPROVAL LETTER

Ministry of Tourism, Culture and Sport

Archaeology Programs Unit
Programs and Services Branch
Culture Division
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel.: (416) 212-5107
Email: Wai.Hadlari@ontario.ca

Ministère du Tourisme, de la Culture et du Sport

Unité des programmes d'archéologie
Direction des programmes et des services
Division de culture
401, rue Bay, bureau 1700
Toronto ON M7A 0A7
Tél. : (416) 212-5107
Email: Wai.Hadlari@ontario.ca

Ontario

Sep 28, 2017

Sherri Pearce (P316)
Timmins Martelle Heritage Consultants Inc.
90 Caprice London ON N5V 3M2

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 & 2 Archaeological Assessment Union Gas Limited 2018 Dawn Deliverability Project Bickford Storage Pool Part of Lot 6, Concession 12 Geographic Township of Sombra, Now the Municipality of St. Clair Township, Lambton County, Ontario", Dated Sep 14, 2017, Filed with MTCS Toronto Office on Sep 20, 2017, MTCS Project Information Form Number P316-0339-2017, MTCS File Number 0007404

Dear Ms. Pearce:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18.[1] This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 Standards and Guidelines for Consultant Archaeologists set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the assessment of the study area as depicted in Maps 5, 8, and 9 of the above titled report and recommends the following:

A Stage 1 and 2 archaeological assessment was conducted for the UGL 2018 Dawn Deliverability Project. All work met the provincial Standards and Guidelines (MTC 2011). Two locations were identified. Our recommendations with respect to each of these locations and the overall property are presented below.

1) Location 1 is a native findspot of indeterminate age and cultural affiliation. Based on the recovery of fewer than five non-diagnostic artifacts within a 10 m by 10 m area (MTC 2011:40; Section 2.2, Standard 1.a.ii.2), Location 1 does not meet provincial standards for Stage 3 assessment and no further work is recommended.

2) Location 2 is a suspect chert flake recovered from an area where natural chert was present in the area. An intensified survey confirmed that the area contains natural and unmodified chert and the suspect chert flake is likely natural in origin. Based on the recovery of fewer than five non-diagnostic artifacts within a 10 m by 10 m area (MTC 2011:40; Section 2.2, Standard 1.a.ii.2), Location 1 does not meet provincial

standards for Stage 3 assessment and no further work is recommended.

3) The Project area may be considered free of any further archaeological concern and no further archaeological assessment work is recommended.

This recommendation is subject to the conditions laid out in Section 5.0 of this report and to the Ministry of Tourism, Culture and Sport's review and acceptance of this report into the provincial registry.

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Wai Hadlari
Archaeology Review Officer

cc. Archaeology Licensing Officer
Evan Tomek,Union gas Ltd
Evan Tomek,Union gas Ltd

[1]In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

APPENDIX D

SPECIES AT RISK REPORT

2018 Dawn Deliverability, Bickford Station, Species at Risk Report

Township of St. Clair, Ontario

Neegan Burnside Ltd.
292 Speedvale Avenue West Unit 20
Guelph ON N1H 1C4 CANADA

November 2017
300041170.0000

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
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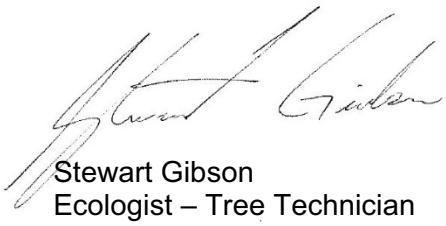
0	November 15, 2017	Initial Submission to Union Gas

Neegan Burnside Ltd.

Report Prepared By:

Kevin Butt, B.Sc. (Env.), Rest. Cert.
ISA Certified Arborist & Terrestrial Ecologist
KB:sr/js



Stewart Gibson
Ecologist – Tree Technician
SAG:sr/js

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1.0 Introduction

Neegan Burnside Ltd. (Neegan Burnside) has been retained by Union Gas Limited (Union Gas) to prepare a Species at Risk (SAR) Report for the proposed Bickford Station 2018 Dawn Deliverability project. Neegan Burnside reviewed background natural heritage information and completed an onsite assessment of the study area for existing conditions and natural heritage constraints.

The project site is found at the northeast corner of Bentpath Line and Highway 40 (PIN 434050111) and is owned by Union Gas.

This SAR Report is to be read in conjunction with the Environmental Protection Plan prepared by Union Gas (dated November 2017) that provides a complete description of the proposed work.

2.0 Background Information

The following documents were reviewed in the preparation of this report:

- 2018 Dawn Deliverability Project, Environmental Protection Plan prepared by Union Gas Limited (dated November 2017); and
- Proposed well locations mapping prepared by Union Gas Limited (dated November 2017).

3.0 Potential Species at Risk within Study Area

Both historical records and field investigations were completed to determine if SAR are present within the study area. The study area is defined as the access roads and temporary work areas as identified in Figure 1.

3.1 Historical Species at Risk Records

A search of Species at Risk and species tracked by the Natural Heritage Information Centre (NHIC) of the Ministry of Natural Resources and Forestry (MNRF) within the study area was completed on July 14, 2017. Data of the NHIC data square 17LH8330, which the site is located within, is provided in Table 1.

Table 1: NHIC Tracked Species documented with NHIC data (NHIC Square 17LH8330)

Scientific Name	Common Name	Srank	COSEWIC Status	COSSARO Status	Last Observation Date	Required Habitat
Tyto alba	Barn Owl	S1			1963/09/00	• In southern Ontario, this adaptable owl nests and roosts in barns and abandoned buildings. • It may also use natural cavities in trees or holes in cliff faces, as it did before the arrival of Europeans in North America.[1]
Restricted Species	Restricted Species				2014/08/06	Not applicable

[1] From www.ontario.ca (accessed September 2017)

The Barn Owl record is greater than 20 years old and is considered historical, therefore it will not be a constraint to the project since no on-site habitat exists.

3.1.1 Eastern Foxsnake

The restricted species, confirmed by MNRF to be Eastern Foxsnake (Carolinian population), *Pantherophis gloydi*, is a record from 2009 (email communication dated October 3, 2017, Kathleen Buck, MNRF Alymer District). MNRF indicated that the subject property is identified as regulated habitat.

MNRF identifies regulated habitat as follows:

The habitat regulation for Eastern Foxsnake (Carolinian population) protects sites used for nesting, hibernation, and communal shedding and basking, as well as areas within 1,500 m of an Eastern Foxsnake (Carolinian population) that are suitable for it to carry out its life processes (e.g. foraging and thermoregulation)[1].

The MNRF defines the preferred habitat as:

Eastern Foxsnakes in the Carolinian population are usually found in old fields, marshes, along hedgerows, drainage canals and shorelines. Females lay their eggs in rotting logs, manure or compost piles, which naturally incubate the eggs until they hatch[2]. (Ontario.ca)

3.2 Natural Heritage Field Investigation

Investigations of the site conditions were completed by Neegan Burnside biologists on July 19, 2017 in order to identify potential presence of SAR or their habitat.

The habitat where the proposed well UB37 and its associated temporary work space are located is characterized as meadow with cool season grasses (Fescue spp.) and early successional forbs: Canada Goldenrod (*Solidago canadensis*), Grass-leaved Goldenrod (*Euthamia graminifolia*) and Wild Strawberry (*Fragaria vesca*) are the dominant species. Green Ash (*Fraxinus pennsylvanica*) trees have been planted sparsely throughout the meadow and occupy approximately 20% canopy closure by immature trees (2 to 4 m tall).

The natural feature at the location of UB38 and the associated temporary work space is characterized as an immature (maximum 8 m tall) plantation of Silver Maple (*Acer saccharinum*) growing in rows. The canopy is open to allow for meadow as seen in the previous community, dominated by Fescue spp. and Canada Goldenrod.

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[1] Eastern Foxsnake (Carolinian Population) Habitat Protection Summary. https://www.ontario.ca/page/eastern-foxsnake. Accessed October 30, 2017.
2 Eastern Foxsnake. https://www.ontario.ca/page/eastern-foxsnake. Accessed October 30, 2017.

The natural feature at UB39 and the majority of the associated temporary work space is similar to the previous feature but dominated by less mature Green Ash growing in rows with meadow groundlayer vegetation. Most of the ash is dying out with severe to total crown dieback identified on most of the trees, anticipated to be as a result of Emerald Ash Borer.

A portion of the proposed temporary work space identified with UB39 illustrates an encroachment into the wooded area. The east edge of this deciduous forest community is characterized as dominated by mature Silver Maple, with associates of Bur Oak (*Quercus macrocarpa*) and White Elm (*Ulmus americana*). Artificially created remnant drainage channels are seen within the eastern edge of the forest resulting in conditions similar to vernal pools that were dry at the time of assessment and unvegetated at the bottom. These channels extend southward to a minor and isolated extent into the meadows with Buttonbush (*Cephalanthus occidentalis*) and Water Parsnip (*Sium latifolium*) colonizing the wetter areas.

Proposed work within the meadow has a potential to impact Eastern Foxsnake.

4.0 Potential Impacts and Proposed Mitigation

The following section outlines anticipated impacts that may result or will occur from the proposed construction. Mitigation measures to avoid, minimize or compensate for potential impacts have also been provided.

