November 4, 2016

BY COURIER & RESS

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

Dear Ms. Walli:

Re: Union Gas Limited ("Union")
2017 Storage Enhancement Project
EB-2016-0322

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

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

Yours truly,

[original signed by]

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

cc: P. Duguay
Z. Crnojacki

ONTARIO ENERGY BOARD

IN THE MATTER OF the Ontario Energy Board Act, 1998, S.O. 1998, c.15, Schedule B; and in particular sections 90, 38(1) and 40(1) thereof.

AND IN THE MATTER OF an Application by Union Gas Limited for an Order varying the maximum operating pressure in the Dawn 156 Pool relating to the allowable pressure gradient in this natural gas storage pool in the Township of Dawn in the County of Lambton;

AND IN THE MATTER OF an Application by Union Gas Limited to the Ministry of Natural Resources for licences to drill wells in the Dawn 156 and Bentpath Storage Pools;

AND IN THE MATTER OF an Application by Union Gas Limited for leave to construct a natural gas pipeline and ancillary facilities in the Municipality of Chatham-Kent.

UNION GAS LIMTED

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1. Union Gas Limited (the "Applicant or Union") is proposing changes to the Dawn 156 and Bentpath Storage Pools in the Township of Dawn in the County of Lambton.

2. Union wishes to operate the Dawn 156 natural gas storage pool at a maximum pressure gradient of 17.2 kPa/m (0.76 psi per foot) as permitted under the CSA Standard Z341.1-14.

3. Union therefore applies for leave to operate the Dawn 156 natural gas storage pool above the 16.5 kpa/m (0.73 psi/foot) as identified in the EB-2007-0633 proceeding.

4. Union requests that the following condition be placed on the Dawn 156 Pool:

   Union Gas Limited shall not operate the storage pool above a pressure representing a pressure gradient of 17.2 kPa/m (0.76 psi/f) of depth without leave of the Board. Union Gas Limited shall provide summaries of an engineering study and geological study in support of any leave application and a formal confirmation from the Ministry of Natural Resources and Forestry that operating

the pool at the increased operating pressure complies with the requirements of the CSA Z341 standard.

5. The Applicant is also applying for an Order for Leave to Construct approximately 600 metres of NPS 12 pipeline.

6. 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 Dawn 156 Pool, one (1) new injection/withdrawal well in the Bentpath Pool, deepening and converting an observation well to an injection/withdrawal well in the Bentpath Pool and deepening three (3) injection/withdrawal wells in the Benthpath Pool.

7. Attached hereto as Schedule "A" is a map showing the general locations of the Dawn 156 and Bentpath designated storage areas.

8. In order to meet the proposed in-service date of September 2017, the Applicant requests an approval by February 2017. The Applicant therefore applies to the Board for a timely approval of this Application.

Dated at the Municipality of Chatham-Kent, Ontario this 4th day of November, 2016.

[original signed by]

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

Comments respecting this Application should be directed to:

W.T. (Bill) Wachsmuth, RPF
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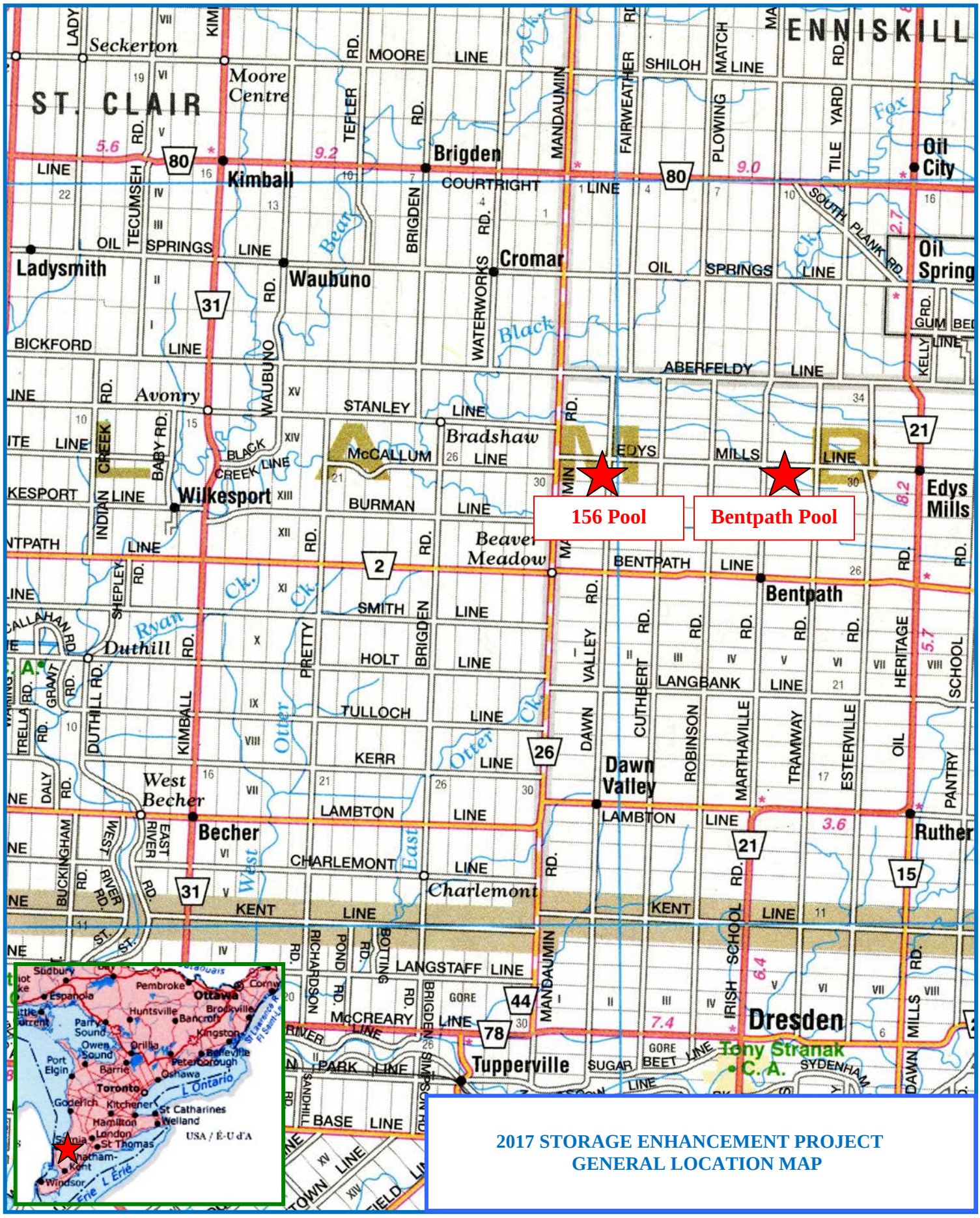


2017 STORAGE ENHANCEMENT PROJECT
GENERAL LOCATION MAP

2017 Storage Enhancement Project

INDEX

Schedules

PROJECT SUMMARY

1. Union Gas Limited ("Union") is proposing the 2017 Storage Enhancement Project ("the Project"), in order to meet growing market demand for incremental storage space and deliverability.

2. The Project will include Delta Pressuring the Dawn 156 Storage Pool ("Dawn 156") to 17.2 kPa/m (0.76 psi/ft), and increasing the deliverability in both the Dawn 156 and Bentpath Storage Pools ("Bentpath"). A map showing the two pools can be found at Schedule 1.

3. Increasing the pressure in Dawn 156 will represent a change in the operation of this pool from what was approved by the Ontario Energy Board ("OEB or Board") in the EB-2007-0633 proceeding. As part of this application, Union is requesting the Board attach a condition to the approval of this Project to allow for the increased pressure. Additional information regarding this vary request can be found below.

4. The Project facilities include:

   a. three new injection/withdrawal ("I/W") wells in Dawn 156;
   b. the abandonment of two wells at Dawn 156;
   c. workovers on 24 existing wells;
   d. new wellheads on 18 wells;
   e. the installation of Emergency Shutdown Valves on all I/W wells within Dawn 156;
   f. one new I/W within the Bentpath pool;

g. deepening and completion of an observation well (EB-2012-0391) in the Bentpath Pool, to be converted to an I/W well;
h. deepening of three I/W wells in the Bentpath pool;
i. construction of 600 metres of NPS 12 pipeline within the Dawn 156 and Bentpath pools;
j. construction of roadways and drilling pads to facilitate access to the well locations; and
k. abandon approximately 50 metres of NPS 6 and 150 metres of NPS 8 pipeline.

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

6. Union is proposing the Project to meet the growing demand for storage and in particular high deliverability storage in Ontario. Specifically, a natural gas fired generation facility has entered into a contract with Union to provide high deliverability storage for the efficient operation of the facility. The additional space provided by the Project, as a result of the delta pressuring of the Dawn 156 pool, will be sold through Union's normal practices.

7. This project is a continuation of past projects which Union has submitted to the OEB for approval. In developing this project Union determined that these two pools were the preferred Pools for increases in pressure and deliverability.

8. Union met with the MNRF on August 10, 2016 to discuss the Project. At that meeting Union provided the MNRF with details of the Project and copies of the engineering reports which were prepared for the Project. An updated presentation was provided to the MNRF on October

24, 2016. This presentation highlighted the changes in Union's proposal between August and October of 2016.

9. These studies provided to MNRF confirm that the Dawn 156 Pool can be operated safely at the increased pressure and support the enhancement of the deliverability at both Dawn 156 and Bentpath. Union will follow its standard construction and operating practices during construction and operation of the proposed facilities.

10. In the Board's Decision in Union's 2016 Storage Enhancement Project (EB-2015-0250) the Board made a number of recommendations that Union should implement in future applications. These recommendations requested that Union provide:

- summaries of the Engineering and Geological studies completed for the Project; and
- a formal letter from the MNRF confirming that it had reviewed the studies and that they complied with the relevant code requirements.

Details on how Union has dealt with these recommendations are included in this evidence.

10. 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.

11. 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 Pipelines;

- A Vary order allowing for the increase in pressure in the Dawn 156 Pool; and
- A favourable report to the Minister of Natural Resources and Forestry regarding the proposed well drilling.

12. 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 February 2017.

NEED FOR FACILITIES

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

14. The proposed pressure increase in Dawn 156 will create additional working capacity of 49,000 10^3m^3. This capacity will be used to meet the requirements of Union's storage service customers.

15. If this application is approved, the additional space will be sold at non-utility, market-based prices.

16. The Project will increase the deliverability in Union's storage system by 1,800 10^3m^3 per day (70,000 GJ per day). This increased deliverability has been contracted for by a natural gas fired generation plant.

17. This customer approached Union for the requested service. This Project will meet some of the requirements of this customer; Union is planning to make a second application in 2017 in order to meet the full requirements of the customer.

18. Economics have not been completed for the Project as the increases in space and deliverability will form part of Union's un-regulated storage business.

VARY REQUEST

19. In the EB-2007-0633 Dawn Deliverability proceeding, Union identified that the maximum operating pressure of the Dawn 156 pool would be 8,290 kPaa. This relates to a pressure gradient of 16.5 kPa/m (0.73 psi/ft).

20. Union is proposing to increase the pressure in the Dawn 156 pool to 17.2 kPa/m (0.76 psi/ft).

21. This increase in pressure is consistent with past applications submitted by Union and approved by the Board. (EB-2015-0250).

22. Schedule 2 is a table summarizing the current delta pressure of Union's pools with pressure gradients of 16.5 kPa/m (0.73 psi/ft) or greater.

23. If the Board approves the Project, Union will accept the same condition that was attached to the approval in the EB-2015-0250 proceeding. The condition in the EB-2015-0250 proceeding is as follows:

Union Gas shall not operate the storage pool above a pressure representing a pressure gradient of 17.2 kPa/m (0.76 psi/f) of depth without leave of the OEB. Union Gas Limited shall provide summaries of an engineering study and geological study in support of any leave application and a formal confirmation from the Ministry of Natural Resources and Forestry that operating the pool at the increased operating pressure complies with the requirements of the CSA Z341 standard.

GEOLOGY AND RESERVOIR ENGINEERING

Bentpath Pool

24. The Bentpath Pool was discovered in 1970 with the drilling of the Dawn 8-32-V well ("Union Bentpath 1") and was converted to natural gas storage in 1974. A location map showing the Bentpath Pool is shown at Schedule 1. Currently, the pool is operated and monitored using seven injection/withdrawal wells and five observation wells. The Bentpath Pool has a total capacity of 218,800 10^3m^3 and a working capacity of 153,000 10^3m^3. The pool operates between a cushion pressure of 2,760 kPaa and a maximum pressure of 8,200 kPaa.

25. The Bentpath Pool will continue to operate at the current working capacity and operating pressures.

26. A map showing the Bentpath Pool Designated Storage Area ("DSA") and Guelph structure is included at Schedule 3. The geological interpretation was completed using 3D seismic data 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 wells to be deepened and the new proposed well are also shown on Schedule 3.

27. A cross section illustrating the reef structure of the Bentpath Pool is provided at Schedule 4. 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 flank 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 22.5 m to 28.0 m. The A2 Anhydrite overlying the crest of the reef ranges in thickness from 0.4 m to 2.5 m.

Dawn 156 Pool

28. The Dawn 156 Pool will have three new wells drilled, two wells abandoned and a pressure increase of 330 kPaa as part of the Project. For the deliverability portion of the Project, one new well will be drilled. For the Delta Pressuring portion of the Project, there will be two new wells drilled, two wells abandoned and a pressure increase.

29. The Dawn 156 Pool was discovered in 1952 with the drilling of the Union Dawn 156 well and was converted to natural gas storage in 1962. A location map showing the Dawn 156 Pool is shown at Schedule 1. Currently, the pool is operated and monitored using 22 injection/withdrawal wells and five observation wells. The Dawn 156 Pool has a total capacity of 1,023,300 10^3m^3 and a working capacity of 746,700 10^3m^3. The pool operates between a cushion pressure of 2,413 kPaa and a maximum pressure of 7,960 kPaa.

30. A map showing the Dawn 156 Pool DSA, Guelph structure and depth-to-crest is included at Schedule 5. The geological interpretation was completed using 3D seismic data and well information. The map is contoured in 10 metre intervals and shows the reef reaching approximately 100 metres above the regional Guelph surface. The minimum depth-to-crest is 502.9 metres.

31. A map showing the location of the wells to be abandoned and the new proposed wells is included at Schedule 6.

32. A cross section illustrating the reef structure of the Dawn 156 Pool is provided at Schedule 7. The cross section illustrates the relationship of the pinnacle reef to the surrounding formations. The A2 Salt, A1 Carbonate and A1 Anhydrite units pinch out against the flank 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 24.7 to 26.4 metres. The A2 Anhydrite is thin but continuous over the reef and ranges in thickness from 0.6 to 5.2 metres.

33. Union is proposing to operate the Dawn 156 Pool at 8,290 kPaa. This equates to a pressure gradient of 17.2 kPa/m (0.76 psi/ft). This will increase the working capacity from 746,700 10^3m^3 to 795,700 10^3m^3, which is an incremental capacity gain of 49,000 10^3m^3.

34. The MOP of the gathering lines in the pool is 8,620 kPa.

35. In order to ensure the proposed maximum pressure gradient complies with CSA Z341.1-14, an engineering study was conducted by Geofirma Engineering Ltd. for the Dawn 156 Pool. This engineering study incorporated data from geomechanical and regional in-situ tests completed on the reservoir and caprock formations.