4.1 Impacts to Eastern Foxsnake

4.1.1 Potential Impact

The identification of the property as regulated habitat, combined with the species' preference for meadow environments where work is proposed to occur means that snakes may be encountered, injured or killed during land clearing and construction operations.

4.1.2 Recommended Mitigation

The construction detail for exclusion fencing in MNRF's *Species at Risk Branch Best Practices Technical Note: Reptile and Amphibian Exclusion Fencing Version 1.1 (July 2013)* identifies the type of fencing that is required for installation around the limit of construction. This document has been provided in Appendix A and the construction detail of the snake exclusion fence is illustrated on Figure 1 (Page 10). Additional explanation and refinement of construction of the fence are as follows:

1. 2 x 4 or 4 x 4 stakes that extend a minimum of 1.8 m above grade and a minimum of 1 m below grade or to a depth as required to support the fence adequately.

2. Stakes are to be spaced at a maximum spacing of 4 m.

3. The fence material shall be woven geotextile, class II and shall be securely fastened to the stakes.

4. A trench 200 mm wide and 300 mm deep shall be excavated in front of the erected fence such that the geotextile extends into the grade a minimum of 300 mm and turns outward for 100 mm. The trench shall be backfilled and compacted such that the buried portion of the geotextile is anchored into the ground. The geotextile shall be one continuous fabric from the top of the fence to the bottom of the trench.

5. Brace the fence as required to ensure that it is sturdy and remains erect for the entire duration that it is required to be on site. The Contactor shall ensure that any bracing or strengthening of the fence does not allow snakes to climb the fence or bracing.

6. In locations where the fence is required to terminate or facilitate road crossings, construction accesses or water crossings, the running line of the fence shall be turned back for a minimum of 10 m with a turning radius of 2 m.

The following construction sequence and measures are required to reduce impacts to potential Eastern Foxsnake individuals located adjacent to the workzone:

1. Installation of exclusion fencing at the limit of workzone which includes all areas required for excavation and spoil stockpile, vehicle and worker access and material laydown. Inspection of the entire enclosed work area and fence construction by an ecologist.

   Anticipated timing: March / early April 2018 (during snake hibernation - late October to early April).

2. Cutting of trees, as needed, to facilitate access and proposed work while remaining in conformity with the Migratory Birds Convention Act (1994) to avoid impacts to bird nests. A qualified biologist will inspect the work zone and lands immediately adjacent for active nests if tree removals must happen within the peak nesting period (late April to late July).

   Anticipated timing: Prior to April 1, 2018. If later, a biologist will be retained.

3. An ecologist to review the construction site for Eastern Foxsnake or any wildlife found within the workzone and inspect fencing for deficiencies prior to work commencement.

   Anticipated timing: Spring 2018.

4. Construction process:

   a) Excavation, installation of gas wells, reinstatement of excavation soils, installation of topsoil.

   b) Daily inspection of fencing for tears, undercutting and other deficiencies in the fencing by the site supervisor.

   Daily review of the work site for snakes prior to commencement by the site supervisor, plus diligence by workers during the work period.

   Anticipated timing: Spring 2018.

5. Installation of native seed mix of grasses and wildflowers with a cover crop on disturbed soils during the active growing period May to September once construction has been completed.

   Anticipated timing: Summer / fall 2018.

6. Removal of exclusion fence following completion of the construction and seeding.

   Anticipated timing: Summer / fall 2018.

All work will remain within the areas designated by fencing. No storage, stockpiling or access can occur outside of the workzone. All SAR wildlife and vegetation encountered during the above construction process will be documented for submission to the MNRF.

Additional measures that are recommended to improve habitat potential for Eastern Foxsnake following construction:

- Woodchip, brush piles, bodywood and root masses of trees created during or resulting from tree clearing operations are to be left onsite to provide hibernation areas.
- Rocks and boulders greater than 15 cm diameter encountered during excavation operations will be collected into piles to provide basking areas.
- Excavation of a localized depression area (minimum 5 m in diameter and 15 cm deep) to provide amphibian habitat that may supply snakes with a food source.

These measures are recommended to be implemented at west limit of the Part 3 Temporary Work Space. This location will allow for these measures to be set back from the wells and supporting operations (e.g., vehicular traffic of staff).

The impact to the habitat of the project will be short-term, with the anticipated construction period lasting for approximately one year. The final site will have 3 wells on gravel pads approximately 20 m x 20 m with gravel access roads. The remainder of the site will be restored as identified in Section 4.2.2.

Other general recommendations for reducing potential impacts to Eastern Foxsnake:

- Educate contractors that this species is present in the area and may be encountered. They should also be told that the species is harmless, protected from harassment and killing by the provincial ESA and that sightings should be recorded.
- Drivers of vehicles entering and leaving the site on the access roads must be watchful of snakes that may be basking on the road.
- The project ecologist must be contacted if a snake is encountered within the construction zone to coordinate the relocation with the MNRF.

4.2 Impacts and Mitigation to Vegetation

4.2.1 Potential Impact

Construction may result in disruption of nesting bird nests, contravening the Migratory Birds Convention Act (1994) and the Endangered Species Act (2007) in meadow, as well as sparsely treed and forested lands within the proposed workzone.

4.2.2 Recommended Mitigation

It is recommended that the work spaces are prepared (i.e., tree felling and vegetation clearing) prior to the last week of May (the beginning of nesting period) or that work does not commence until mid-August, when peak nesting season is complete. Reinstatement of the topsoil in the temporary work space to allow for recolonization by the latent seedbank or seed rain from adjacent meadow grasses and forbs, or application of a meadow seed mix, following completion of work will allow the meadow to reestablish.

4.2.3 Confirmed Impact

Removal of trees at the east edge of the forest was required to accommodate the temporary work space, resulting in reduced tree cover and potential wildlife habitat.

4.2.4 Recommended Mitigation

Isolation of the work space to the open meadow and immature plantation areas to the greatest extent possible is recommended. Select tree removal that may be required to

accommodate construction may be investigated by a qualified ecologist prior to removal to determine extent of clearing, potential impacts to the forest and appropriate compensation effort and locations. Tree compensation is recommended through onsite planting adjacent to the forest to mitigate the reduction of forest resulting from the proposed work.

5.0 Conclusion

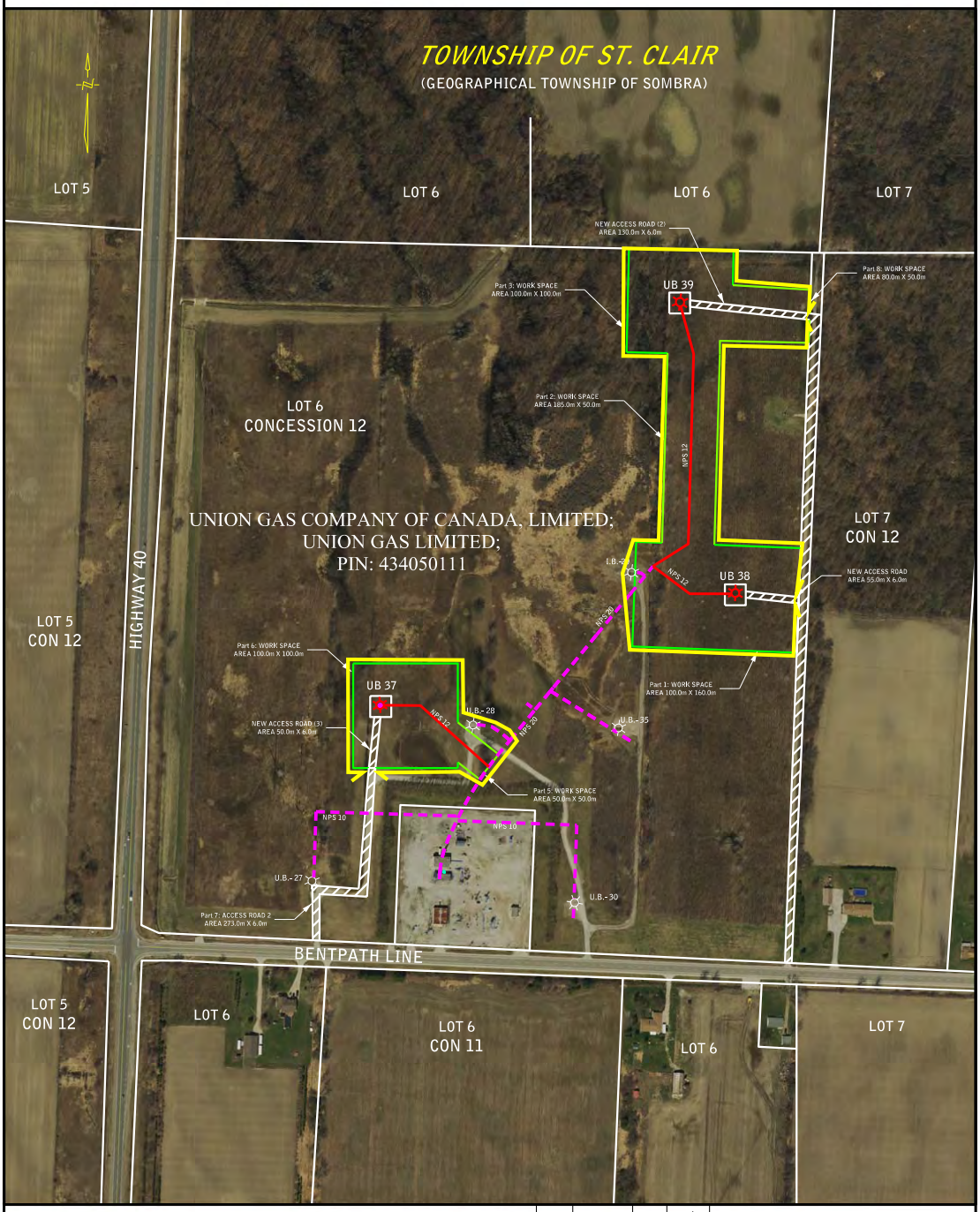
Implementation of the recommended mitigation will prevent and/or compensate the environmental effects associated with the proposed project so that impacts are short-term and minimal.

NEEGAN BURNSIDE

Figures

2018 DAWN DELIVERABILITY - BICKFORD STATION

PROPERTY SKETCH
SHOWING APPROXIMATE LOCATION OF
PROPOSED TEMPORARY LAND USE RIGHTS FOR
PT LT 6 CON 12 SOMBRA AS IN L640678 & PT 1, 25R404; ST. CLAIR
UNION GAS COMPANY OF CANADA; UNION GAS LIMITED;



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WORK SPACE
- Snake exclusion fence locations with curved ends (Locations by Neegan Burnside, Nov. 2017)

No.	DATE	BY	APP'D	REMARKS
	REVISIONS			

uniongas
An Enbridge Company

PROPOSED FACILITIES
BICKFORD POOL

DRAWN BY: T. James	DATE: 2017/11/08	PLOT SPEC: 1/2500
CHECKED BY	DATE	FILE REVISION DATE
APPROVED BY	DATE	DISTRICT: LONDON
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: ST2121-02

NEEGAN BURNSIDE

Appendix A

Species at Risk Branch Best Practices Technical Note: Reptile and Amphibian Exclusion Fencing

SPECIES AT RISK BRANCH
BEST PRACTICES TECHNICAL NOTE

REPTILE AND AMPHIBIAN EXCLUSION FENCING

Version 1.1

July 2013

July 2013

Ontario Ministry of Natural Resources
Species at Risk Branch

Recommended Citation:
OMNR. 2013. Reptile and Amphibian Exclusion Fencing: Best Practices, Version 1.0. Species at Risk Branch Technical Note. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. 11 pp.

Cover illustration: Photograph by Matthew J. Aresco, Conservation Director, Nokuse Plantation

Before an activity can be initiated, permissions, approvals or authorizations may be required from MNR (e.g. Endangered Species Act authorization, Wildlife Scientific Collector's Authorization) or other agencies, levels of government (e.g. a conservation authority, municipality, federal or provincial government), or landowners. It is your responsibility to ensure that all necessary permissions, approvals and authorizations are acquired prior to proceeding with your activity.

This document presents information as of the point in time of publication and is meant to be updated through time as improved information becomes available.

Cette publication hautement spécialisée, Reptile and Amphibian Exclusion Fencing Best Practices n'est disponible qu'en anglais en vertu du Règlement 671/92 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez communiquer avec le ministère des Richesses naturelles au Pamela Wesley,705-755-5217.

Document History

Revision Number	Revision Date	Summary of Changes	Originated	Reviewed	Authorized
1.1	**June, 2013**	**Pre-publishing edits**	**June, 2013**	**June, 2013**	**June, 2013**

REPTILE AND AMPHIBIAN EXCLUSION FENCING - BEST PRACTICES -

The purpose of this guidance document is to provide an overview of proven design and installation techniques for reptile and amphibian exclusion fencing. Though this document points to site and species-specific design requirements, it is important to recognize that every situation is different. This guidance is not meant to replace site-specific advice obtained from local MNR staff or experienced exclusion fencing contractors. Moreover, exclusion fences are only effective when well planned, properly constructed, and maintained.

Exclusion fencing seeks to eliminate access to specific areas where activities that could harm animals are occurring (e.g. active aggregate operations, construction sites, and roads). The selection and installation of exclusion fencing can present some challenges, particularly if multiple species are being excluded. For example, some reptiles and amphibians are able to dig under fencing while others can climb over. Some may also take advantage of burrows dug by other animals. To maintain effectiveness, the bottom of the fence should be buried or secured firmly to the ground and minimum height recommendations (Table 1) are considered.

Exclusion fence design should consider the target species as well as those that might be unintentionally impacted. Fencing material should not pose a risk of entanglement or permit individuals to pass underneath or between openings. Landscape features such as topography and substrate need to be considered as they may constrain fencing design.

Including plans for fencing in advance of a project can increase efficiency and fence effectiveness. For example, long-term road projects that will include a permanent sound barrier could design the sound barrier such that it also meets the specifications of the required exclusion fence.

EFFECTIVE FENCE CHARACTERISTICS

The fence burial and height recommendations listed in Table 1 below have been compiled from scientific literature, established management practices, and practitioner best advice. These are general recommendations and at times other specifications may be more appropriate. For instance, in areas where the substrate does not permit fence burial, weighing down the fence with heavy items (e.g. sand bags) or backfilling may be acceptable. Where needed, speak with your local MNR staff or experienced exclusion fencing contractor to develop site-specific plans.

If multiple species are being excluded from the same area, and the species-specific fencing specifications differ, the uppermost minimum height and greatest depth recommendation should be used (Table 1). If you are excluding both Blanding's Turtle and Gray Ratsnake, for example, the exclusion fence should be a minimum of 2 m tall (see Gray Ratsnake section below for additional details).

Exclusion fences should be installed prior to emergence from hibernation. A survey of the enclosed/secluded area should be conducted immediately following fence installation to ensure that no individuals have been trapped on the wrong side of the fence.

Table 1. Recommended burial depth and height requirements of exclusion fencing for reptiles and amphibians. Recommended height is the height of the fence after it has been installed including the buried components and any installed overhangs or extended lips.

SPECIES	RECOMMENDED DEPTH OF FENCE BURIED (cm) *	RECOMMENDED HEIGHT OF FENCE (cm) **
Turtles – general	10 – 20	60
Eastern Musk Turtle, Wood Turtle	10 – 20	50
Massasauga, Eastern Hog-nosed Snake, Butler's Gartersnake, Queensnake	10 – 20	60
Gray Ratsnake & Eastern Foxsnake	10 – 20	200
Fowler's Toad	10 – 20	50
Snakes - general	10 – 20	100
Common Five-lined Skink	10 – 20	unknown
Salamanders	10 – 20	30

*** does not include the 10 cm horizontal lip that should extend outward an additional 10 – 20 cm (see Figure 2)**
**** the height of fencing has been provided as an approximate. Fencing materials may in fact not be available in proportions that would allow for these precise measurements. It is most effective, if the height and burial depth recommendations are met.**

DURATION OF ACTIVITIES & DEGREE OF ANTICIPATED DISTURBANCE

The type of disturbance, the proximity to disturbance, and the planned fence longevity are factors that influence which type of exclusion fence is most effective. For short-term activities (i.e. 1 to 6 months) such as minor road repairs, a light-duty geotextile fence is appropriate. Longer term or permanent fencing projects, however, require more durable materials such as – heavy-duty geotextile, wood, concrete, woven-wire, sheet metal, vinyl panels, or galvanized mesh.

GEOTEXTILE FENCES

Geotextile fences (e.g. silt fences) come in many types and qualities. They can be very effective for the temporary exclusion of reptiles and amphibians. For the purposes of this document, temporary use ranges from a few months up to 2-3 years. Winter weather is generally damaging to geotextile materials and the cost of maintenance over the long-term should be considered during the planning phase. Depending upon the quality, geotextile can be resistant to UV degradation and the bio-chemical soil environment.

Light-duty Geotextile Fencing:

Light-duty geotextile fencing is made of nylon material and is typically purchased with wooden stakes pre-attached at 2 m to 3 m intervals (Plate 1). It can also come without pre-attached stakes. Light-duty geotextiles are largely intended for projects with shorter durations of only a few months in duration and up to one season.

Geotextile fencing with nylon mesh lining should be avoided due to the risk of entanglement by snakes.

To use light-duty geotextile fencing:

- Fencing fabric is effective if attached to wooden, heavy plastic or metal stakes using heavy-duty wire staples or tie-wire (Figure 2).
- Secure the fence on posts that are placed at 2 m to 3 m apart. If using the greater recommended distance between posts, additional maintenance may be required to maintain effectiveness.
- Securely drive the stakes into the ground to a recommended depth of 30 cm. The fencing fabric should be buried to the recommended specifications in Table 1 and back-filled with soil.
- For snakes, supporting posts should be staked on the activity side (e.g. on the side facing the aggregate stock pile or the road - Figure 2).
- Light-duty geotextile fences are not effective where rocks or other hard surfaces prevent proper anchoring of fence posts and burial of the fence fabric.
- Light-duty geotextile fences are not effective where a large amount of concentrated run-off is likely or to cross streams, ditches or waterways without specific modifications.
- Contact your local MNR staff or experienced exclusion fencing contractor for advice and recommendations.
- See general best practices section below for additional details.