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

MNRF Review

37. 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 August 10, 2016 to discuss the Project.

38. At that meeting Union provided the MNRF with a presentation that summarized the Project. An updated presentation was sent to MNRF on October 24, 2016. A copy of the updated presentation can be found at Schedule 8.

39. Union provided the MNRF the following reports:

- A "What If" Analysis of Hazards and Operability Issues Report (HAZOP) for both pools;
- An Assessment of Neighbouring Activities for both pools;
- An Engineering Assessment for the Dawn 156 Pool (An Engineering Assessment for the Bentpath Pool was provided to MNRF as part of the EB-2012-0391 proceeding).

40. Executive Summaries of the reports are provided at Schedule 9.

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

42. 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

43. A total of four I/W wells will be drilled as part of this Project. Four existing wells will be deepened and two existing wells will be abandoned as part of the Project.

45. Approximately 600 metres of NPS 12 gathering lines are required to connect the wells to the existing gathering systems.

46. A drawing of the Proposed Facilities can be found at Schedules 10 and 11.

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

Wells

48. The development of the 2017 Storage Enhancement Project will include four new I/W wells (Union Dawn 286, Union Dawn 287, Union Dawn 288 and Union Bentpath 14) and the deepening of four existing wells (Union Bentpath 1, Union Bentpath 8, Union Bentpath 12 and Union Bentpath 13) in order to allow increased deliverability and delta pressuring.

49. The locations of these wells are illustrated at Schedules 10 and 11. A copy of the MNRF Applications for Well License (Form 1) and survey maps are included at Schedule 12.

50. The wells will be drilled using cable tool drilling methods. Schedule 13 describes the drilling procedure that Union will employ for the drilling. Schedule 14 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).*

51. Union will install emergency shut-down valves at existing I/W wells in Dawn 156 and on the proposed I/W wells in both Pools, in accordance with CSA Z341.1-14 clause 9.3. Emergency shut-down valves were installed on all existing I/W wells in the Bentpath pool in 2013.

52. Eighteen wells in the Dawn 156 Pool will receive a new wellhead. Wellhead replacements will not be required in Bentpath as they were replaced in 2013.

53. Temporary drilling pads will be constructed in the fall of 2016. 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.

54. Access to the proposed wells will be provided by permanent all weather access roads as shown at Schedules 10 and 11.

55. In order to begin well drilling in 2017, materials will be ordered in November 2016. A Project schedule which identifies the timing of well drilling can be found at Schedule 15.

56. Two wells are proposed to be abandoned as part of this Project. Wells Dawn 190 and Dawn 223, both located in the Dawn 156 pool will be abandoned in accordance with CSA Z341.1-14 and the OGSRA *Provincial Operating Standards (Version 2.0)* Union is proposing to abandon these wells based on the results of the modeling completed by Geofirma Engineering Ltd. to ensure that the Dawn 156 Pool can be safely delta-pressured.

Pipeline Facilities

57. The Project will require approximately 600 metres of NPS 12 gathering lines. The location of the pipelines can be found at Schedules 10 and 11. The proposed pipelines are designed to transport the expected flows to and from the new wells. These pipelines will be constructed during the spring and summer of 2017 using the existing access road network. A Project schedule can be found at Schedule 15.

58. Design and pipe specifications for the proposed storage gathering pipelines are outlined at Schedule 16. All the design specifications are in accordance with the Ontario Regulation 210/01 for Oil and Gas Pipeline Systems.

59. The Maximum Operating Pressure ("MOP") for the proposed gathering pipelines is 8620 kPa.

60. 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, 0.625 for pipe within a station and a design factor of 0.8. For a pipeline within a Class 2 location, Union uses location factors of 0.9 for general locations, 0.625 for road crossings, 0.625 for pipe within a station and a design factor of 0.8.

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

62. Schedule 17 describes the techniques and methods of construction that Union will employ for the construction of the proposed pipelines.

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

64. As stated above Union is proposing to abandon two wells as part of this Project. The gathering lines to these wells will be abandoned in place. Approximately 50 metres of NPS 6 and 150 metres of NPS 8 will be abandoned in place. These pipelines will be abandoned following the TSSA Abandonment Guidelines which can be found at Schedule 18.

ENVIRONMENTAL MATTERS

65. The EPP for this project is found at Schedule 19. The EPP has been completed to meet the intent of the OEB's Environmental Guidelines. The EPP was sent to the OPCC on October 3, 2016 for their review. An update letter to the EPP was sent to the OPCC on October 25, 2016. A copy of the update can be found at Schedule 20.

66. The location of the roads and pipelines were determined through discussions with the directly affected landowners. These locations are acceptable to the landowners.

67. 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.

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

69. 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.

70. 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.

71. 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

72. Union has discussed the Proposed Project with the directly affected landowners (and tenants where applicable). During these discussions Union's Land Agent described to the landowner the Proposed Facilities which would be constructed on their property. As well, Union identified the site-specific mitigation measures which would be implemented on their property.

Well Drilling, Gathering Pipelines and Roads

73. The location of the gathering pipelines, roads and wells has been discussed with the directly affected landowners.

74. Drilling of the wells, construction of the gathering lines and roadways will be undertaken pursuant to the existing Storage Lease Agreements Union has with the landowners.

75. Although Union has the authority it requires to install the gathering lines pursuant to the existing Storage Lease Agreements, Union will secure easements for the gathering lines in order to clearly define their location and register them on title. Union's Grant of Easement form is attached at Schedule 21. Union will obtain these easements after construction.

76. The location of the wells, roads and pipelines can be found at Schedules 10 and 11.

77. Union has discussed the location and construction methods of permanent all-weather access roadways with the directly affected landowner. 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 10 and 11.

78. Three of six landowners have signed a Letter of Acknowledgement stating that they agree to the location of the Proposed Facilities and have no objection to the commencement of drilling of the wells and construction of the pipelines and the permanent all-weather access roadways. Union will continue to work with the unsigned landowners to obtain Letters of Acknowledgment. No landowners have objected to the Project however, some landowners have not yet signed the Acknowledgement. These Acknowledgements can be found at Schedule 22.

79. Compensation for all crop damages and other surface impacts from the construction of the wells, pipelines and roadways will be paid to the landowner or tenant farmer where applicable.

After construction, negotiations with the landowner will continue where necessary to settle any damages that were not foreseen or compensated for prior to construction. At the conclusion of construction, a Full and Final Release from each of the directly affected landowners and tenant farmers will be obtained.

Landowner Contacts

80. Union has implemented a comprehensive program to provide landowners, tenants, and other interested persons with information regarding the proposed development. Project information was distributed through individual meetings.

Construction Monitoring and Follow-Up

81. During the construction phase, a Landowner Relations Agent will be available to ensure that commitments made to the landowners 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.

FIRST NATIONS AND METIS CONSULTATION

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

83. Union had made initial contact with the consulted First Nations and Métis on May 9, 2015. Communications have taken place over the past several months with the First Nations that have responded.

84. Union has an extensive data base and knowledge of First Nations and Métis organizations in Ontario and consults with the Tribal organizations and the data bases of the Ministry of Aboriginal Affairs and Northern Development Canada and Provincial Ministry of Energy to ensure consultation is carried out with the most appropriate groups.

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

86. The following First Nations and Métis were notified about the project.

May 9, 2016	Emailed Chief Leslee White-eye and Roland Elijah, Consultation Manager of the Chippewa of the Thames First Nation
May 9, 2016	Emailed Chief Louise Hillier Caldwell First Nation
May 9, 2016	Emailed Chief Chris Plain and Sharilyn Johnston, Environmental Coordinator of Aamjiwnaang First Nation
May 9, 2016	Emailed Chief Dan Miskokomon, Dean Jacobs and Jared Macbeth, Consultation Manager of Walpole Island First Nation
May 9, 2016	Emailed Chief Tom Bressette and Lorraine George, Consultation Manager of Kettle and Stoney Point First Nation

87. The consultation included:

- Meeting with the Aamjiwnaang First Nations Environmental Committee and Unions Manager of First Nations, Manager Underground Storage and the Principal Reservoir Engineer (July 5, 2016). The Committee requested a copy of the Risk Analysis Report and an update presentation on Union's Emergency procedures. Union has provided the

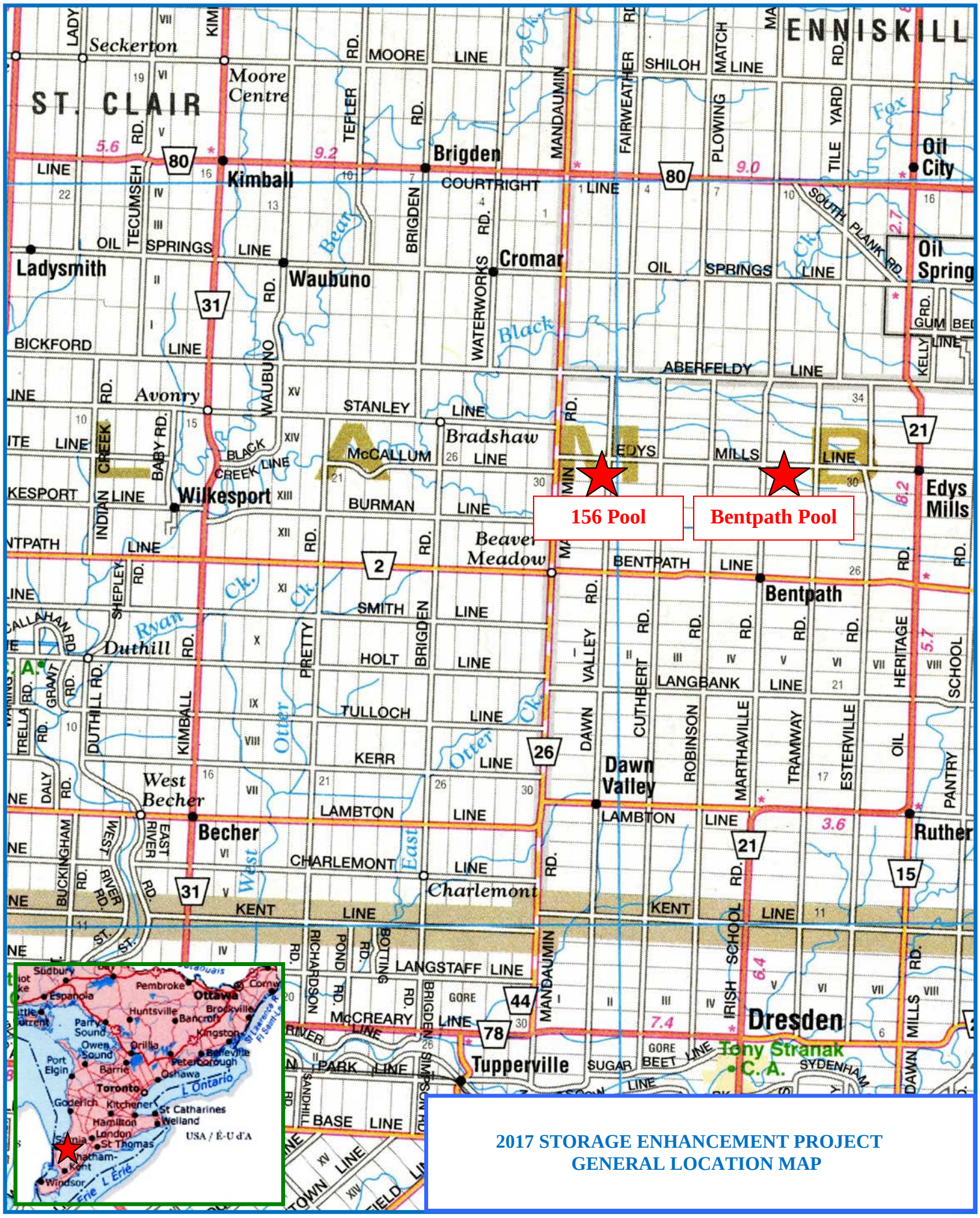
Aamjiwnaang First Nations with a copy of the Risk Analysis Report and making arrangements for a presentation on Union's Emergency procedures.

- Fallon Burch, Consultation Manager for the Chippewa's of the Thames First Nation requested a meeting with Union to determine any impacts. From an initial discussion on the work to be completed no issues arose.

88. To date, no issues have been brought forward regarding the project. Due to the location and specifics of the project, Union is not expecting issues to be brought forward by the First Nations or Métis for the project.

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

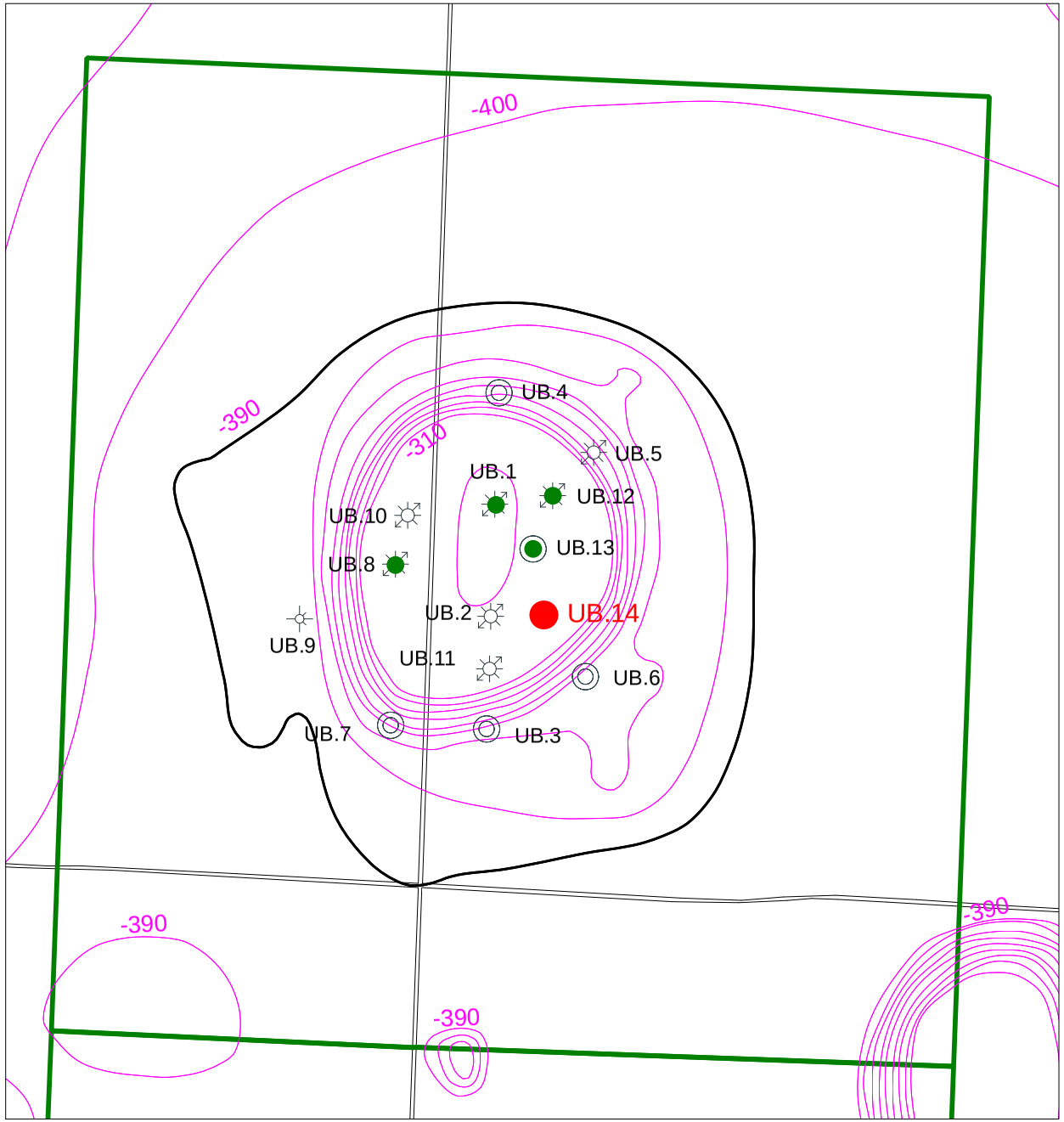
90. When Union completes the necessary archaeological assessments for the project, Union will consult with and provide the result of the surveys to any First Nations or Métis upon their request.