Generally, light-duty geotextile fences are not effective if they exceed 1 metre in height unless purposely manufactured for greater height (e.g. stakes placed at closer intervals or cross braces). If greater height is required consider using heavy duty geotextile, hardware cloth or other fencing materials.

Plate 1. Light-duty geotextile fencing with pre-attached wooden stakes used to exclude turtles from a road as seen on a regular maintenance check (photo credit: Brad Steinberg).

Heavy-duty Geotextile Fencing:

Heavy-duty geotextile fencing is typically constructed of a thick felt-like fabric. It may also be called ‘double row’ or ‘trenched’ fencing. For support, this fencing uses a woven wire fence (e.g. chain link) or some other structure (Plate 2). It is recommended that a minimum density of 270R or equivalent woven geotextile fabric is used.

Heavy-duty geotextile material can be effective for up to 2 or 3 years with proper maintenance. This type of fencing can be damaged by small mammals chewing through or torn by heavy debris (e.g. tree branches). Therefore, it may be best suited to turtles, which are less likely to take advantage of holes or tears in the fabric. If

used to exclude snakes or other animals, more maintenance may be required.

Heavy-duty geotextile fencing:

- The wire fence should be installed on the activity side to prevent animals from leveraging and climbing into the exclusion area while allowing the animal to escape if they find themselves on the wrong side (Figure 2).
- Geotextile fences across streams, ditches or waterways should have case-specific modifications.
- Contact your local MNR staff or experienced exclusion fencing contractor for advice.
- See light-duty geotextile section above and general best practices below for additional details.

Plate 2. Example of a heavy-duty geotextile fencing used to exclude snake species (photo credit: Jeremy Rouse).

HARDWARE CLOTH FENCES

Hardware cloth (also known as galvanized mesh or Birdscreen) is durable, cost effective and useful for excluding reptiles and amphibians. The fence should be made of heavy galvanized hardware cloth with a ¼ inch mesh. For fences intended to exclude small snakes, a ⅛ inch mesh may be more effective. In contrast, fencing intended to exclude turtle species can have a larger mesh size (e.g. ½ inch). Larger mesh may have a longer lifespan as it is constructed from a thicker material compared to smaller mesh sizes.

To use hardware cloth fencing:

- Secure the fence on posts placed a recommended 2.5 m apart with the stakes on the activity side (Figure 2).
- Pull the mesh taught and staple or secure with screws and a metal stripping to prevent the mesh from being ripped when pressure is applied.
- Installing a top rail or folding the mesh over a taut smooth wire reduces tearing (Plates 3 and 4).
- An outward facing lip installed on the species side ensures that snakes and amphibians are unable to climb or jump over the fence (Figure 2; Plate 4)
- Tears can be mended with 18-gauge galvanized wire.
- See general best practices section below for additional details.

Plate 3. Example of a galvanized mesh fencing used for the long-term exclusion of snakes and turtles from the adjacent highway (photo credit: Megan Bonenfant).

Plate 4. Long-term to permanent exclusion fencing using galvanized mesh with over-hanging lip to prevent animals from climbing or jumping over (photo credit: Megan Bonenfant).

WOOD LATH SNOW FENCING

In certain circumstances, wood lath snow fencing can be effective at excluding turtles. This fencing is typically constructed from soft wood slats that have been woven together with 13-gauge wire and is then attached to steel fence posts which have been driven into the ground.

Wood lath fencing is cost effective and can easily be laid down during the winter to prevent damage. The durability of the material, however, is not meant for very long-term use (e.g. more than 3 years), unless regular maintenance occurs.

To use wood lath snow fencing:

- The fencing should be attached to heavy plastic or metal stakes using heavy-duty wire staples or tie-wire.
- The stakes are recommended to be placed at 2 to 3 m intervals and securely driven into the ground 30 cm or more.
- Wood lath snow fencing across streams, ditches or waterways should have case-specific modifications.
- Wood lath snow fencing lends itself well to being combined with other types of material to ensure complete exclusion.
- See general best practices section below for additional details.

Plate 5. Example of a wood lath snow fencing used to exclude turtles (photo credit: Karine Beriault).

EXCLUSION FENCING FOR GRAY RATSNAKE AND EASTERN FOXSNAKE

Gray Ratsnake and Eastern Foxsnake are the largest snakes in Ontario - reaching nearly 2 m in length. They are also excellent climbers. For this reason, fencing intended to exclude either of these species has additional recommended design specifications.

- The fence should be at least 2 m high.
- The material on the species side (Figure 2) should be smooth to prevent the snakes from climbing into the excluded area.
- Stakes should be on the activity side of the fence (Figure 2).
- Due to the increase in fence height, it is valuable to decrease the distance between posts or install diagonal braces.
- See general best practices section below for additional details.

CONCRETE, SHEET METAL & VINYL WALLS

Concrete, metal or vinyl walls can stand alone or be combined with woven wire or chain link fences. They are durable, require minimal maintenance and are effective in excluding target species from high risk areas and guiding them to crossing structures or other desired locations (Plates 6 and 7). This fence type is comprised of a continuous vertical face of concrete, metal or vinyl sheeting with no gaps. Concrete walls can be installed as either pre-cast sections or pour directly in place.

Plate 6. Stand-alone continuous concrete wall used to exclude salamander species installed as pre-cast forms (photo credit: Steven Roorda).

Plate 7. Pre-formed vinyl sheeting fence intended to exclude salamanders for a construction site (photo credit: Herpetosure Ltd.)

The wall height depends upon the target species, but they are usually between 45 and 60 cm tall and buried 25 cm. Concrete, metal or vinyl exclusion fencing is most appropriate for salamanders, skinks, small snakes, and small turtles. For large turtle species, a chain link fence can be installed directly on top of the concrete wall for complete exclusion.

HABITAT CONNECTIVITY

Habitat connectivity is the connectedness between patches of suitable habitat or the degree to which the landscape facilitates animal movement. Exclusion fencing installed along roads or other large projects can effectively reduce or eliminate habitat connectivity for animals. In these scenarios, exclusion fencing should be considered with eco-passages in order to maintain connectivity. Fencing in isolation should be viewed as a temporary method to reduce mortality until species movement can be restored. Where eco-passages are not feasible they should be identified for consideration with any future road work or development to improve connectivity.

During the installation of fencing with an eco-passage, it is important that the fencing sits flush with the passage to ensure that

there are no gaps where animals can squeeze through.

Plate 7. A wood turtle travelling through a dry eco-passage. Ecopassages such as this help to ensure the long-term connectivity of seasonal habitat for this and other reptile and amphibian species (photo credit: Amy Mui).

GENERAL BEST PRACTICES:

- To deter digging, bury the fence 10 cm down with an additional 10 cm horizontal lip (Figure 2).
- Backfill and compact soil along the entire length on both sides of the fence (Figure 2).
- Once the fence is installed, a survey should be done to ensure that no individuals have been trapped inside (speak with MNR for survey advice).
- Exclusion fencing intended to exclude snakes should have the stakes installed on the activity side (opposite the normal requirement for sediment control fencing) to prevent snakes from using the stakes to maneuver over the fencing.
- For snakes and toads, the fence should have an overhanging lip on the species side (Figure 2).
- Fences should be inspected after spring thaw and at regular intervals throughout the active season, especially following heavy rain events. This is particularly important for geotextile fences. Any damage that affects the integrity of the fence (e.g. tears, loose edges, collapses, etc.) should be fixed promptly.
- Tall or woody vegetation on the species side of the fence should be managed if there is a risk that it may enable the animals to climb over. This is most important during spring and fall. Proceed cautiously to not harm animals protected plant species during vegetation removal.
- When installing an eco-passage, fencing or exclusion walls should be used as a guiding system to direct animals to passage openings.
- Natural screens such as trees or shrubs can help to reduce road access and can be combined with fencing to provide protection of individuals from predation.
- Install fences with a turn-around at the ends furthest from the wetland habitat and at any access areas to assist in redirecting animals away from any fence openings (Figure 1).
- Curving the ends of the fencing inward (i.e. away from the road or construction site) may help to reduce access to these locations. The ends may also be tied off to natural features on the landscape such as trees or rock cuts.

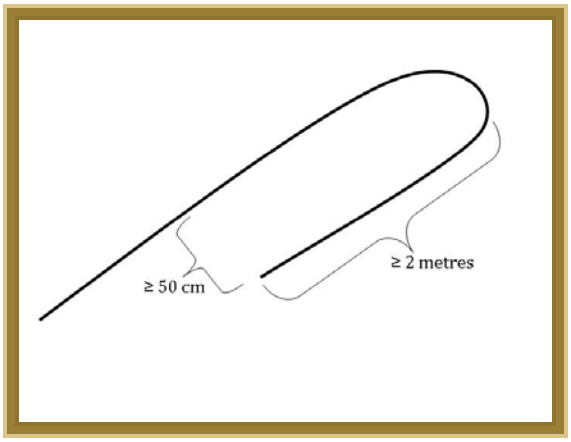


Figure 1. Diagram of the ends of the fence designed to curve inward in order to direct animals away from the area of exclusion.