2017 STORAGE ENHANCEMENT PROJECT
GENERAL LOCATION MAP

Union Gas Pools Delta Pressured at or Above 16.5 kPa/m (0.73 psi/ft)

Storage Pool	Current Gradient (kPa/m)	Year Delta Pressured to Current Gradient	Maximum Operating Pressure (kPaa) (Wellhead)
Bentpath	17.2	2013	8,200
Bentpath East	17.2	2016	7,850
Bickford	17.2	2015	9,000
Bluewater	16.5	2009	9,780
Booth Creek	17.2	2016	8,350
Dawn 47-49	17.2	2014	7,920
Dawn 59-85	17.2	2016	7,930
Dawn 156	16.5	2001	7,960
Dawn 167	17.2	2014	7,800
Dow A	16.5	2008	10,690
Enniskillen 28	17.2	2015	9,090
Heritage	16.5	2009	10,620
Mandaumin	16.5	2016	9,820
Oil City	17.2	2015	8,610
Oil Springs East	17.2	2015	8,390
Payne	16.5	2008	9,250
Rosedale	17.2	2013	8,210
Terminus	16.5	2001	7,720
Waubuno	16.5	2004	8,670



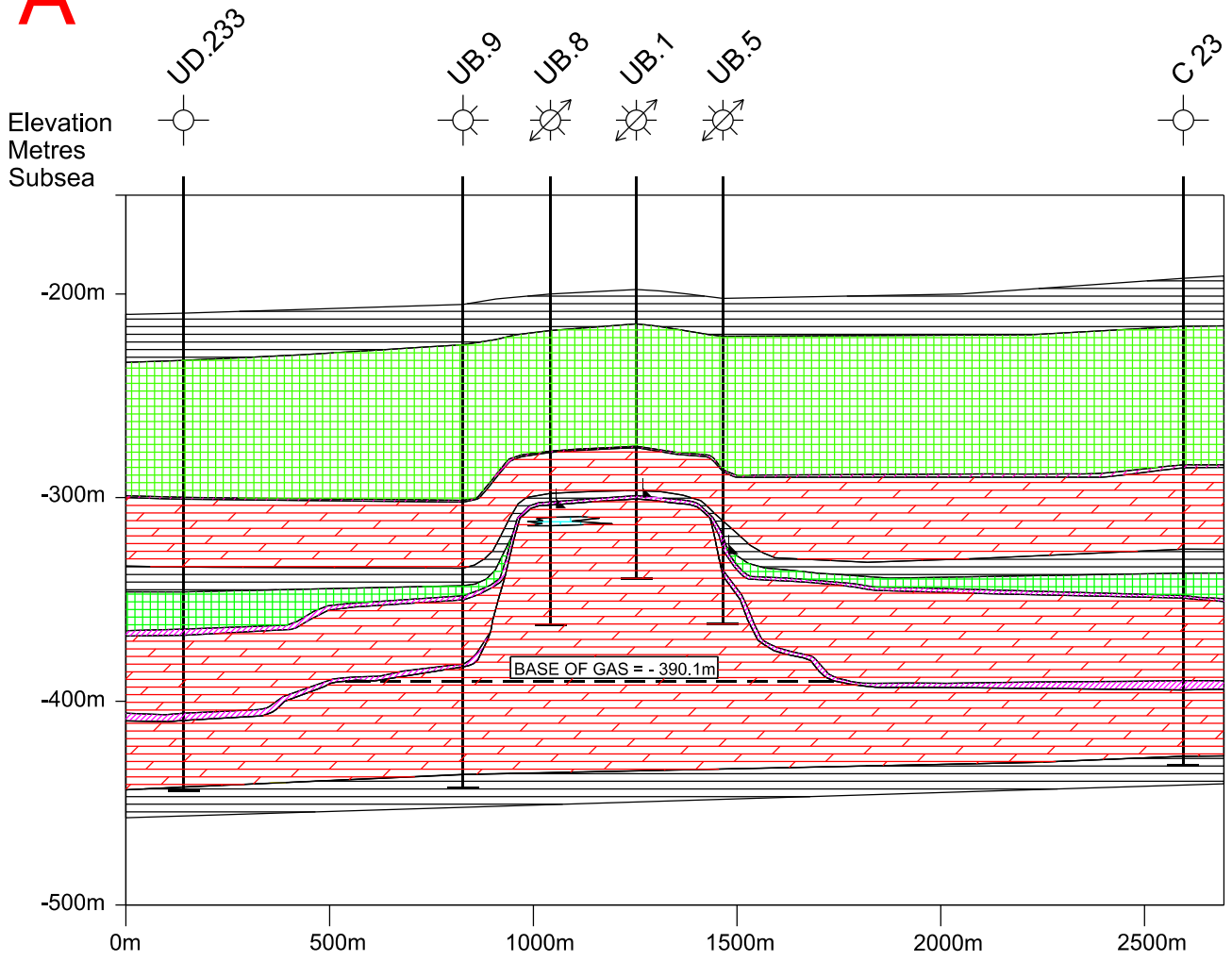
LEGEND

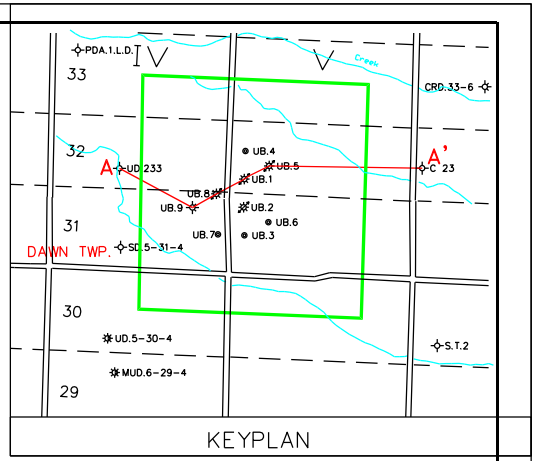
- PROPOSED WELL TO BE DEEPENED
- PROPOSED NEW WELL
- GAS SHOW, ABANDONED
- OBSERVATION
- NATURAL GAS STORAGE
- DSA - UNION GAS
- GUELPH CONTOUR
- REEF FOOTPRINT

SCALE

REMARKS	UNION GAS LIMITED
	BENTPATH POOL GUELPH STRUCTURE
DRAWN BY	DATE 2016 — SCALE As Shown
CHECKED BY	DATE — PROJECT CODE

Filed: 2016-11-04
EB-2016-0322
Schedule 3





LEGEND

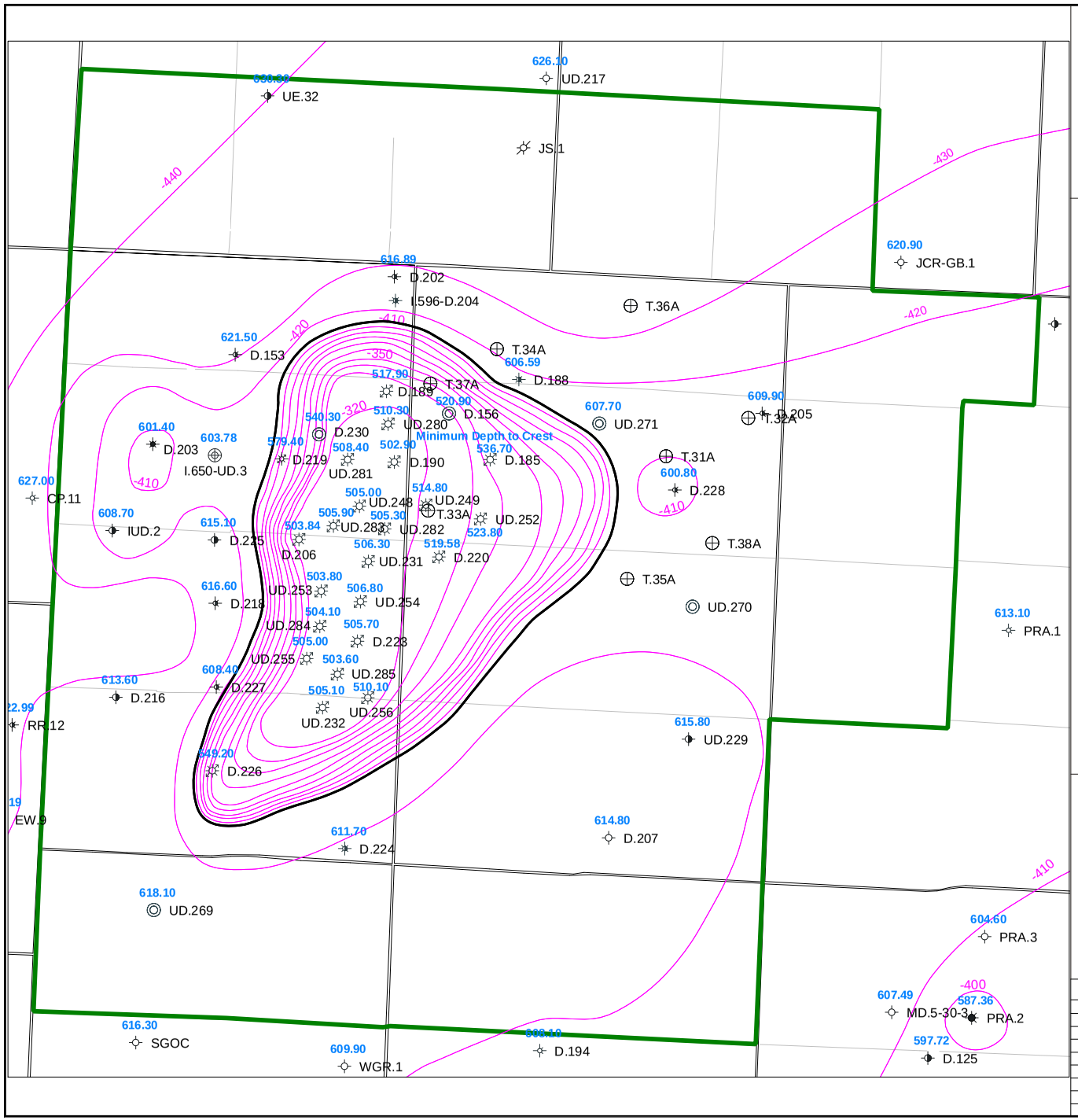
- GAS SHOW, SUSP/ABD
- INJECTION/WITHDRAWAL
- DRY HOLE, ABANDONED

REMARKS
- VERTICAL EXAGGERATION = 5X
- HORIZONTAL SCALE AS SHOWN
- ⌊ CASING SET POINTS
- ROCHESTER THICKNESS DERIVED FROM UNION DAWN 12
- B ANHYDRITE ASSUMED FOR UD.233 & C.23
- A2 ANHYDRITE ASSUMED FOR C.23
- LITHOLOGY ASSUMED FOR UD.233 & C.23
- REVISED 20 AUG 14 - J.L.W.

BENTPATH POOL

CROSS SECTION A-A'

DRAWN BY JW	DATE 19 JUL 2014	SCALE As Shown
CHECKED BY	DATE	AC/DRAW CODE BENXSAA



LEGEND

- DSA - UNION GAS
- REEF FOOTPRINT
- 502.90 GUELPH SUBSEA ELEVATION
- GUELPH CONTOURS
- DRY HOLE, UNKNOWN
- DRY HOLE, ABANDONED
- GAS PRODUCER, ABANDONED
- GAS PRODUCER, OIL SHOW, ABANDONED
- GAS SHOW, ABANDONED
- NATURAL GAS STORAGE
- NATURAL GAS STORAGE, ABANDONED
- OBSERVATION
- OBSERVATION, ABANDONED
- OIL PRODUCER, GAS PRODUCER, ABANDONED
- OIL PRODUCER, GAS SHOW
- OIL SHOW, GAS SHOW, ABANDONED
- OIL SHOW, ABANDONED
- STRATIGRAPHIC TEST WELL

SCALE

300 0 300 600 900 m

REMARKS

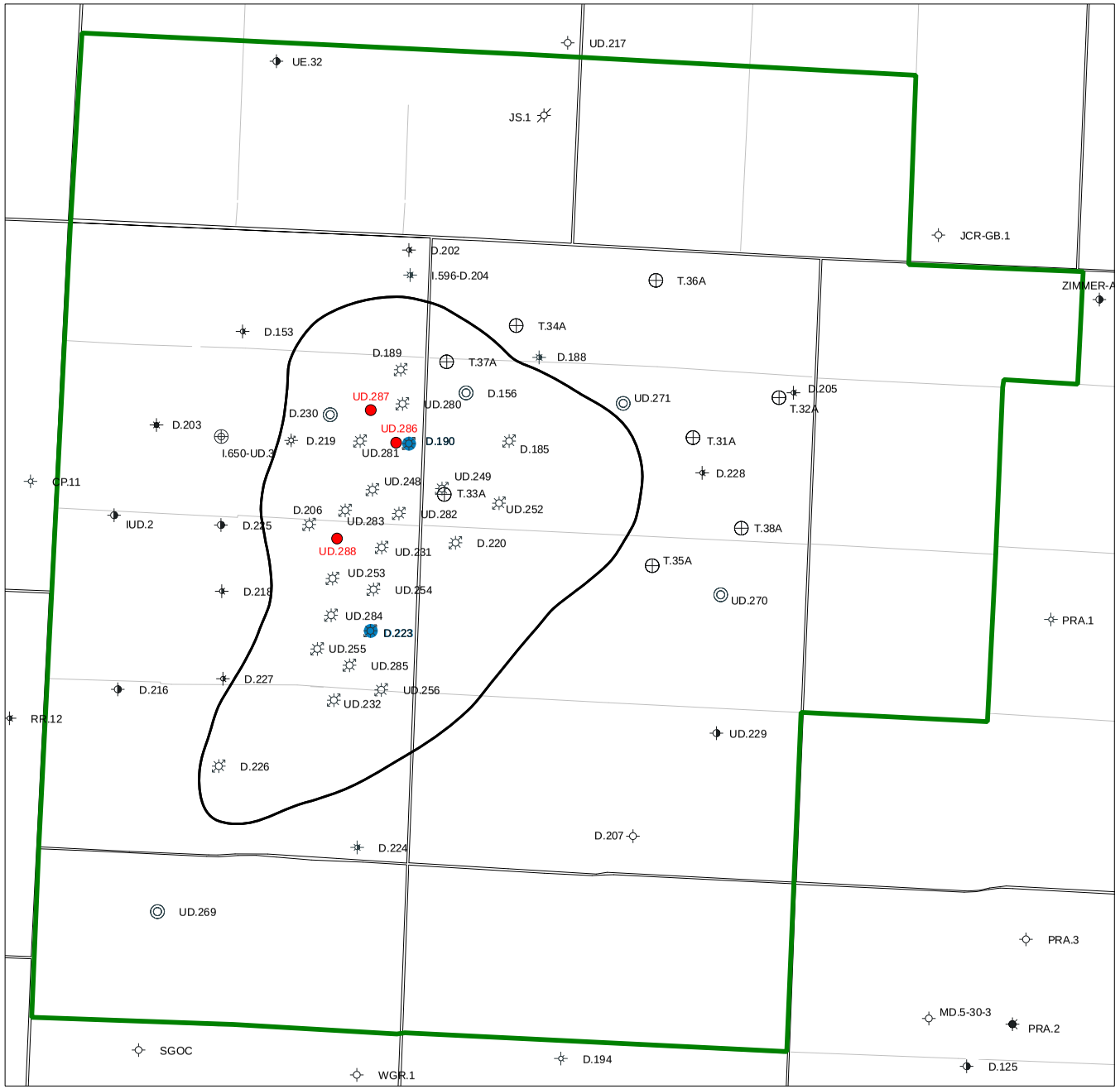
DAWN 156 POOL

DEPTH TO CREST AND GUELPH STRUCTURE MAP

DRAWN BY | DATE | SCALE

CHECKED BY | DATE | PROJECT CODE

Filed: 2016-11-04
EB-2016-0322
Schedule 5



LEGEND

- DSA - UNION GAS
- REEF FOOTPRINT
- PROPOSED NEW WELLS
- PROPOSED WELLS TO BE ABANDONED
- DRY HOLE, UNKNOWN
- DRY HOLE, ABANDONED
- GAS PRODUCER, ABANDONED
- GAS PRODUCER, OIL SHOW, ABANDONED
- GAS SHOW, ABANDONED
- NATURAL GAS STORAGE
- NATURAL GAS STORAGE, ABANDONED
- OBSERVATION
- OBSERVATION, ABANDONED
- OIL PRODUCER, GAS PRODUCER, ABANDONED
- OIL PRODUCER, GAS SHOW
- OIL SHOW, GAS SHOW, ABANDONED
- OIL SHOW, ABANDONED
- STRATIGRAPHIC TEST WELL

SCALE

300 0 300 600 900 m

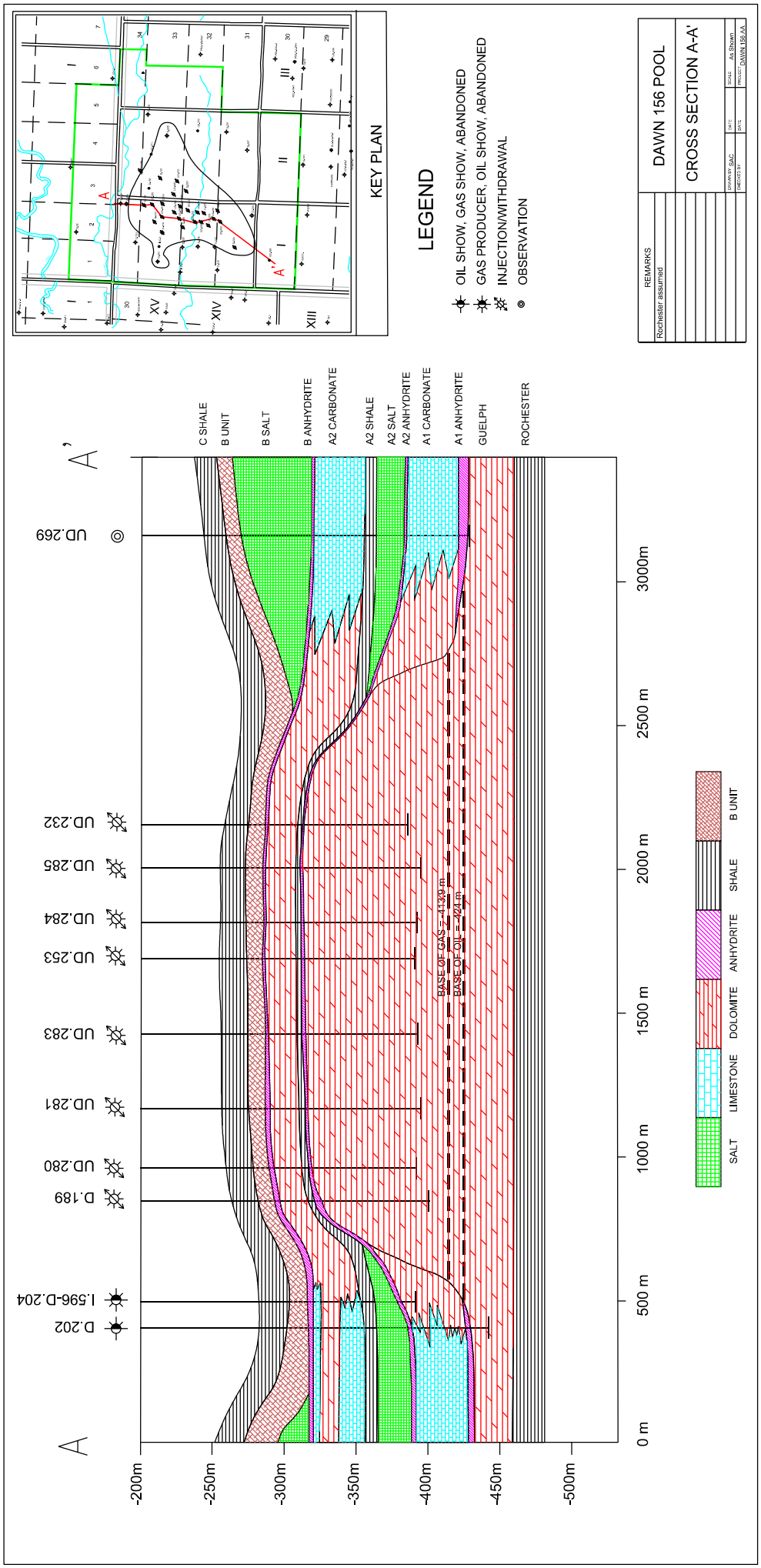
REMARKS

DAWN 156 POOL

PROPOSED NEW AND ABANDONED WELLS

DRAWN BY	DATE	SCALE
CHECKED BY	DATE	PROJECT CODE

Filed: 2016-11-04
EB-2016-0322
Schedule 6


KEY PLAN
LEGEND
OIL SHOW, GAS SHOW, ABANDONED
GAS PRODUCER, OIL SHOW, ABANDONED
INJECTION/WITHDRAWAL
OBSERVATION
REMARKS
Rochester assumed
DAWN 156 POOL
CROSS SECTION A-A'
A
A'
UD.269
UD.232
UD.285
UD.284
UD.253
UD.283
UD.281
UD.280
D.189
1.596-D.204
D.202
C SHALE
B UNIT
B SALT
B ANHYDRITE
A2 CARBONATE
A2 SHALE
A2 SALT
A2 ANHYDRITE
A1 CARBONATE
A1 ANHYDRITE
GUELPH
ROCHESTER
BASE OF GAS = -413.9 m
BASE OF OIL = -424 m
-200m
-250m
-300m
-350m
-400m
-450m
-500m
0 m
500 m
1000 m
1500 m
2000 m
2500 m
3000m
SALT
LIMESTONE
DOLOMITE
ANHYDRITE
SHALE
B UNIT

2017 Storage Enhancement Project

Ministry of Natural Resources and Forestry

August 10, 2016

Updated October 19, 2016

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Project Purpose

Increase storage capacity by 49,000 10^3m^3 (1.7 Bcf) through the delta pressuring of the Dawn 156 pool to 17.2 kPa/m (0.76 psi/ft) in 2017

Increase deliverability by 70,000 GJ/day through well drilling and deepening in the Dawn 156 and Bentpath pools in 2017

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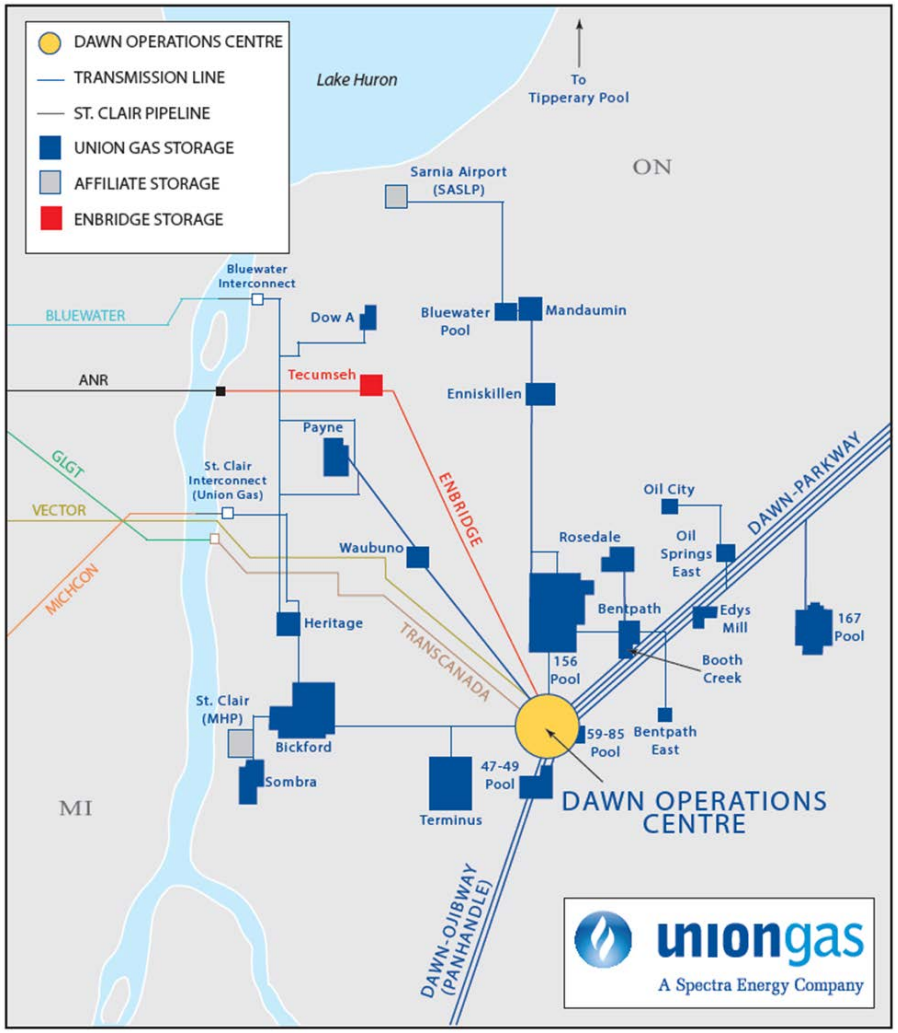
EB-2016-0322
Schedule 8

Pool Location



Filed: 2016-11-04
EB-2016-0322
Schedule 8

Background

- The delta pressuring program has been ongoing since 2001
- Union began delta pressuring pools to 16.5 kPa/m (0.73 psi/ft) in 2001
- Twelve pools delta pressured to 17.2 kPa/m (0.76 psi/ft) beginning in 2013
- Union retained Geofirma in 2011 to complete an engineering assessment of delta pressuring
- Geofirma has completed engineering assessments for all pools delta pressured to 17.2 kPa/m (0.76 psi/ft)
- Deliverability Projects have been constructed to meet demand as required

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Increase Storage Capacity

- Delta pressure the Dawn 156 pool to 17.2 kPa/m (0.76 psi/ft)
  - Increase the operating pressure to 8,290 kPaa (330 kPa)
  - Increase total capacity to 1,023,300 10^3m^3 (49,000 10^3m^3)
- Dawn 156 facilities required
  - All wells will be upgraded to meet CSA Z341.1-14
  - Wellheads will be replaced at 18 wells
  - ESV's will be installed on all I/W wells
  - Abandon wells D.190 and D.223
  - Drill two new wells (UD.286, UD.288)
  - Construct approximately 285 m of NPS 12 pipeline
- Project will be in-service by September 1, 2017

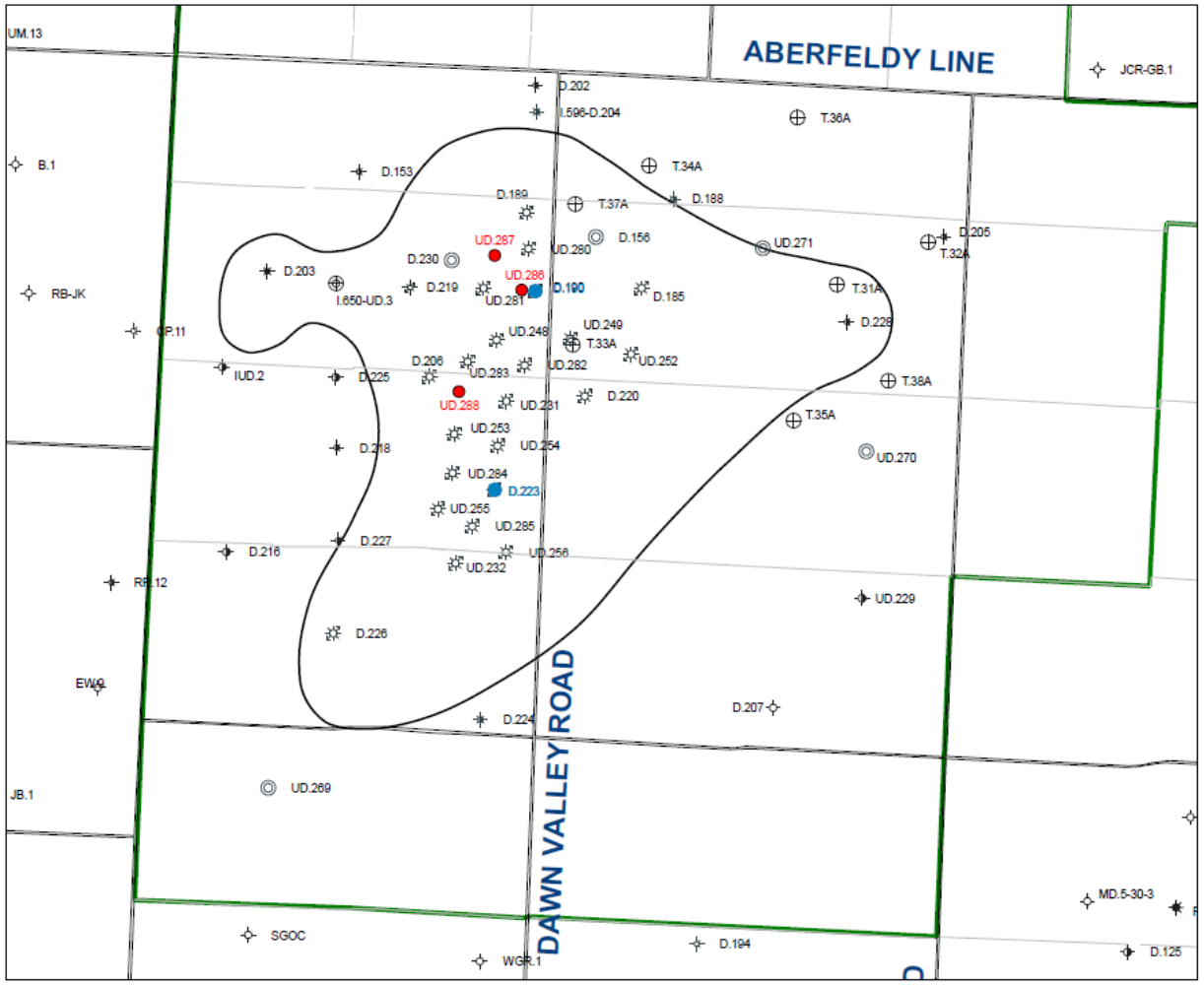
Filed: 2016-11-04
EB-2016-0322
Schedule 8