WATER MOVEMENT & DRAINAGE

- In areas where surface water run-off may erode a soil-based backfill, consider using rocks or sand bags. Ensure these materials cannot be used by animals to climb over the fence.
- Where possible, minimize the number of water crossings: when necessary, it should occur where flow is minimal.
- Fence posts in waterways or areas prone to seasonal flooding should be driven rather than dug – unless following established best practices.
- Fencing should be placed above the high water mark anticipated for high water events such as spring freshet or periods of heavy or continuous rainfall.

TOPOGRAPHY:

- Fence posts should be closer together in undulating topography.
- Fences installed on slopes have a different effective height depending upon whether the animal will be approaching from the up or down slope. The fence height can be adjusted accordingly.

Improvements or questions regarding exclusion fencing can be brought to the local MNR Species at Risk Biologist or other MNR staff.

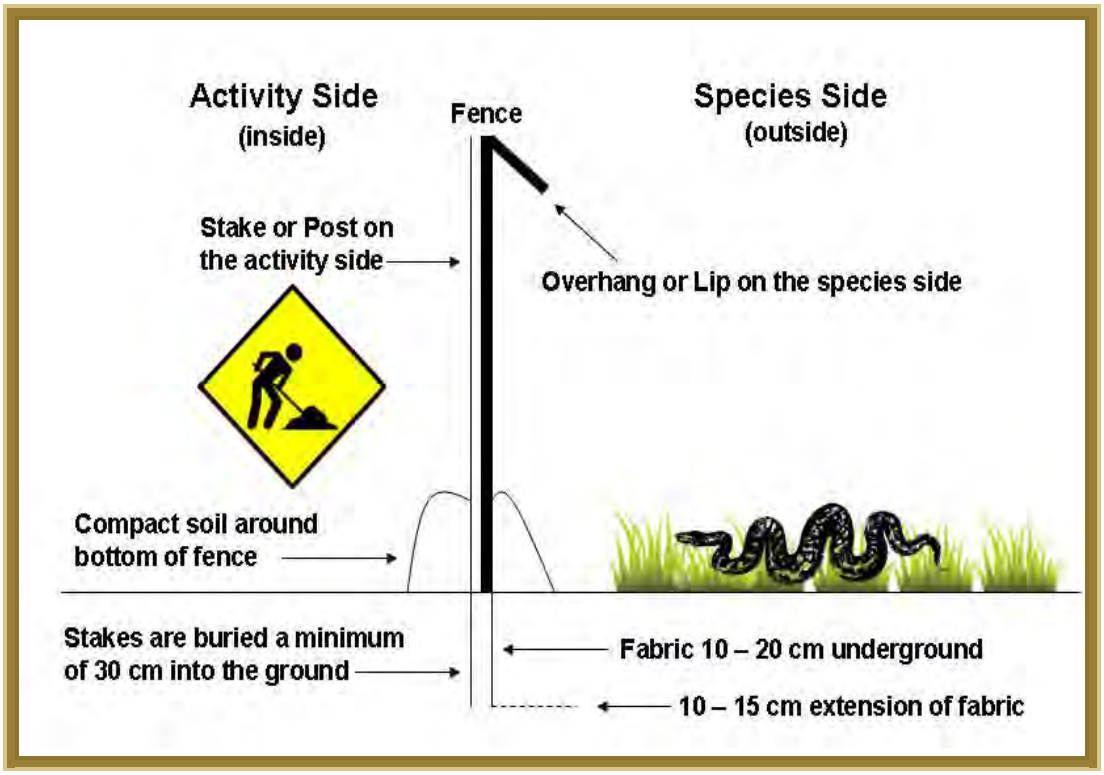


Figure 1. A side view of a basic exclusion fence including an overhang or flexible lip to deter animals from climbing or jumping over the fence. Placement of the stake on the Activity Side or on the inside of excluded area is also illustrated. This is particularly important for snake species which may use the stakes to maneuver over the fence.

RESOURCES:

ACO Systems Ltd., 2007. Wildlife fencing systems. Accessed July 2012. Available at: http://www.acocan.ca/wildlife/fence.htm.

Dodd, C.K, W.J. Barichivich, and L.L. Smith. 2004. Effectiveness of a barrier wall and culverts in reducing wildlife mortality on a heavily traveled highway in Florida. Biological Conservation 118: 619-631

Flat-tailed Horned Lizard Interagency Coordinating Committee. 2003. Flat-tailed horned lizard rangewide management strategy, 2003 revision. 80 pp., plus appendices.

Jochimsen, Denim M., Charles R. Peterson, Kimberly M. Andrews, and J. Whitfield Gibbons. 2004. A literature review of the effects of roads on amphibians and reptiles and the measures used to minimize those effects. USDA Forest Service.

KRCA, 2006. Silt Fence Installation and Maintenance. KRCA, Kawartha Region Conservation Authority Environmental Advisory Services, Port Hope, ON, 2 pp.

Long, K, and A. Robley, 2004. Cost Effective Feral Animal Exclusion Fencing for Areas of High Conservation Value in Australia. The Department of Environment and Heritage. Natural Heritage Trust, Victoria, Australia, 61 pp.

Queensland Department of Transport and Roads, 2010. Fauna Sensitive Road Design Manual, Volume 2: Preferred Practices. Chapter 9, Case Studies, Connecting Queensland, Road and Delivery Performance Division, Queensland Government, 134 pp.

Sarell, M, 2006. Living in Nature Series: How to Snake-proof you House and Yard. South Okanagan-Similkameen Stewardship

Program. The Land Conservancy of BC, Penticton, BC. 8 pp.

TWP Incorporated, Galvanzied Mesh for Snake Control. Accessed July 2012, Available at: http://www.twpinc.com.

For additional information:

Visit the species at risk website at
ontario.ca/speciesatrisk
Contact your MNR district office
Contact the Natural Resources Information Centre
1-800-667-1940
TTY 1-866-686-6072
mnr.nric.mnr@ontario.ca
ontario.ca/mnr

Indigenous Consultation Report

Union Gas Bickford Storage Pool

Indigenous Consultation Report
Union Gas Bickford Storage Pool

1. **Project Description**

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB37), Union Bickford 38 (UB38), and Union Bickford 39 (UB39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400m of NPS 12" pipelines to connect the new wells to the existing gathering system which will require a leave to construct.

Please see the attached map of the general area (Schedule A).

2. **First Nation and Métis Communities Consulted**

As directed under the *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 2016,* Union Gas was delegated the procedural aspects of the consultation from the Ministry of Energy (MOE). The follow communities were listed by the MOE in the delegation letter (Schedule B):

Aamjiwnaang First Nation	Chief Joanne Rogers Sharilyn Johnson, Environment Coordinator
Bkejawnong (Walpole Island) First Nation	Chief Dan Miskokomon Dr. Dean Jacobs, Consultation Manager Janet Macbeth, Project Review Coordinator Ed Gilbert, Consultation Business Development Officer Rex Issac, Employment Councillor Kammy White-Eye, Intern
Caldwell First Nation	Chief Louise Hillier Allen Deleary, Director of Operations
Chippewas of Kettle and Stony Point First Nation	Chief Thomas Bressette Lorraine George, First Nation Manager Valerie George, Consultation Coordinator
Chippewas of the Thames First Nation	Chief Leslie White-Eye Kelly Riley, Acting Lands & Environment Director Fallon Burch, Consultations Coordinator
Oneida Nation of the Thames	Chief Randall Phillips

3. Consultation Activities

Aamjiwnaang First Nation

Date	Activity	Issues raises	Outcome	Doc Location
Aug 3/17	Notification of the project sent via email to Chief Joanne Rogers, Sharilyn Johnston	No response received		Pg. 13
Oct 3/17	Follow up email sent to Chief Rogers and Sharilyn Johnston			Pg. 13
Nov 2/17	Email received from Christine Rogers, Environmental Consultation Worker	Environmental Committee would like a presentation on Bickford storage well project.	Ken McCorkle will present on December 5, 2017 at the Band Administration Building	Pg. 14-15

Bkejawnong (Walpole Island) First Nation

Date	Activity	Issues raises	Outcome	Doc Location
Aug 3/17	Notification of the project sent via email to Chief Dan Miskokomon, Dean Jacobs, Janet Macbeth	No response received		Pg. 16
Oct 3/17	Follow up email sent to Chief Miskokomon, Dean Jacobs, Janet Macbeth	No response received		Pg. 16
Nov 5/17	Meeting with Janet Macbeth, Ed Gilbert, Rex Issac and Kammy White-Eye	Discussed the details and scope of the Bickford projects. There were no issues or concerns brought forward. Union Gas was asked for a site visit	Union Gas to set up a site tour with on given date that works for members of community.	