Increase Deliverability

- Increase deliverability by 70,000 GJ/day by drilling/deepening wells in Bentpath and Dawn 156 pools
- Bentpath Pool
  - Deepen UB.12 to 575 mKB (72 m)
  - Deepen well UB.13 to 575 mKB (78 m)
  - Deepen well UB.1 to 574 mKB (36 m)
  - Deepen well UB.8 to 577 mKB (13 m)
  - Drill one new well (UB.14)
  - Install ESV's on UB.13 and UB.14
  - Construct approximately 230 m of NPS 12 pipeline
- Dawn 156 Pool
  - Drill one new well (UD.287)
  - Construct approximately 170 m of NPS 12 pipeline

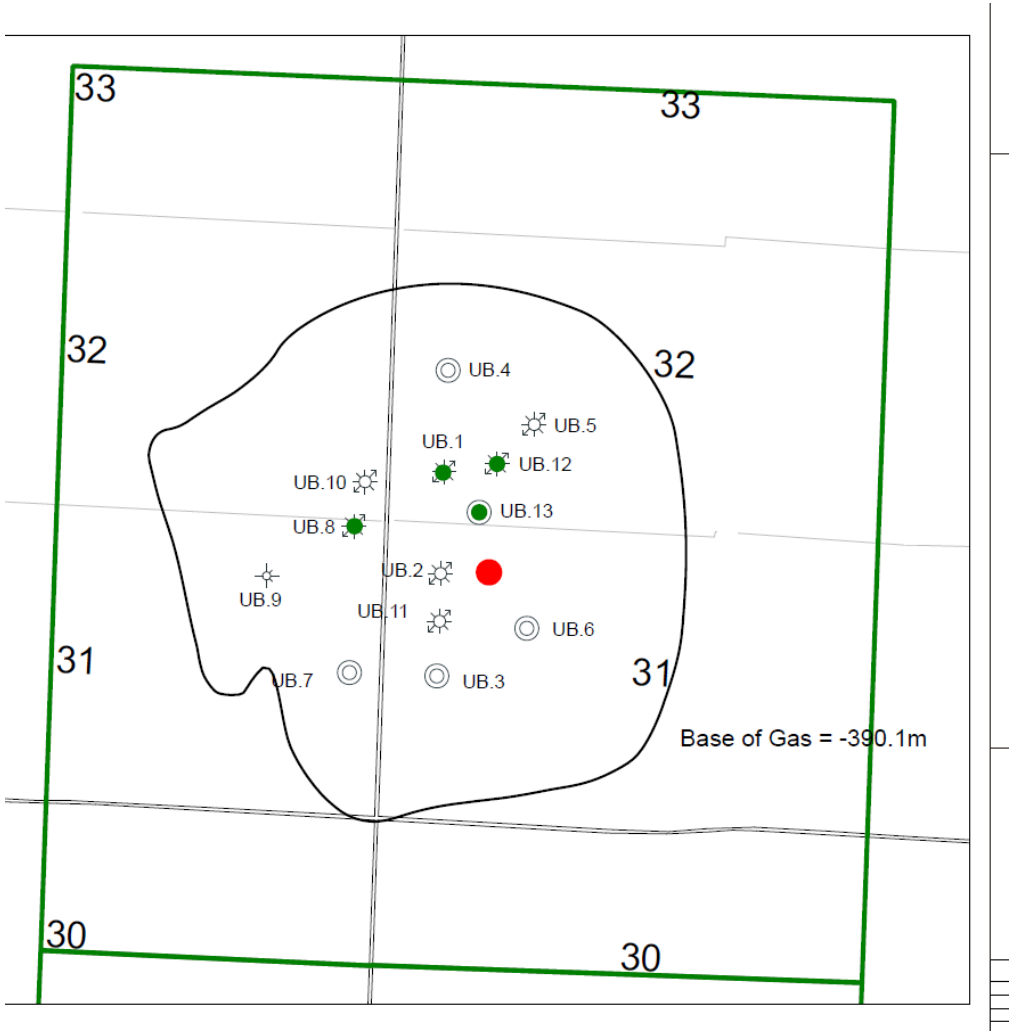
Filed: 2016-11-04
EB-2016-0322
Schedule 8

Dawn 156



Filed: 2016-11-04
EB-2016-0322
Schedule 8

Bentpath (Updated)



Filed: 2016-11-04
EB-2016-0322
Schedule 8

Data and Reports

- New/updated reports for each pool were generated for this project:
  - Engineering Assessment of the Dawn 156 Pool– Geofirma Engineering Ltd.
  - Risk Assessment – “What If” Analysis of Hazards and Operability Issues Report (“HAZOP”) (Dawn 156 and the Bentpath Pools)
  - Assessment of Neighbouring Activities (Dawn 156 and the Bentpath Pools)

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Dawn 156 Pool Modelling Report

- An engineering analysis of the Dawn 156 Pool was completed by Geofirma Engineering Limited
- The model assesses the potential for pressure and gas propagation in the caprock, and the geomechanical response to pressure changes in the reservoir
- The Dawn 156 Pool was modelled to 18.1 kPa/m (0.80 psi/ft)
- The models concluded that the increased operating pressure is below 80% of the fracture gradient as specified in the CSA code

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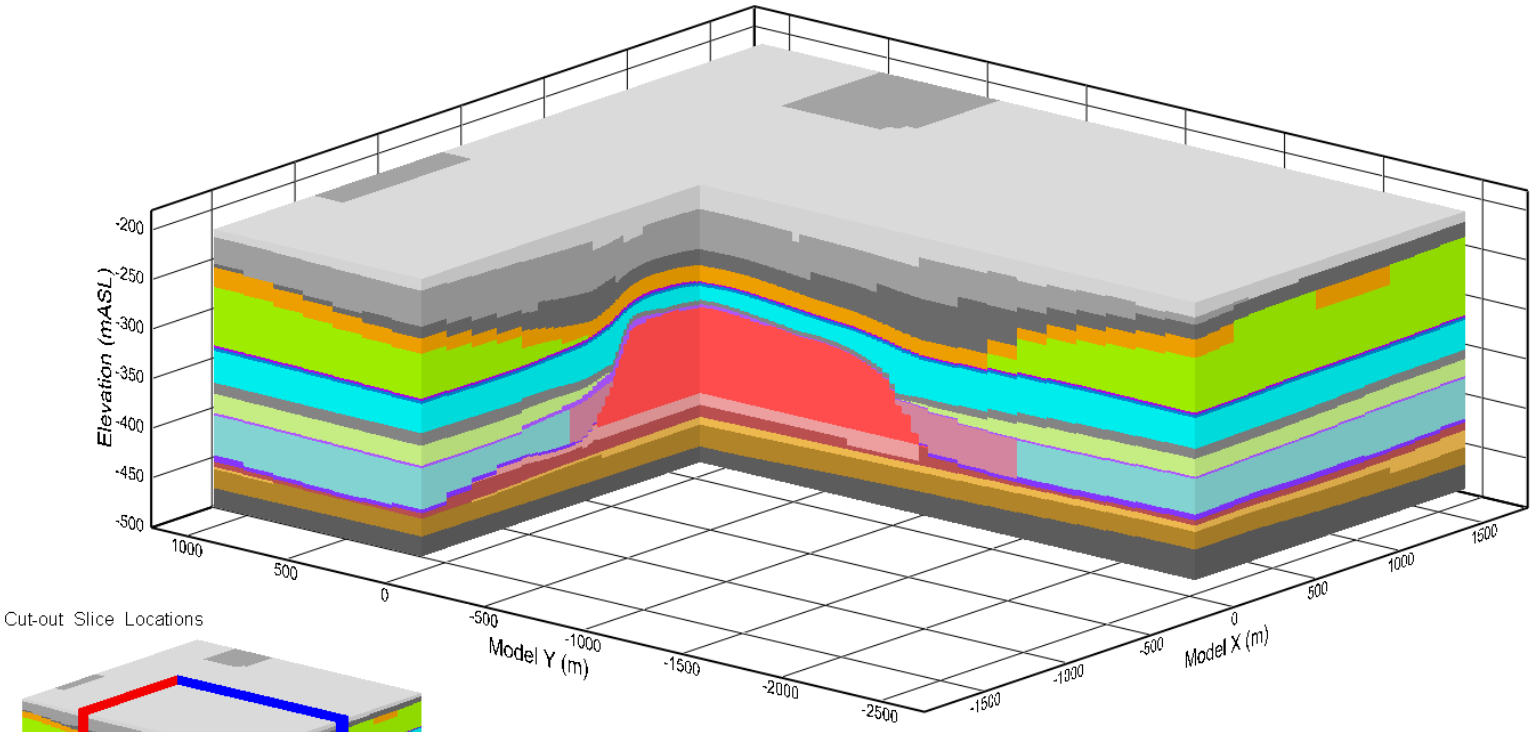
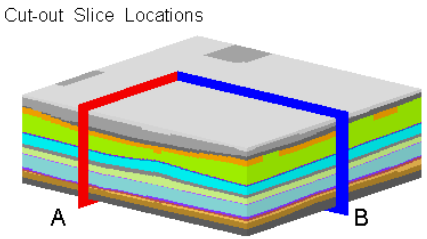
EB-2016-0322
Schedule 8

3D Cutaway View of TOUGH2 Model



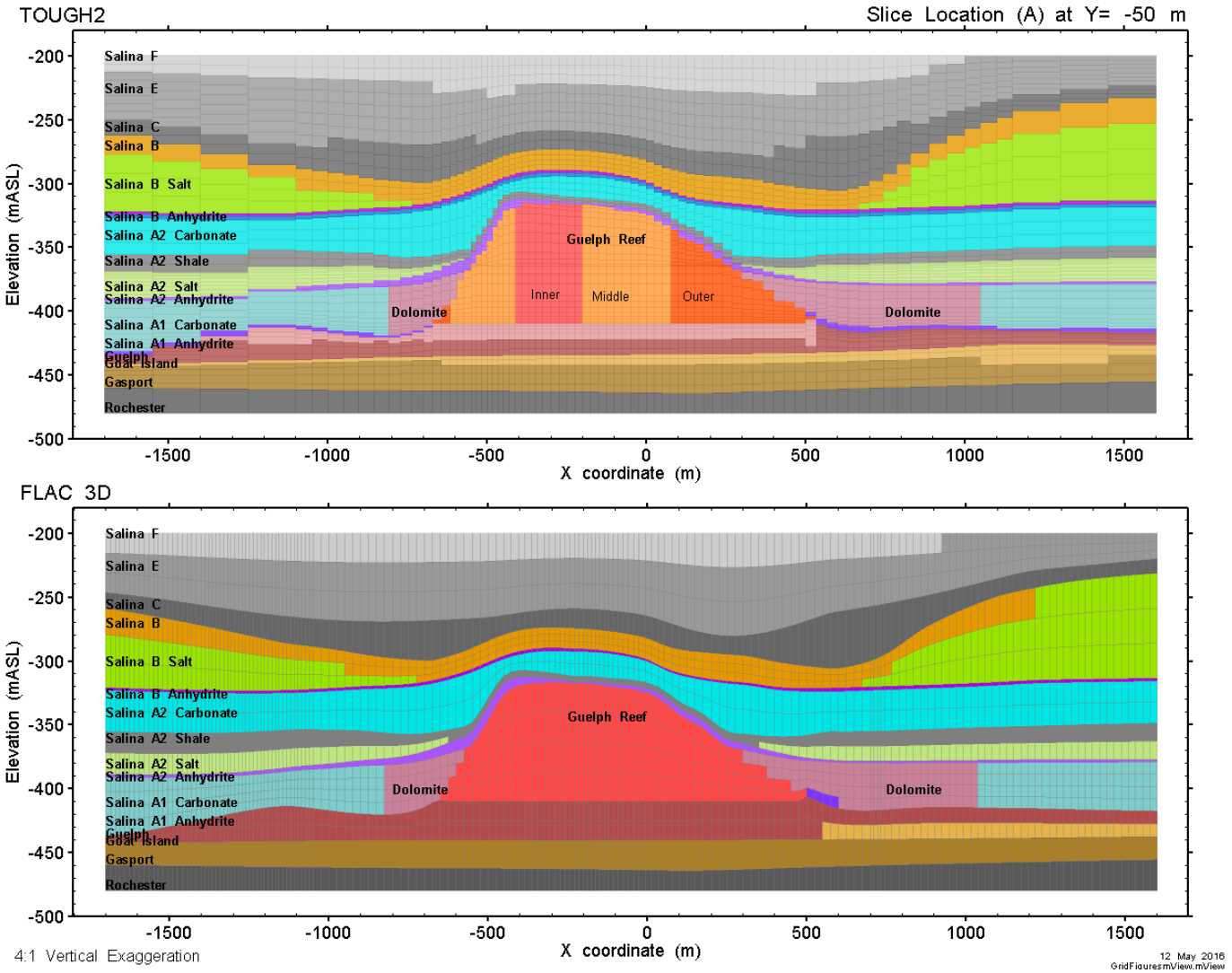


- Salina F
- Salina E
- Salina C
- Salina B
- Salina B Salt
- Salina B Anhydrite
- Upper Salina A2 Carbonate
- Lower Salina A2 Carbonate
- Salina A2 Shale
- Salina A2 Salt
- Salina A2 Anhydrite
- Salina A1 Carbonate
- Salina A1 Anhydrite
- Guelph Reef
- Goat Island
- Gasport
- Rochester
- Guelph
- Salina A1 Dolomite
- Incipient Guelph Reef

05 May 2016
T2GridsandPropsR1_Review

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Cross Sections of Grid and Properties



“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:
  - Delta pressuring the Dawn 156 Pool
  - Well drilling at Dawn 156 and Bentpath Pools
- The sessions did not indicate further mitigation or actions

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Assessment of Neighbouring Activities

- The reports 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 reports did not identify any areas of concerns

Filed: 2016-11-04
EB-2016-0322
Schedule 8

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

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Next Steps

- A letter of acknowledgement from the MNRF is required to file the application to the Ontario Energy Board
- Submit drilling applications for the proposed wells to the MNRF
- File Ontario Energy Board application in the beginning of October 2016

Questions?

Filed: 2016-11-04
EB-2016-0322
Schedule 8

OEB Conditions for Delta Pressuring

- "Union Gas Limited shall file summaries of an engineering study and geological study in support of any leave application and a formal confirmation from the Ministry of Natural resources and Forestry that operating the pool at the increased operating pressure complies with the requirements of the CSA Z341 standard."

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Appendix CSA Code

7.6.2 Maximum operating pressure

The maximum operating pressure for the storage zone shall be

(a) the discovery pressure of the reservoir; or

(b) a higher pressure that has been shown by caprock testing (as specified in Clause 5.2) not to compromise the integrity of the storage zone. The maximum operating pressure shall not exceed 80% of the fracture pressure of the caprock formation. In the absence of local fracture pressure data, the maximum pressure shall be no greater than 18.1 kPa per metre of depth to the top of the reservoir.

7.6.3 Delta pressure

Where the maximum operating pressure of the storage zone is planned to be above the discovery pressure of the reservoir, the operator shall determine the impact on reservoir integrity of the planned maximum delta pressure prior to injecting hydrocarbons at pressures exceeding the discovery pressure of the reservoir.

Filed: 2016-11-04
EB-2016-0322
Schedule 8

Report Summary

Title: "What If" Analysis of Hazards and Operability Issues
2016 Well Drilling and Deepening – The Bentpath Pool

Author: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Bentpath Pool with regards to the deepening of Union Bentpath 12 (UB.12) and Union Bentpath 13 (UB.13) and the proposed drilling of Union Bentpath 14 (UB.14). The 2016 Well Drilling & Deepening report performs an update of the original 2012 Bentpath Delta Pressuring Project assessment to incorporate the current drilling and deepening work. The original "What if" sessions took place over a two day period - Monday, April 30th and Tuesday, May 1st, 2012. The third session covering drilling and deepening was held on Tuesday, July 26, 2016.

The 2012 sessions were attended by the "What if" Leader and five technical experts from Union Gas per session day, the 2016 session day had seven technical experts from Union Gas plus leader. 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 5.0/8.0 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 145 "What ifs" concerning Bentpath Pool were generated over the total three days from the scope of the CSA Z341.1-14, and examined in the sessions. 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. There were no high ranked "What ifs" that might invite Actions through the level of expressed risk.

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.

The sessions were a complete study of the Bentpath Pool drilling and deepening activities within the scope of the CSA Z341.1-14 regulation. It was agreed that the sessions 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 Bentpath location, indicate "Negligible Risk."

Executive Summary

Title: "What If" Analysis of Hazards and Operability Issues
Delta Pressuring Project 2016 – The Dawn 156 Pool

Authors: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Dawn 156 Pool with regards to the 2016 Delta Pressuring Project and the drilling of three new wells Union Dawn 286 (UD.286), Union Dawn 287 (UD.287), and Union Dawn 288 (UD.288). It describes the "What if" session of hazard assessment that took place over a three day period. The first two session days were Tuesday and Wednesday, April 19 and 20, 2016. The third day of sessions was held on Tuesday, July 26, 2016.

The sessions were attended by the "What if" Leader and four technical experts per session day, plus two participants new to qualitative analysis techniques. In addition, a Union Gas reservoir engineer attended for the first day. 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 145 "What if" entries concerning Dawn 156 Pool were generated from the scope of the CSA Z341.1-14, and examined in the sessions. 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. There were no high ranked "What ifs" that might invite Actions through the level of expressed risk. 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 sessions were a complete study of the Dawn 156 Pool Delta Pressuring Project within the scope of the CSA Z341.1-14 regulation. It was agreed that the sessions 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 Dawn 156 Pool Delta Pressuring Project development location, indicate "Negligible Risk."

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September 8, 2016 Doc. ID.: UG-TR-13-07

EXECUTIVE SUMMARY

Title: **Delta Pressuring Study: Bentpath Pool Modelling Report**

Document ID: **UG-TR-13-07**

Authors: **Robert Walsh, Ph.D., P.Eng.**

Geofirma was contracted to prepare a modelling study assessing the feasibility of increasing the maximum storage pressure in the Bentpath underground natural gas storage reservoir. This required an assessment of the potential for pressure and gas propagation in the caprock, and the geomechanical response of the system to pressure changes in the storage reservoir. To solve this problem in an efficient manner, models developed in the codes TOUGH2 and FLAC3D were combined in series. Two-phase flow models were developed in TOUGH2 and calibrated with data collected on-site. The mechanical response of the caprock to delta pressuring was modelled using FLAC3D, allowing assessment of the induced stresses in formations surrounding the reservoirs.

As part of the delta pressuring study, coring and extensive testing of a new borehole, UB.13, was undertaken. This site characterization work at the Bentpath pool included coring through the formations directly above the pool, sampling and laboratory testing for geomechanical properties, retention properties, permeability, and geochemistry. Subsequent to coring, a field hydraulic testing program was undertaken, providing in-situ measurements of formation permeability. After hydraulic testing, a multilevel groundwater monitoring system was installed to measure and monitor pressures in the units directly above the storage pool. This provided a pressure profile, and direct observations of in-situ pore pressures and pressure changes in the cap during filling and draining of the pool. These observations allowed us to conclude that there is no significant permeable connection between the pool and the overlying caprock units, though gradual seepage into the A2 Carbonate could not be ruled out. This information was incorporated into the improved conceptual model of the hydrogeological system. Salina A2 unit caprock properties were calibrated to match the observed pressure profile.

Model scenarios were developed to simulate current operations at the pool at a maximum delta pressure of 0.73 psi/ft, and to assess the impact of increasing the maximum delta pressure to 0.8 psi/ft. At 0.73 psi/ft the maximum percent fracture gradient is estimated to be 65.1%. Increasing the maximum delta pressure to 0.8 psi/ft increases the maximum percent fracture gradient to 71.4%. The highest fracture gradients occurred at the top of the reef. Model scenarios were run to assess the potential for shear failure, and this was determined to be a very unlikely failure mode. The model results showed that a pressure increase to a maximum delta pressure of 0.80 psi/ft would be feasible, and would not exceed 80% of the fracture gradient, in compliance with CSA Z341.1-14.

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July 27, 2016 Doc. ID.: UG-TR-16-01

EXECUTIVE SUMMARY

Title: **Delta Pressuring Study: Dawn 156 Pool Modelling Report**

Document ID: **UG-TR-16-01**

Authors: **Robert Walsh, P.Eng., Nicola Calder, P.Eng., Othman Nasir, P.Eng.**

Geofirma was contracted to prepare engineering and modelling studies assessing the feasibility of increasing the maximum storage pressure in the Dawn 156 underground natural gas storage reservoir. This required an assessment of the potential for pressure and gas propagation in the caprock, and the geomechanical response to pressure change in the storage reservoir and connected secondary storage zones. To solve this problem in an efficient manner, models developed in the codes TOUGH2 and FLAC3D were combined in series. Two-phase flow models were developed in TOUGH2 and calibrated with data collected on-site. The mechanical response of the caprock to delta pressuring was modelled using FLAC3D, allowing assessment of the induced stresses in formations surrounding the reservoirs. In the Dawn 156 pool, open boreholes intersecting two thin caprock units immediately above the reservoir allowed gas flow into the shallower A2 Carbonate unit. The presence of these open boreholes significantly impacted the modelled fracture gradients. Model scenarios were developed to simulate current operations at the pool with permeable connections representing all boreholes currently open in the A2 Carbonate. The highest fracture gradients were predicted to occur at the location of open boreholes, as a result of the propagation of reservoir pressures to these shallower zones. Wells D.190 and D.223 had the highest predicted fracture gradients, due to their having the shallowest casing set depths in the A2 carbonate. An updated model was developed in which permeable elements representing wells D.190 and D.223 were removed, to reflect plans by Union Gas to plug and abandon these wells, thereby closing the permeable connections at these locations. Under current maximum operating pressure, with all current wells, the maximum fracture gradient is estimated to be 76.8%. If permeable connections at wells D.190 and D.223 are removed, the maximum estimated fracture gradient is reduced to 72.0%, occurring at well UD.281. Increasing the maximum delta pressure to 0.76 psi/ft increases the maximum fracture gradient to 73.7%, and a further increase to 0.80 psi/ft increases the maximum fracture gradient to 78.0%. Model scenarios were run to assess the potential for shear failure due to increased delta pressuring, and this was determined to be a very unlikely failure mode. To assess the impact of some key, but uncertain, model parameters, a number of other sensitivity cases with alternate parameter sets were assessed. These sensitivity cases included increasing the caprock permeability, increasing the pool compressibility, increasing the gas saturation in the A2 Carbonate, and using alternate material properties to represent the A2 Carbonate (permeability, capillarity, and mobility weighting functions). The model results showed that a pressure increase to a maximum delta pressure of 0.80 psi/ft would be feasible, and would not exceed 80% of the fracture gradient, in compliance with regulatory requirements. This conclusion is predicated on the plugging and abandonment of wells D.190 and D.223.

Report Summary

Title: Assessment of Neighbouring Activities
2016 Well Drilling and Deepening – The Bentpath 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 Bentpath Pool.

Union Gas Limited (Union) proposes to increase the deliverability of the Bentpath Pool by drilling a new Injection/Withdrawal (I/W) well Union Bentpath 14 (UB.14) and deepening four wells, Union Bentpath 1 (UB.1), Union Bentpath 8 (UB.8), Union Bentpath 12 (UB.12) and Union Bentpath 13 (UB.13).

The Bentpath Pool is protected by a Designated Storage Area (DSA) which was approved by the Ontario Energy Board (OEB) in 1974 (EOB 64/EBLO 147 and EBO 55/EBLO 147). The DSA is comprised of approximately 310.6 hectares. Union is confident that the DSA adequately protects the Bentpath 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 four wells have been drilled within 1 km of the base of gas of the Bentpath 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 Bentpath Pool indicates that there are six natural gas storage reservoirs (owned and operated by Union), five oil and gas production reservoirs and one brine production operation. There is no communication between the Bentpath 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).

Thirteen wells penetrate the Bentpath Pool storage zone. All wells are associated with the operation of the Bentpath pool. 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 Bentpath Pool meet the requirements of CSA Z341.1-14.

In conclusion, the Bentpath Pool has been safely operated as a natural gas storage pool for the past forty-two 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 Bentpath Pool. All active wells that penetrate

the storage zone within the Bentpath 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: Assessment of Neighbouring Activities
Delta Pressuring Project 2016 – The Dawn 156 Pool

Authors: 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 delta pressuring and deliverability in the Dawn 156 Pool.

Union Gas Limited (Union) proposes to increase pressure in the Dawn 156 Pool and to increase the deliverability. The project includes abandoning two wells; Dawn 190 (D.190) and Dawn 223 (D.223) and drilling three new wells (Union Dawn 286, Union Dawn 287 and Union Dawn 288).

The Dawn 156 Pool is protected by a Designated Storage Area (DSA) which was approved by Ontario Regulation 88/62 in April 1962. The DSA is comprised of approximately 1,130 hectares. Union is confident that the DSA adequately protects the Dawn 156 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, the 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 35 wells have been drilled within 1 km of the base of gas of the Dawn 156 Pool. Union has 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 kilometres of the Dawn 156 Pool indicates that there are four natural gas storage reservoirs (owned and operated by Union) and six active production operations. There is no communication between the Dawn 156 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).

Thirty-two wells penetrate the Dawn 156 storage zone. Twenty-seven of the wells are associated with storage operations and five of the wells are abandoned. The integrity of each well that penetrates the storage zone, including casing, cement, and abandonment records was reviewed. Union Gas Limited is satisfied that the wells penetrating the Dawn 156 Pool meet the requirements of CSA Z341.1-14.

In conclusion, the Dawn 156 Pool has been safely operated as a natural gas storage pool for the past 54 years and is protected by an approved DSA. The technical information reviewed, indicates that there is minimal risk regarding the potential migration of natural gas between any known existing or abandoned wells within 1 km, and existing operations within 5 km, of the Dawn 156 Pool. All active wells that penetrate the storage zone within the Dawn 156 Pool are utilized as part of storage operations.

All the active wells 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. Union is satisfied that the new operating pressure will not compromise the integrity of the Dawn 156 Pool and any associated facilities.

PROPOSED FACILITIES: BENTPATH POOL

Filed: 2016-11-04
EB-2016-0322
Schedule 10

TOWNSHIP OF DAWN-EUPHEMIA

(GEOGRAPHICAL TOWNSHIP OF DAWN)

LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
	REVISIONS			

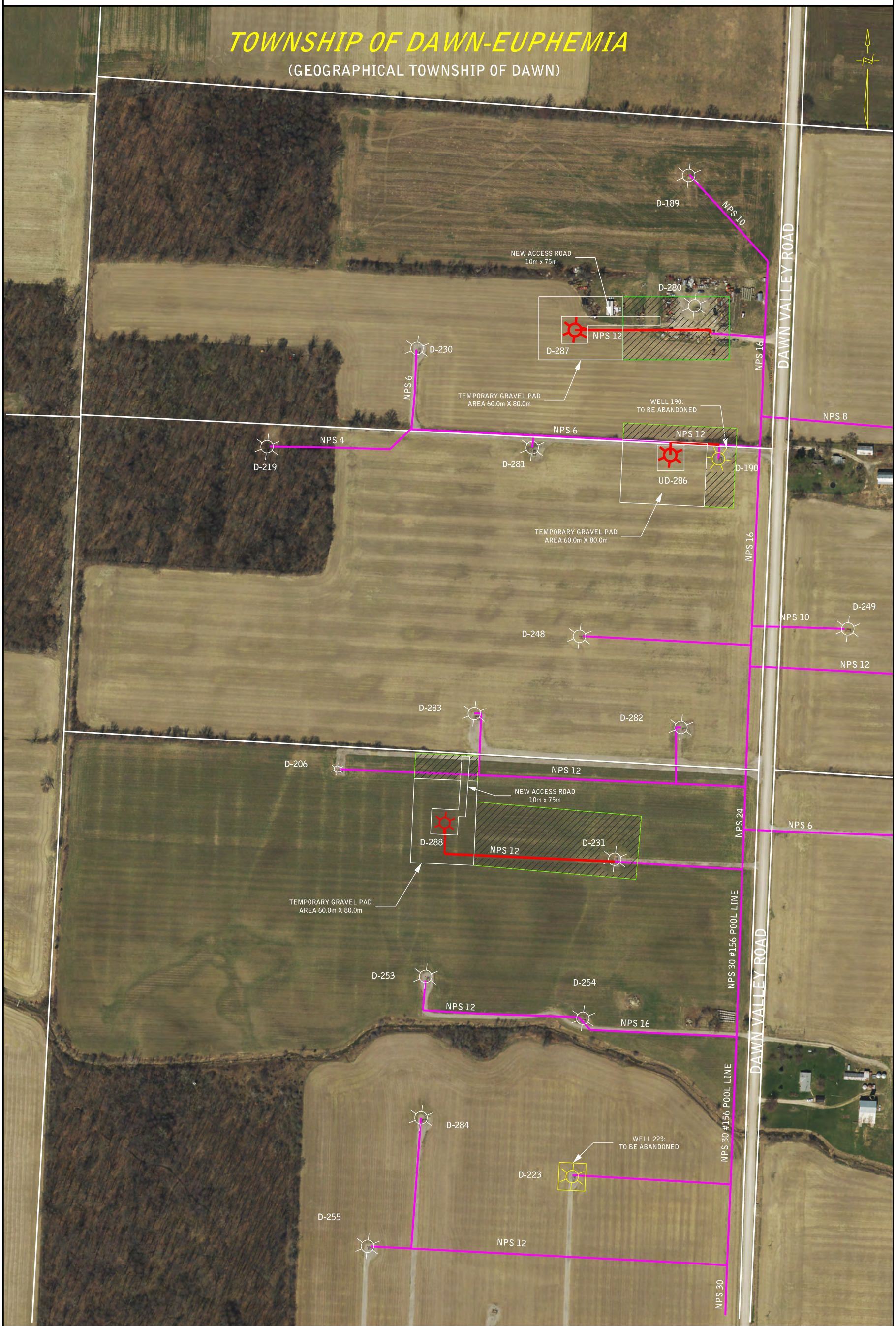
uniongas
A Spectra Energy Company

PROPOSED FACILITIES
BENTPATH POOL

DRAWN BY: T. James	DATE: 2016/10/15	PLOT SPEC: 1/2500
CHECKED BY	DATE	CAD CODE: M797
APPROVED BY	DATE	FILE REVISION DATE: 2016-00-00

SHEET No.	SYSTEM	DRAWING No.
1 OF 1		M797 OEB

PROPOSED FACILITIES: DAWN 156 POOL



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WELLS TO BE ABANDONED
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
01				

REVISIONS

uniongas
A Spectra Energy Company

PROPOSED FACILITIES
DAWN 156 POOL

DRAWN BY: T. James	DATE: 2016/09/21	PLOT SPEC: 1/4000
CHECKED BY:	DATE:	CAD CODE: PL1476
APPROVED BY:	DATE:	FILE REVISION DATE: 2016-00-00

SHEET No.	SYSTEM	DRAWING No.
1 OF 1		PL1476 OEB

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Dawn 8-32-V, (Union Bentpath 1) 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 8 Lot 32 Concession V Offshore: Block Tract Licence/Lease No.