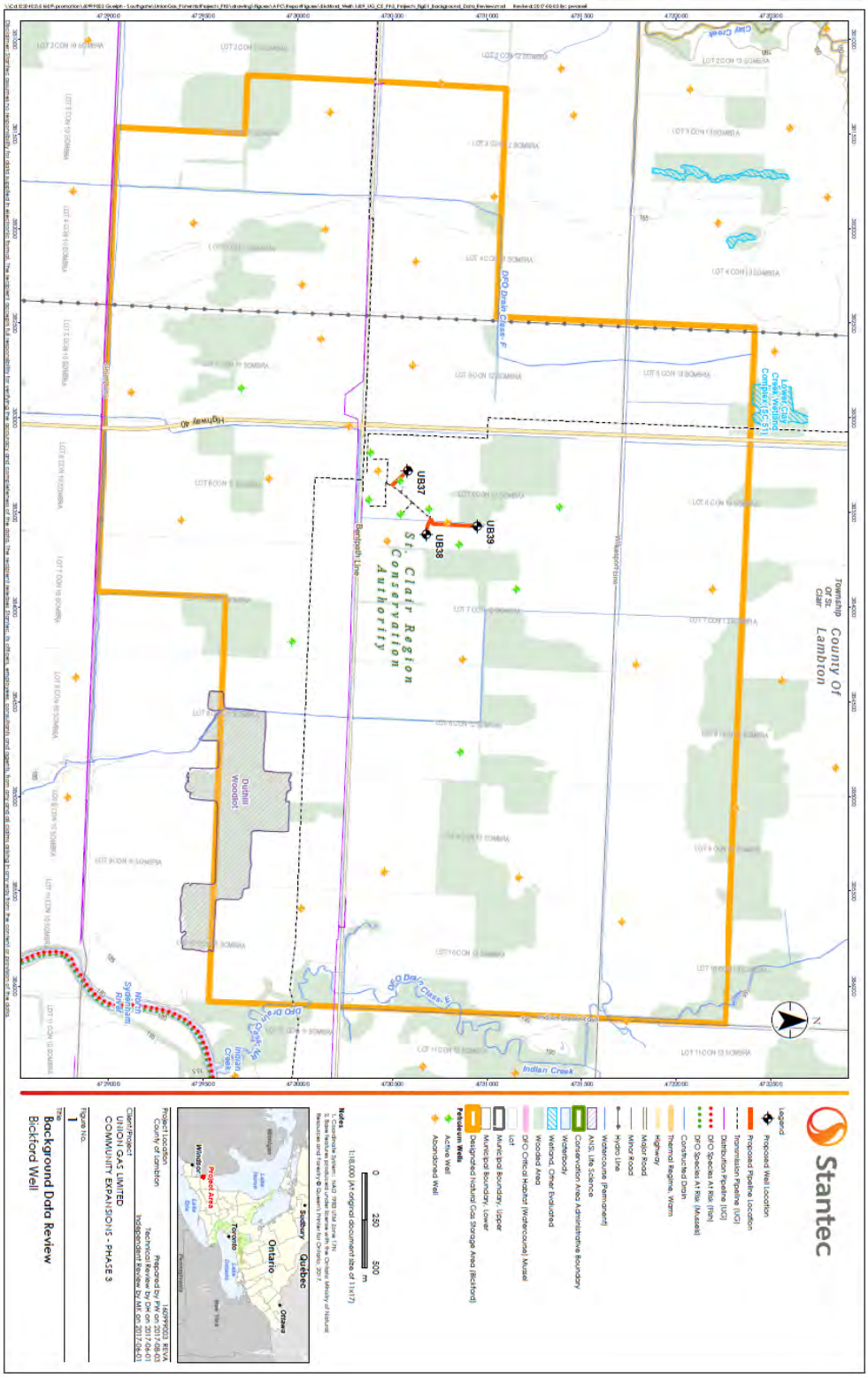
Caldwell First Nation

Date	Activity	Issues raises	Outcome	Doc Location
Aug 3/17	Notification of the project sent via email to Chief Louise Hillier	No response received		Pg. 17
Oct 3/17	Follow up email sent to Allen Deleary			Pg. 17
Nov 7/17	Phone call to Allen Deleary to follow up on emails to Chief Hillier	No response received		

Nov 9/17	Meeting with Allen Deleary, Director of Operations	Met with Allen Deleary at Leamington Band office. Discussed the details and scope of the Bickford project. Mr. Deleary had no issues or concerns. He asked for a tour of the site.	Tour to be arranged at a given time that works for Mr. Deleary.	
Chippewas of Kettle and Stony Point First Nation				
Date	**Activity**	**Issues raises**	**Outcome**	**Doc Location**
Aug 3/17	Notification of the project sent via email to Chief Thomas Bressette, Lorraine George, First Nations Manager	No response received		Pg. 18
Oct 3/17	Follow up email sent to Chief Thomas Bressette, Lorraine George, and Valerie George	Response received via email		Pg. 18
Oct 11/17	Email received from Valerie George	As a result of a discussion at the CKSPFN Consultation and Accommodation Committee Meeting, request to have Union Gas present on the Bickford Storage Well.	Advised they would reach out in future with some dates to present	Pg. 18
Chippewas of the Thames First Nation				
Date	**Activity**	**Issues raises**	**Outcome**	**Doc Location**
Aug 3/17	Notification of the project sent via email to Chief Henry and Kelly Riley	No response received		Pg. 19
Oct 3/17	Follow up email sent to Chief Henry and Kelly Riley	No response received		Pg. 19
Nov 10/17	Follow up telephone call made to Fallon Burch	Left voicemail following up on previous two emails that we have received no response.		Pg. 20
Oneida Nation of the Thames				
Date	**Activity**	**Issues raises**	**Outcome**	**Doc Location**
Aug 3/17	Notification of the project sent via email to Chief Randall Phillips	No response received		Pg. 21
Oct 3/17	Follow up email sent to Chief Phillips	No response received		Pg. 21
Nov 1/17	Voicemail left with Chief Phillips	Advising to contact us if any questions or concerns on Bickford project.		

4. **Supporting Documents**

Schedule A - Detailed Map of Project site



Schedule B – Interaction with the Ministry

July 12, 2017

Ms. Michelle Schlag
Senior Advisor Aboriginal Energy Policy
Ministry of Energy
77 Grenville Street, 6th Floor
Toronto, ON M7A 2C1

Dear Ms. Schlag:

Re: 2018 Dawn Deliverability Project

Enclosed please find Union's Report to the Ministry of Energy to determine the Indigenous Consultation required for the above noted project. Please note this project has a well drilling and a pipeline construction component that requires a Leave to Construct.

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,

Ken McCorkle

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Limited
50 Keil Drive North
Chatham, ON N7M 5M1
Phone: 519-436-4600 ext. 5002243
Email: kmccorkle@uniongas.com

Union Gas Limited 2018 Dawn Deliverability Project - Summary for Ministry of Energy

1. Introduction

This Summary Report has been prepared to provide the Ministry of Energy ("MOE") with an overview of the 2018 Dawn Deliverability Project ("Project"), which will include a leave to construct application and the drilling of three new wells, to support the preparation of a contact list of indigenous communities that may have an interest in the Project.

1.1 Project Overview

Union Gas Limited ("Union Gas") is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (UB 39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system which will require a leave to construct. The location of the project is shown on the attached map.

The following co-ordinates are the approximate proposed locations of the new wells:

Proposed Well	Latitude	Longitude
Union Bickford 37	42°43'8.05"N	82°25'31.92"W
Union Bickford 38	42°43'11.61"N	82°25'17.14"W
Union Bickford 39	42°43'19.95"N	82°25'19.75"W

2. Regulatory Requirements and Approvals

Ontario Energy Board ("OEB") review and approval is required before this project can proceed. As part of that application, an Environmental Protection Plan (EPP) will be prepared in accordance with the OEB *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario (2016)*. The EPP for this Project will be submitted to the OEB in fall 2017 as part of Union's leave to construct application. The Project is planned to begin in spring 2018 with an in service date of fall 2018.

Other permits and authorizations for the project will be determined and may be necessary at the Federal, Provincial and Municipal levels.

3. Environmental Planning Process

The environmental planning process for the Project will be initiated in the summer of 2017 by Union Gas, with support provided throughout the process by consultant archaeologists, cultural heritage specialists, and biologists. The following provides a general overview of the environmental planning process for the Project:

- **Complete an Environmental Protection Plan (EPP)**
  - 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; and
  - Describe the public consultation opportunities.
- **Complete all necessary studies and assessments**
  - An Archaeological Assessment will be conducted by a licensed archaeologist in accordance with the Ministry of Tourism, Culture and Sport (MTCS) guidelines to identify known or potential archaeological resources within the Project area and will develop an appropriate mitigation plan if required.
  - A heritage specialist will review the running line for potential cultural heritage landscapes and built heritage resources and will develop an appropriate mitigation plan if required.
  - A certified biologist will review the running line for potential species at risk and determine if any species will be impacted by construction activities and will develop an appropriate mitigation plan if required.
- **Obtain all necessary environmental permits and approvals**
  - Union Gas will work with all relevant governing agencies (i.e. the Ministry of Natural Resources and Forestry (MNRF)) to obtain any permit and/or approval should it be necessary.

4. Consultation

Public consultation is an important part of the environmental planning process and will include discussions with MNRF, St. Clair Township, Lambton County, directly affected landowners, and the First Nations and Métis Nation as identified by MOE Project Notification

Union Gas will meet with the Township, County, and MNRF to discuss and review the project. Union Gas will also meet with any directly affected landowners.