Surface location, metres from Lot Boundaries: 105.4 m North [X] South [ ] 106.3 m East [X] West [ ]

Latitude 42°44'45.107" N Longitude 82°10'17.054" N

Bottom-hole Lat. 42°44'45.107" N Bottom-hole Long. 82°10'17.054" N

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

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

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

Ground Elevation 197.8 Proposed Depth 574.0 Proposed Depth TVD 574.0 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 CAL MITCHELL DRILLING Tel # 519-695-6060

Address PO BOX 51, 443 Princess St. Cit PORT LAMBTON Pr ON Postal Code N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION: How Set	Cement Type	Cement Top KB / RF

8. BLOW-OUT PREVENTION EQUIPMENT

Blind Rams, Annular Preventer

9. WELL SECURITY Name of Trustee 1236596 Ontario Limited Harrison Pensa & Associates Total # Unplugged Wells 209 Current Balance $70,000

10. REMARKS Deepening of Well Licence T003007

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) 03-Nov-16 Name Mike Learn Signature

Company Union Gas Limited Title Principal Drilling Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Bentpath 8, Dawn 2-31-IV — 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: 2 — Lot: 31 — Concession: IV — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 14.7 m North [ ] South [X] — 58.25 m East [ ] West [X] — Latitude: 42°44'44.135" N — Longitude: 82°10'28.478" W — Bottom-hole Lat.: 42°44'44.135" N — Bottom-hole Long.: 82°10'28.478" W

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

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

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

Ground Elevation: 197.5 — Proposed Depth: 577.0 — Proposed Depth TVD: 577.0 — 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 CAL MITCHELL DRILLING — Tel #: 519-695-6060

Address: PO BOX 51, 443 Princess St. — Cit: PORT LAMBTON — Pr: ON — Postal Code: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION: How Set	Cement Type	Cement Top KB / RF

8. BLOW-OUT PREVENTION EQUIPMENT

Blind Rams, Annular Preventer

9. WELL SECURITY Name of Trustee: 1236596 Ontario Limited / Harrison Pensa & Associates — Total # Unplugged Wells: 209 — Current Balance: $70,000

10. REMARKS Deepening of well licence # T003147

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): 03-Nov-16 — Name: Mike Learn — Signature: 

Company: Union Gas Limited — Title: Principal Drilling Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Bentpath 12, Dawn 8-32-V — 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: 8 — Lot: 32 — Concession: V — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 126.55 m North [X] South [ ] — 215.85 m East [X] West [ ]

Latitude: 42°44'48.486" N — Longitude: 82°10'15.407" N

Bottom-hole Lat.: 42°44'48.486" N — Bottom-hole Long.: 82°10'15.407" N

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

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

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

Ground Elevation: 198.1 — Proposed Depth: 575.0 — Proposed Depth TVD: 575.0 — 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 CAL MITCHELL DRILLING — Tel # 519-695-6060

Address: PO BOX 51, 443 Princess St. — Cit: PORT LAMBTON — Pr: ON — Postal Cod: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION How Set	Cement Type	Cement Top KB / RF

8. BLOW-OUT PREVENTION EQUIPMENT

Annular Preventer, Blind Rams, Pipe Rams

9. WELL SECURITY Name of Trustee: 1236596 Ontario Limited — Total # Unplugged Wells: 209 — Current Balance: $70,000

Harrison Pensa & Associates

10. REMARKS Deepening of well T008460

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): 03-Nov-16 — Name: Mike Learn — Signature:

Company: Union Gas Limited — Title: Principal Drilling Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Bentpath 13, Dawn 8-32-V — 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: 8 — Lot: 32 — Concession: V — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 21.85 m North [X] South [ ] — 180.65 m East [X] West [ ]

Latitude: 42°44'45.107 — Longitude: 82°10'17.054

Bottom-hole Lat.: 42°44'45.107 — Bottom-hole Long.: 82°10'17.054

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

Off-target? Yes [X] No [ ]

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

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

Ground Elevation: 197.6 — Proposed Depth: 575.0 — Proposed Depth TVD: 575.0 — 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 Cal Mitchell Drilling — Tel # 519-695-6060

Address: P.O. Box 51, 443 Princess St. — City: Port Lambton — Prov.: On — Postal Code: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION		
								How Set	Cement Type	Cement Top KB / RF
200.0	177.80	34.23	K-55	New	498.50	498.50	A2 Anhydrite	Driven	N/A	N/A

8. BLOW-OUT PREVENTION EQUIPMENT

Diverter,Annular Preventer; Blind Rams, Pipe Rams

9. WELL SECURITY Name of Trustee: 1236596 Ontario Limited — Total # Unplugged Wells: 209 — Current Balance: $70,000

Harrison Pensa & Associates

10. REMARKS Deepening of well licence T12205 and conversion to Natural Gas Storage

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): 03-Nov-16 — Name: Mike Learn — Signature:

Company: Union Gas Limited — Title: Senior Drilling and Reservoir Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Bentpath 14, Dawn 7-31-V — 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: 31 — Concession: 5 — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 103.4 m North [ ] South [X] — 204.45 m East [X] West [ ]

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

Ground Elevation: 197.5 — Proposed Depth: 571.0 — Proposed Depth TVD: 571.0 — 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	21.1	Kettle Point / Bedrock	Driven	N/A	N/A
482.6	406.40	96.73	H-40	New	35.1	Kettle Point / Bedrock	Cemented	0:1:0	1.9
387.3	339.70	71.43	H-40	None	114.1	Dundee	Retrieved	N/A	1.9
322.0	273.10	60.27	K-55	New	335.1	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
253.0	219.10	35.72	K-55	New	498.1	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, Harrison Pensa & Associates — Total # Unplugged Wells: 209 — Current Balance: $70,000

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): 03-Nov-16 — Name: Mike Learn — Signature:

Company: Union Gas Limited — Title: Principal Drilling and Reservoir Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Dawn 286, 1-33-I — 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: I — Lot: 33 — Concession: 1 — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 295.1 m North [X] South [ ] — 92.62 m East [ ] West [X]

Latitude: 42°45'18.163" N — Longitude: 82°13'31.766" W

Bottom-hole Lat.: 42°45'18.163" N — Bottom-hole Long.: 82°13'31.766" 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 [ ] Cable [X] — Well to be cored? Yes [ ] No [X] — Formation at TD: Guelph

Ground Elevation: 191.7 — Proposed Depth: 587.0 — Proposed Depth TVD: 587.0 — 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 Cal Mitchell Drilling — Tel # 519-695-6060

Address: P.O. Box 51, 443 Princess St. — City: Port Lambton — Prov.: On — Postal Code: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION		
								How Set	Cement Type	Cement Top KB / RF
387.3	406.40	76.49	Line pipe	New	26.2	26.2	Kettle Point / Bedrock	Driven	N/A	N/A
387.3	339.70	71.43	H-40	New	40.2	40.2	Kettle Point / Bedrock	Cemented	0:1:0	1.9
322.0	273.10	60.27	K-55	New	161.6	161.6	Dundee	Retrieved	N/A	1.9
253.0	219.10	35.72	K-55	New	387.6	387.6	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
200.0	177.80	34.23	K-55	New	504.1	504.1	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 / Harrison Pensa & Associates — Total # Unplugged Wells: 209 — Current Balance: $70,000

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 N6E 1L3, 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): 03-Nov-16 — Name: Mike Learn — Signature:

Company: Union Gas Limited — Title: Principal Drilling and Reservoir Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Dawn 287, 2-33-I — 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: 2 — Lot: 33 — Concession: I — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 204.8 m North [ ] South [X] — 187.72 m East [ ] West [X]

Latitude: 42°45'21.961" N — Longitude: 82°13'35.822" W

Bottom-hole Lat.: 42°45'21.961" N — Bottom-hole Long.: 82°13'85.822" 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 [ ] Cable [X] — Well to be cored? Yes [ ] No [X] — Formation at TD: Guelph

Ground Elevation: 191.8 — Proposed Depth: 585.0 — Proposed Depth TVD: 585.0 — 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 Cal Mitchell Drilling — Tel # 519-695-6060

Address: P.O. Box 51 , 443 Princess St. — City: Port Lambton — Prov.: On — Postal Code: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION		
								How Set	Cement Type	Cement Top KB / RF
387.3	406.40	76.49	Line pipe	New	24.8	24.8	Kettle Point / Bedrock	Driven	N/A	N/A
387.3	339.70	71.43	H-40	New	38.8	38.8	Kettle Point / Bedrock	Cemented	0:1:0	1.9
322.0	273.10	60.27	K-55	New	167.2	167.2	Dundee	Retrieved	N/A	1.9
253.0	219.10	35.72	K-55	New	392.6	392.6	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
203.0	177.80	34.23	K-55	New	519.8	519.8	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 / Harrison Pensa & Associates — Total # Unplugged Wells: 209 — Current Balance: $70,000

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): 03-Nov-16 — Name: Mike Learn — Signature:

Company: Union Gas Limited — Title: Principal Drilling and Reservoir Engineer

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 information, together with the application fee of $100. Make cheques payable to "Minister of Finance".

1. WELL NAME Union Dawn 288, 2-32-I — 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: 2 — Lot: 32 — Concession: 1 — Offshore: Block: — Tract: — Licence/Lease No.:

Surface location, metres from Lot Boundaries: 62.1 m North [ ] South [X] — 293.1 m East [ ] West [X]

Latitude: 42°45'06.740" N — Longitude: 82°13'40.963" W

Bottom-hole Lat.: 42°45'06.740" N — Bottom-hole Long.: 82°13'40.963" 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 [ ] Cable [X] — Well to be cored? Yes [X] No [ ] — Formation at TD: Guelph

Ground Elevation: 191.2 — Proposed Depth: 585.0 — Proposed Depth TVD: 585.0 — 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 Cal Mitchell Drilling — Tel #: 519-690-6060

Address: P.O. Box 51, 443 Princess St. — City: Port Lambton — Prov.: ON — Postal Code: N0P 2B0

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 Depth Meas.	Setting Formation	CASING SETTING INFORMATION		
								How Set	Cement Type	Cement Top KB / RF
387.3	406.40	76.49	Line pipe	New	28.2	28.2	Kettle Point / Bedrock	Driven	N/A	N/A
387.3	339.70	71.43	H-40	New	42.2	42.2	Kettle Point / Bedrock	Cemented	0:1:0	1.9
322.0	273.10	60.27	K-55	New	170.7	170.7	Dundee	Retrieved	N/A	1.9
253.0	219.10	35.72	K-55	New	386.2	386.2	F Unit Shale	Cemented	0:8:0; 0:1:0	1.9
203.0	177.80	34.23	K-55	New	503.6	503.6	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: 209 — 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): 03-Nov-16 — Name: Mike Learn — Signature: M. Learn

Company: Union Gas Limited — Title: Principal Drilling and Reservoir Engineer

DRILLING PROCEDURE

Dawn 8-32-V, (Union Bentpath 1)

MAIN HOLE - CABLE TOOL

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 in the Production and Open hole sections are to 1.9 mKB

3. Install orbit valve and BOP.
4. Perform Function test and pressure test on BOP system (to OGSRL provincial standards sect 4.4)
5. Drill rat hole
6. Rig up lubricator and tool trap.
7. Drill under lubricator to TD (574 M) with a 114.3 mm bit
8. Record daily pressure prior to drilling. Record drilling times in Guelph formation.
9. Rig out cable tool drilling rig.
10. Install blind flange on top of master valve.
11. Underground Storage to notify M.N.R. within 48 hours after TD is reached.

DRILLING PROCEDURE

Union Bentpath 8, Dawn 2-31-IV

MAIN HOLE - CABLE TOOL

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 in the Production and Open hole sections are to 1.9 mKB

3. Install orbit valve and BOP.
4. Perform Function test and pressure test on BOP system (to OGSRL provincial standards sect 4.4)
5. Drill rat hole
6. Rig up lubricator and tool trap.
7. Drill under lubricator to TD (577 M) with a 158.8 mm bit
8. Record daily pressure prior to drilling. Record drilling times in Guelph formation.
9. Rig out cable tool drilling rig.
10. Install blind flange on top of master valve.
11. Underground Storage to notify M.N.R. within 48 hours after TD is reached.

DRILLING PROCEDURE

Union Bentpath 12, Dawn 8-32-V

MAIN HOLE - CABLE TOOL

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 in the Production and Open hole sections are to 1.9 mKB

3. Install orbit valve and BOP.
4. Perform Function test and pressure test on BOP system (to OGSRL provincial standards sect 4.4)
5. Drill rat hole
6. Rig up lubricator and tool trap.
7. Drill under lubricator to TD (575 M) with a 158.8 mm bit
8. Record daily pressure prior to drilling. Record drilling times in Guelph formation.
9. Rig out cable tool drilling rig.
10. Install blind flange on top of master valve.
11. Underground Storage to notify M.N.R. within 48 hours after TD is reached.

DRILLING PROCEDURE

Union Bentpath 13, Dawn 8-32-V

Production 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 in the Production and Open hole sections are to 1.9 mKB

3. Pressure test wellhead and production casing to 13,790 kPag for four (4) hours.
4. Install orbit valve and BOP.
5. Perform Function test and pressure test on BOP system (to OGSRL provincial standards sect 4.4)
6. Drill rat hole when convenient before Guelph formation is reached.
7. 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.
8. Ream hole with 200 mm bit to TD. Drill hole to 499.5 mKb
9. Run 177.8 mm production casing with insert float 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. 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). Raise production casing 0.5 m off bottom and set in slips.
10. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
11. Ensure that a collar is not positioned where the wellhead seals need to be installed.
12. Prepare to cement 177.8 mm production casing to surface.
13. Hold safety meeting with all on-site personal.
14. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
15. Pump citric acid followed by fresh water pre-flush. Cement to surface as per cementing program. 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.
16. Lift BOP and Set casing slips.