5. Project Activities

Union Gas will follow its standard construction practices in accordance with CSA Z341.1-14 for well drilling and construction. Union Gas's standard well construction practices include construction of a permanent all-weather roadway, construction of temporary drilling pads, construction of the NPS 12" pipeline, and restoring the area to its original condition upon completion of drilling.

From: McCorkle, Ken [mailto:KMcCorkle@uniongas.com]
Sent: Thursday, August 3, 2017 4:02 PM
To: Bouvier, Anne-Laure (ENERGY)
Subject: RE: 2018 Dawn Deliverability project

Hello Anne:
The Environmental planner forwarded me this new map that I have attached. UB 39 has been moved 10 metres to the East to avoid removing the trees in the natural forest. The land the wells are on is called a cultural meadow. He stated that this is land previously distributed and is now just overgrown. Please let me know if this is meets your need.

Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
We can't change the past, but we can influence our future

From: Bouvier, Anne-Laure (ENERGY) [mailto:Anne-Laure.Bouvier@ontario.ca] Next Previous
Sent: August-04-17 11:21 AM
To: McCorkle, Ken
Subject: RE: 2018 Dawn Deliverability project

Hi Again,

Just to clarify, you say below that "this is land previously distributed": did you mean "disturbed"?

AL

From: McCorkle, Ken [mailto:KMcCorkle@uniongas.com]
Sent: Friday, August 4, 2017 11:47 AM
To: Bouvier, Anne-Laure (ENERGY)
Subject: RE: 2018 Dawn Deliverability project

Yes "disturbed" is correct. Sorry for the confusion.

Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
We can't change the past, but we can influence our future

From: Bouvier, Anne-Laure (ENERGY) [mailto:Anne-Laure.Bouvier@ontario.ca] Next Previous
Sent: August-08-17 4:19 PM
To: McCorkle, Ken
Subject: RE: 2018 Dawn Deliverability project

Hi Ken,

One question re: Dawn deliverability projects (Wells):
Is the land in the project area currently farmland or not?
My understanding is that it used to be farmland at least but is now overgrown (see your answer below). Is it now overgrown because of the fact that you are digging wells on it?

AL

Ministry of Energy

77 Grenville Street
6th Floor
Toronto ON M7A 2C1

Tel: (416) 314-2599

Ministère de l'Énergie

77 rue Grenville
6e étage
Toronto ON M7A 2C1

Tél: (416) 314-2599

Ontario

Indigenous Energy Policy

VIA EMAIL

August 14, 2017

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Limited
50 Keil Drive North
Chatham, ON N7M 5M1

Re: Dawn Deliverability Project

Dear Mr. McCorkle:

Thank you for your email dated July 13, 2017, notifying the Ministry of Energy of Union Gas Limited's (Union Gas) intention to apply for Leave to Construct for the Dawn Deliverability Project and requesting clarification on Duty to Consult requirements.

I understand that Union Gas is proposing to drill new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB37), Union Bickford 38 (UB 38) and Union Bickford 39 (UB39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625m deep. Union will also be constructing approximately 400m of NPS 12" pipelines to connect the new wells to the existing gathering system which will require a leave to construct.

	Latitude	Longitude
Union Bickford 37	**42°43'8.05"N**	**82°25'31.92"W**
Union Bickford 38	**42°43'11.61"N**	**82°25'17.14"W**
Union Bickford 39	**42°43'19.95"N**	**82°25'19.75"W**

The Ministry has reviewed the information provided relative to its current understanding of the interests of First Nation and Métis communities in the area and has determined that it may have the potential to affect First Nation and Métis communities who hold or claim Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982.

As you are aware, the Government of Ontario (the "Crown") has a constitutional duty to consult and accommodate First Nation and Métis communities when Crown project approvals may lead to an appreciable adverse impact on established or asserted Aboriginal or treaty rights. While the legal duty to consult falls on the Crown, the Crown may delegate the day-to-day, procedural aspects of consultation to project proponents. The Ministry of the Energy is delegating the procedural aspects of consultation to Union Gas through this letter.

Based on the Crown's preliminary assessment of First Nation and Métis community rights and project impacts, the following Aboriginal communities should be consulted on the basis that they have or may have constitutionally protected Aboriginal or treaty rights that may be adversely affected by the Project:

Community	Mailing Address
Chippewas of the Thames First Nation	320 Chippewa Road, RR #1 Muncey ON N0L 1Y0
Aamjiwnaang First Nation	978 Tashmoo Avenue Sarnia ON N7T 7H5
Chippewas Of Kettle and Stony Point First Nation	6247 Indian Lane Kettle & Stony Point First Nation ON N0N 1J0
Bkejawnong (Walpole Island) First Nation	RR 3 Wallaceburg ON N8A 4K9
Oneida Nation of the Thames	RR 2 Southwold ON N0L 2G0
Caldwell First Nation	14 Orange Street Leamington ON N8H 1P5

This rights-based consultation list is based on information that is subject to change. First Nation and Métis communities may make new rights assertions at any time, and other developments (e.g. the discovery of Aboriginal archaeological sites) can occur that may require additional First Nation and/or Métis communities to be notified and/or consulted. If you become aware of potential rights impacts on communities that are not listed above at any stage of the consultation and approval process, kindly bring this to the attention of the Ministry with any supporting information regarding the claim. The Ministry will then assess whether it is necessary to include the community on the rights-based consultation list above.

The Ministry relies on consultation conducted by proponents when it assesses the Crown's obligations and directs proponents during the regulatory process. Union Gas' responsibilities for procedural aspects of consultation include:

- Providing the First Nation and Métis communities with timely notice of the project for the purposes of considering possible impacts on their Aboriginal and/or treaty rights;

- Providing First Nation and Métis communities with information about the project including anticipated impacts, and information on project timelines;
- Following up with First Nation and Métis communities to ensure they have received project information and that they are aware of the opportunity to express comments and concerns about the project;
- Explaining the regulatory and approval processes that apply to the project;
- Gathering information about how the project may adversely impact the relevant Aboriginal and/or treaty rights (for example, hunting, fishing) or sites of cultural significance (for example, burial grounds, archaeological sites);
- Considering the comments and concerns raised by First Nation and Métis communities and providing responses;
- Where appropriate, discussing accommodation, including mitigation or other measures to address potential adverse impacts on Aboriginal and/or treaty rights;
- Where appropriate, developing and discussing with the Crown appropriate accommodation measures;
- Taking reasonable steps to foster positive relationships with the First Nation and Métis communities;
- Bearing the reasonable costs associated with these procedural aspects of consultation; and
- Maintaining records of activities in relation to carrying out the delegated procedural aspects of consultation and providing information to the Ministry.

If you have any questions about this letter or require any additional information please contact me at 416-314-2599 or Shannon.mccabe@ontario.ca .

Sincerely,

Shannon McCabe
A/Manager
Indigenous Energy Policy

C: Ontario Pipeline Coordinating Committee (OPCC)

Aamjiwnaang First Nation

From: McCorkle, Ken
Sent: August-03-17 4:42 PM
To: 'Joanne Rogers'; Sharilyn Johnston
Subject: Bickford Storage Pool

Dear: Chief Rogers and Sharilyn:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
An integral part of this project is an Environmental Assessment that will be completed by Union Gas. As part of the Environmental Assessment, an archaeological assessment, cultural heritage study, and a species at risk study will be completed by an independent third party consultant.

Consultation with affected landowners, First Nations, government agencies and others will be carried out by Union Gas.

If you have any questions regarding this project, feel free to call or email me.

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle [mailto:KMcCorkle@uniongas.com]
Sent: October-03-17 4:29 PM
To: Chief Rogers <chief@aamjiwnaang.ca>; Sharilyn Johnston <sjohnston@aamjiwnaang.ca>
Subject: FW: Bickford Storage Pool

Dear Chief Rogers & Sharilyn:
I am following up on an email (see below) that was forwarded to you on August 3, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
We can't change the past, but we can influence our future

From: Christine Rogers [mailto:crogers@aamjiwnaang.ca]
Sent: November-02-17 4:24 PM
To: Ken McCorkle
Cc: Sharilyn Johnston
Subject: [External] RE: Bickford Storage Pool

Hi Ken,
The environment committee would like to request a presentation on several upcoming Union Gas projects. The three projects that we are interested in are Auburn natural gas pipeline project, Warwick natural gas pipeline project, and Bickford storage well.
We are booking our next Environment presentations on December 5 or 19, 2017.

Sincerely,

Christine Rogers
Environment Consultation Worker
Aamjiwnaang First Nation
978 Tashmoo Avenue
Sarnia, ON N7T7H5
Phone: 519-336-8410
crogers@aamjiwnaang.ca
www.aamjiwnaangenvironment.ca
www.facebook.com/AamjiwnaangEnvironment

From: Ken McCorkle
Sent: November-04-17 11:37 AM
To: 'Christine Rogers'
Cc: Sharilyn Johnston
Subject: RE: [External] RE: Bickford Storage Pool

Hello Christine:
I will attend the December 5th meeting. Please confirm time and location?

Miigwetch,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
We can't change the past, but we can influence our future

From: Courtney Jackson [mailto:cjackson@aamjiwnaang.ca]
Sent: November-07-17 1:22 PM
To: Ken McCorkle
Cc: Christine Rogers
Subject: RE: RE: [External] RE: Bickford Storage Pool

Good afternoon Ken,

I have scheduled Union Gas on December 5, 2017 at 5:00 - 5:30 p.m. at the Band Administration Building (978 Tashmoo Avenue, Sarnia, ON N7T 7H5). Please have a seat in lobby and i will come get you once we're ready. The committee request all presentations prior to meeting for review. Please send me an electronic copy of presentation no later than Wednesday, November 29, 2017 by 3:00 pm.

If you have any questions. please contact me.

Thank you
Courtney Jackson

Courtney Jackson
Environment Worker
Aamjiwnaang First Nation
978 Tashmoo Ave.
Sarnia, ON
N7T 7H5
(519) 336-8410 tel
(519) 336-0382 fax
https://www.facebook.com/AamjiwnaangEnvironment

Bkejawnong (Walpole Island) First Nation

From: McCorkle, Ken
Sent: August-03-17 4:45 PM
To: dan.miskokomon@wifn.org; 'Dean Jacobs'; 'Janet Macbeth'
Subject: Bickford Storage Pool

Dear: Chief Miskokomon, Dr. Jacobs & Janet:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
An integral part of this project is an Environmental Assessment that will be completed by Union Gas. As part of the Environmental Assessment, an archaeological assessment, cultural heritage study, and a species at risk study will be completed by an independent third party consultant.

Consultation with affected landowners, First Nations, government agencies and others will be carried out by Union Gas.

If you have any questions regarding this project, feel free to call or email me.

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle Sent: Tue 03/10/2017 4:27 PM
To: dan.miskokomon@wifn.org; Dean Jacobs; Janet Macbeth
Cc:
Subject: FW: Bickford Storage Pool
Message 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf

Dear Chief Miskokomon, Dr. Jacobs & Janet:
I am following up on an email (see below) that was forwarded to you on August 3, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
We can't change the past, but we can influence our future

Caldwell First Nation

From: McCorkle, Ken
Sent: August-03-17 4:47 PM
To: 'Louise Hillier'
Subject: Bickford Storage Pool

Dear: Chief Hillier:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
An integral part of this project is an Environmental Assessment that will be completed by Union Gas. As part of the Environmental Assessment, an archaeological assessment, cultural heritage study, and a species at risk study will be completed by an independent third party consultant.

Consultation with affected landowners, First Nations, government agencies and others will be carried out by Union Gas.

If you have any questions regarding this project, feel free to call or email me.

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle Sent: Tue 03/10/2017 4:24 PM
To: allen.deleary@caldwellfirstnation.ca
Cc:
Subject: FW: Bickford Storage Pool
Message 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf

Dear Mr. Deleary:
I am following up on an email (see below) that was forwarded to Chief Hillier on August 3, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
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Chippewas of Kettle and Stony Point First Nation

From: McCorkle, Ken
Sent: August-03-17 4:40 PM
To: Thomas Bressette; 'Lorraine George'
Subject: Bickford Storage Well

Dear: Chief Bressette & Lorraine:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
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If you have any questions regarding this project, feel free to call or email me.

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Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle Sent: Tue 03/10/2017 4:31 PM
To: Thomas Bressette; Lorraine George; Valerie George
Cc:
Subject: FW: Bickford Storage Well
Message 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf

Dear Chief Bressette, Lorraine & Valerie:
I am following up on an email (see below) that was forwarded to you on August 3, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
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Fax; 519-436-5392
Email: kmccorkle@uniongas.com
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From: Valerie George [mailto:Valerie.George@kettlepoint.org]
Sent: October-11-17 3:54 PM
To: Ken McCorkle; Thomas Bressette; Lorraine George
Subject: [External] RE: Bickford Storage Well

Good afternoon Ken

It was discussed at a recent CKSPFN Consultation and Accommodation Committee meeting to have you and other pertinent representatives of the Bickford Storage Well project meet with us internally. I will send you dates of availability (to-date) that we may be available and other documentation in the near future and will wait for your response.

Thank you for reaching out.

Regards,
Valerie George
Consultation Coordinator

Chippewas of the Thames First Nation

From: McCorkle, Ken
Sent: August-03-17 4:32 PM
To: 'myeengun@cottfn.com'; kriley@cottfn.com
Subject: Bickford Storage Pool

Dear: Chief Henry & Kelly:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
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Consultation with affected landowners, First Nations, government agencies and others will be carried out by Union Gas.

If you have any questions regarding this project, feel free to call or email me.

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle Sent: Tue 03/10/2017 4:35 PM
To: myeengun@cottfn.com; Kelly Riley
Cc:
Subject: FW: Bickford Storage Pool
Message 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf

Dear Chief Henry & Kelly:
I am following up on an email (see below) that was forwarded to you on August 3, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
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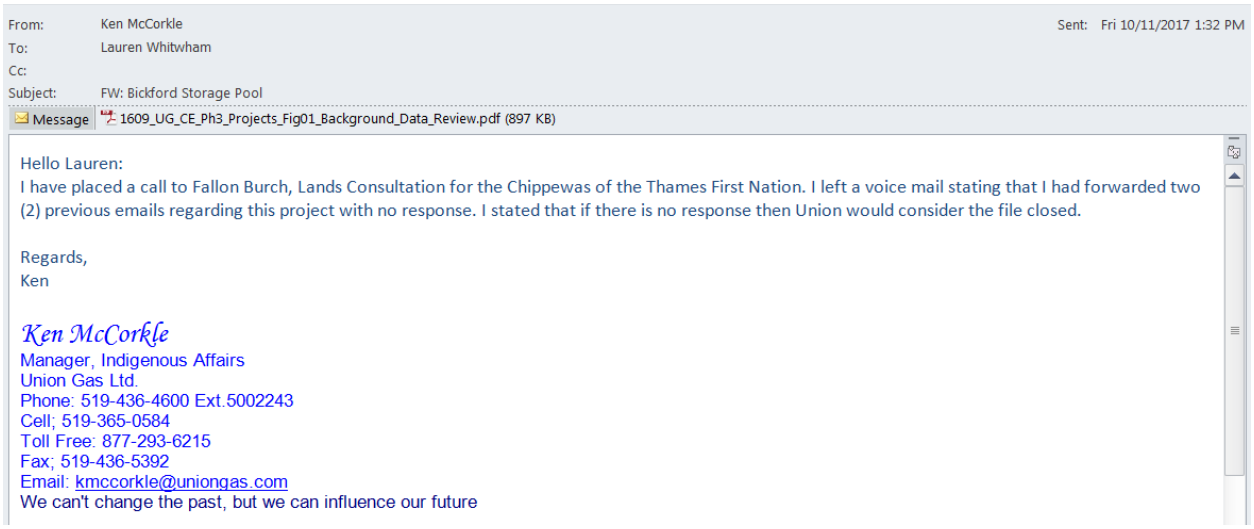

From: Ken McCorkle
Sent: Fri 10/11/2017 1:32 PM
To: Lauren Whitwham
Cc:
Subject: FW: Bickford Storage Pool
Message | 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf (897 KB)

Hello Lauren:
I have placed a call to Fallon Burch, Lands Consultation for the Chippewas of the Thames First Nation. I left a voice mail stating that I had forwarded two (2) previous emails regarding this project with no response. I stated that if there is no response then Union would consider the file closed.

Regards,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
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Email: kmccorkle@uniongas.com
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Oneida Nation of the Thames

From: Ken McCorkle
Sent: August-18-17 2:45 PM
To: Chief Randall Phillips (randall.phillips@oneida.on.ca)
Subject: Bickford Storage Pool

Dear: Chief Phillips:

Union Gas is proposing to drill three new wells in the Bickford Storage Pool. The new wells, Union Bickford 37 (UB 37), Union Bickford 38 (UB 38), and Union Bickford 39 (39), will be located in lot 6, concession 12 (Sombra Township) and will be drilled to a depth to be determined in the coming weeks. The existing wells in the Storage Pool are approximately 625 m deep. Union will also be constructing approximately 400 m of NPS 12" pipelines to connect the new wells to the existing gathering system. The location of the project is shown on the attached map.
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Consultation with affected landowners, First Nations, government agencies and others will be carried out by Union Gas.

If you have any questions regarding this project, feel free to call or email me.

Ken McCorkle
Manager, First Nations and Métis Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell: 519-365-0584

From: Ken McCorkle Sent: Tue 03/10/2017 4:20 PM
To: Chief Randall Phillips (randall.phillips@oneida.on.ca)
Cc:
Subject: FW: Bickford Storage Pool
Message 1609_UG_CE_Ph3_Projects_Fig01_Background_Data_Review.pdf

Dear Chief Phillips:
I am following up on an email (see below) that was forwarded to you on August 18, 2017. Could you please confirm if you require any further information or consultation regarding this project? I will await your response,

Miigwetch,
Ken

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Ltd.
Phone: 519-436-4600 Ext.5002243
Cell; 519-365-0584
Toll Free: 877-293-6215
Fax; 519-436-5392
Email: kmccorkle@uniongas.com
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MOE's Review and Confirmation

TO BE FILED WHEN RECEIVED