MAIN HOLE - CABLE TOOL

17. W.O.C. for 48 hours.
18. Cased Hole Logging. *See LOGGING PROGRAM, Log Run # 3.*
19. Pressure test wellhead and production casing to 13,790 kPag for four (4) hours.
20. Install orbit valve and BOP.
21. Perform Function test and pressure test on BOP system (to OGSRL provincial standards sect 4.4)
22. Drill rat hole when convenient before Guelph formation is reached.
23. Bail hole dry.
24. Drill out cement and shoe.
25. Rig up lubricator and tool trap.
26. Drill 0.5 m of new formation under lubricator.
27. 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.
28. Bail hole dry.
29. Drill under lubricator to TD (575 M) with a 158.8 mm bit
30. Record daily pressure prior to drilling. Record drilling times in Guelph formation.
31. Rig out cable tool drilling rig.
32. Install blind flange on top of master valve.

DRILLING PROCEDURE

Union Bentpath 13, Dawn 8-32-V

33. Underground Storage to notify M.N.R. within 48 hours after TD is reached.

DRILLING PROCEDURE

Union Bentpath 14, Dawn 7-31-V

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 1.9 mKB

3. Drill and drive 508 mm conductor pipe 1 m into Kettle Point / Bedrock (21.1 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 (35.6 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 (35.6 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. Bail hole dry.
13. Drill out cement with 387.3 mm bit.
14. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test
15. Program - Surface Casing-Pressure Test
16. Continue drilling to 1-3 m into the Dundee formation (114.1 mKB) with 387.3 mm bit.
17. Run 273.1 mm retreivable intermediate casing to bottom (114.1 mKB). Tack weld drive shoe to bottom. Attach backoff nipple between joints 2 and 3.
18. Record retrievable intermediate casing OD, weight, grade and set depth.

INTERMEDIATE HOLE

19. Drill to top of F Shale formation (330.1 mKB) with 322 mm bit.

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

20. Drill 5.5m into the F Shale formation to 335.6m with 322 mm bit or as directed by company personnel
21. Hold safety meeting. Run 273.1 mm intermediate casing to bottom (335.6 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 6110 N-m (4500 ft-lb) and the maximum makeup torque is 7650 N-m (5630 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
22. Install circulating head, circulate minimum 1 hole volume, observe returns, ensure clean returns prior to cementing.
23. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
24. Prepare to cement 273.1 mm intermediate casing to surface.
25. Hold safety meeting with all on-site personal.
26. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
27. 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.

DRILLING PROCEDURE

Union Bentpath 14, Dawn 7-31-V

28. W.O.C. for 48 hours.
29. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
30. Install thread-on casing bowl.
31. Hold Safety Meeting. Pressure Test Intermediate casing and BOP in accordance with the Pressure
32. Test Program - Intermediate Casing - Pressure Test
33. Drill out cement and shoe with 253 mm bit.

Production Hole

34. Drill of 0.5 m of new formation. Hold safety meeting. Perform Pressure Integrity Test in according the Pressure Test Program - Production Hole - Pressure Integrity Test (PIT)
35. Bail hole dry.
    Drill rat hole when convenient before Guelph formation is reached.
36. Drill 0.5 m into the A-2 Anhydrite (498.6m) with 253 mm bit.

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

Note: IF A GAS SHOW IS ENCOUNTERED, STOP DRILLING IMMEDIATELY AND CONTACT INPSECTOR

37. Run 219.1 mm production casing to 498.1mKB 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 torque is 7080 N-m (5210 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed.
38. Set slips inside casing bowl. Set secondary seals. Use Plate above seals for cementing.
39. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
40. Hold safety meeting.
41. Prepare to cement 219.1 mm production casing to surface.
42. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
43. 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.
44. W.O.C. for 48 hours.
45. Set primary seals. Cut off casing to proper height. Install casing spool.
46. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
47. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with Pressure Test Program- Production Casing - Pressure Test.

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.

48. Drill 0.5m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Intagrity Test (PIT)
49. Bail hole dry.
50. Drill under lubricator to 571 m with a 203 mm bit
51. Bail hole dry
52. Hold safety meeting. Open Hole Logging See *LOGGING PROGRAM*, Log Run #3
53. Rig out cable tool drilling rig
54. Install blind flange on top of master valve.
55. Underground Storage to notify M.N.R. within 48 hours after TD

DRILLING PROCEDURE

Union Dawn 286, 1-33-I

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 1.9 mKB

3. Drill and drive 406.4 mm conductor pipe 1 m into Kettle Point / Bedrock (26.2 mKB) with a 387.3 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 (40.7 mKB) with a 387.3 mm bit.

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

6. Run 339.7 mm surface casing to bottom (40.7 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 4370 N-m (3220 ft-lb) and the maximum makeup torque is 5470 N-m (4030 ft-lb).
7. Record surface casing OD, weight, grade, placement of cementing hardware and set depth.
8. Raise surface casing 0.5 m off bottom and set in slips. Cement 339.7 mm surface casing to surface as per cementing program.
9. Wait on cement (W.O.C.) for 24 hours.
10. Record cement top in casing.
11. Bail hole dry.
12. Drill out cement with 322 mm bit.
13. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
14. Continue drilling to 1-3 m into the Dundee formation (161.6 mKB) with 322 mm bit.
15. Run 273.1 mm retreivable intermediate casing to bottom (161.6 mKB). Tack weld drive shoe to bottom. Attach backoff nipple between joints 2 and 3.
16. Record retrievable intermediate casing OD, weight, grade and set depth.

INTERMEDIATE HOLE

Drill to top of F Shale formation (382.6 mKB) with 253 mm bit.

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

13. Drill into the F Shale formation (382.6 mKB) to (388.1m) with 253 mm bit or as directed by company personnel
14. Hold safety meeting. Run 219.1 mm intermediate casing to bottom (388.1 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 3570 N-m (2630 ft-lb) and the maximum makeup torque is 5320 N-m (3920 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
15. Install circulating head, circulate minimum 1 hole volume, observe returns, ensure clean returns prior to cementing.
16. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
17. Prepare to cement 219.1 mm intermediate casing to surface.
18. Hold safety meeting with all on-site personal.
19. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Dawn 286, 1-33-I

20. 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.
21. W.O.C. for 48 hours.
22. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
23. Install thread-on casing bowl.
24. Hold Safety Meeting. Pressure Test Intermediate casing and BOP in accordance with the Pressure Test Program - Intermediate Casing - Pressure Test
25. Drill out cement and shoe with 200 mm bit.

Production Hole

26. Drill of 0.5 m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Integrity Test (PIT)
27. Bail hole dry.
    Drill rat hole when convenient before Guelph formation is reached.
28. Drill 0.5 m into the A-2 Anhydrite (505.1m) with 200 mm bit.

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

Note: IF A GAS SHOW IS ENCOUNTERED, STOP DRILLING IMMEDIATELY AND CONTACT INPSECTOR

29. Run 177.8 mm production casing to 504.1mKB 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 5110 N-m (3760 ft-lb) and the maximum makeup torque is 5610 N-m (4130 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed.
30. Set slips inside casing bowl. Set secondary seals. Use Plate above seals for cementing.
31. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
32. Hold safety meeting.
33. Prepare to cement 177.8 mm production casing to surface.
34. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
35. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program - 177.8 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.
36. W.O.C. for 48 hours.
37. Set primary seals. Cut off casing to proper height. Install casing spool.
38. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
39. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with PressuretTest Program- Production Casing - Pressure Test.

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.

40. Drill 0.5m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Intagrity Test (PIT)
41. Bail hole dry.
42. Drill under lubricator to 587 m with a 158.8 mm bit
43. Bail hole dry
44. Hold safety meeting. Open Hole Logging See *LOGGING PROGRAM*, Log Run #3
45. Rig out cable tool drilling rig

DRILLING PROCEDURE

Union Dawn 286, 1-33-I

46. Install blind flange on top of master valve.
47. Underground Storage to notify M.N.R. with 48 hours after TD

DRILLING PROCEDURE

Union Dawn 287, 2-33-I

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 1.9 mKB

3. Drill and drive 406.4 mm conductor pipe 1 m into Kettle Point / Bedrock (24.8 mKB) with a 387.3 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 (39.3 mKB) with a 387.3 mm bit.

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

6. Run 339.7 mm surface casing to bottom (39.3 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 4370 N-m (3220 ft-lb) and the maximum makeup torque is 5470 N-m (4030 ft-lb).
7. Record surface casing OD, weight, grade, placement of cementing hardware and set depth.
8. Raise surface casing 0.5 m off bottom and set in slips. Cement 339.7 mm surface casing to surface as per cementing program.
9. Wait on cement (W.O.C.) for 24 hours.
10. Record cement top in casing.
11. Bail hole dry.
12. Drill out cement with 322 mm bit.
13. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
14. Continue drilling to 1-3 m into the Dundee formation (167.2 mKB) with 322 mm bit.
15. Run 273.1 mm retreivable intermediate casing to bottom (167.2 mKB). Tack weld drive shoe to bottom. Attach backoff nipple between joints 2 and 3.
16. Record retrievable intermediate casing OD, weight, grade and set depth.

INTERMEDIATE HOLE

17 Drill to top of F Shale formation (387.6 mKB) with 253 mm bit.

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

18. Drill into the F Shale formation (387.6 mKB) to (393.1m) with 253 mm bit or as directed by company personnel
19. Hold safety meeting. Run 219.1 mm intermediate casing to bottom (393.1 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 3570 N-m (2630 ft-lb) and the maximum makeup torque is 5320 N-m (3920 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
20. Pull 273.1 mm casing.
21. Install circulating head, circulate minimum 1 hole volume, observe returns, ensure clean returns prior to cementing.
22. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
23. Prepare to cement 219.1 mm intermediate casing to surface.
24. Hold safety meeting with all on-site personal.
25. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Dawn 287, 2-33-I

26. 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.
27. W.O.C. for 48 hours.
28. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
29. Install thread-on casing bowl.
30. Hold Safety Meeting. Pressure Test Intermediate casing and BOP in accordance with the Pressure
31. Test Program - Intermediate Casing - Pressure Test
32. Drill out cement and shoe with 203 mm bit.

Production Hole

30. Drill of 0.5 m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Integrity Test (PIT)
27. Bail hole dry.
    Drill rat hole when convenient before Guelph formation is reached.
28. Drill 0.5 m into the A-2 Anhydrite (520.8m) with 203 mm bit.

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

Note: IF A GAS SHOW IS ENCOUNTERED, STOP DRILLING IMMEDIATELY AND CONTACT INPSECTOR

29. Run 177.8 mm production casing to 519.8mKB 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 5110 N-m (3760 ft-lb) and the maximum makeup torque is 5610 N-m (4130 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed.
30. Set slips inside casing bowl. Set secondary seals. Use Plate above seals for cementing.
31. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
32. Hold safety meeting.
33. Prepare to cement 177.8 mm production casing to surface.
34. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
35. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program - 177.8 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.
36. W.O.C. for 48 hours.
37. Set primary seals. Cut off casing to proper height. Install casing spool.
38. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
39. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with PressuretTest Program- Production Casing - Pressure Test.

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.

40. Drill 0.5m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Intagrity Test (PIT)
41. Bail hole dry.
42. Drill under lubricator to 585 m with a 158.8 mm bit
43. Bail hole dry
44. Hold safety meeting. Open Hole Logging See *LOGGING PROGRAM*, Log Run #3

DRILLING PROCEDURE

Union Dawn 287, 2-33-I

45. Rig out cable tool drilling rig
46. Install blind flange on top of master valve.
47. Underground Storage to notify M.N.R. with 48 hours after TD

DRILLING PROCEDURE

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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 1.9 mKB

3. Drill and drive 406.4 mm conductor pipe 1 m into Kettle Point / Bedrock (28.2 mKB) with a 387.3 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 (42.7 mKB) with a 387.3 mm bit.

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

6. Run 339.7 mm surface casing to bottom (42.7 mKB) with centralizers 2m above shoe and at joints 2, 4 and 8. Tack weld guide shoe on bottom. The optimum makeup torque is 4370 N-m (3220 ft-lb) and the maximum makeup torque is 5470 N-m (4030 ft-lb).
7. Record surface casing OD, weight, grade, placement of cementing hardware and set depth.
8. Raise surface casing 0.5 m off bottom and set in slips. Cement 339.7 mm surface casing to surface as per cementing program.
9. Wait on cement (W.O.C.) for 24 hours.
10. Record cement top in casing.
11. Bail hole dry.
12. Drill out cement with 322 mm bit.
13. Hold safety meeting. Pressure Test surface casing and BOP in accordance with Pressure Test Program - Surface Casing-Pressure Test
14. Continue drilling to 1-3 m into the Dundee formation (170.7 mKB) with 322 mm bit.
15. Run 273.1 mm retreivable intermediate casing to bottom (170.7 mKB). Tack weld drive shoe to bottom. Attach backoff nipple between joints 2 and 3.
16. Record retrievable intermediate casing OD, weight, grade and set depth.

INTERMEDIATE HOLE

17. Drill to top of F Shale formation (381.2 mKB) with 253 mm bit.

Note: Geologist will be onsite to verify top of F Shale

18. Drill into the F Shale formation (381.2 mKB) to (386.7m) with 253 mm bit or as directed by company personnel
19. Hold safety meeting. Run 219.1 mm intermediate casing to bottom (386.7 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 3570 N-m (2630 ft-lb) and the maximum makeup torque is 5320 N-m (3920 ft-lb). Land casing at proper elevation for thread-on type casing bowl.
20. Pull 273.1 mm casing.
21. Install circulating head, circulate minimum 1 hole volume, observe returns, ensure clean returns prior to cementing.
22. Record intermediate casing OD, weight, grade, placement of cementing hardware and set depth.
23. Prepare to cement 219.1 mm intermediate casing to surface.
24. Hold safety meeting with all on-site personal.
25. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.

DRILLING PROCEDURE

Union Dawn 288, 2-32-I

26. 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.
27. W.O.C. for 48 hours.
28. Hold Safety Meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 1.*
29. Install thread-on casing bowl.
30. Hold Safety Meeting. Pressure Test Intermediate casing and BOP in accordance with the Pressure
31. Test Program - Intermediate Casing - Pressure Test
32. Drill out cement and shoe with 203 mm bit.

Production Hole

34. Drill of 0.5 m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with
35. the Pressure Test Program - Production Hole - Pressure Integrity Test (PIT)
36. Bail hole dry.
37. Drill with 203 mm bit until approximately 15.3 m into the A-2 Unit Carbonate @ 486.5 mKB.
38. POOH
39. Head Up wellheadblind rams and BOP. Test blind rams
40. Drill Rat Hole
41. Hold safety meeting with all on-site personal.
42. Set up Core barrel
43. Run into hole with 158.8 mm OD core bit, 121 mm x 88.9 mm barrel, eight (8) 114.3 mm drill collars and 73.0 mm EUE tubing to surface.
    NOTE: Rig up stripper head prior to running 73.0 mm tubing.
44. Rig in Power Swivel and puming unit
45. Fill hole with brine, Circulate hole bottoms up
46. Core with brine through the A2 Carbonate and A2 Shale formations until returns show Guelph formation
47. Core slowly for approximately 1.0 m into the Guelph formation
48. Break out power seive and kelly hose
49. Hook up pumping unit to backside in case of kick
50. Pull tubing, drill collar and core barrel/bit
51. Lay down core barrel, recover, package and remove core from rig floor.
    Note; if additional coreing is required, repeat steps 36 - 47
52. Run into hole with 203 mm cable tool bit and ream cored section
53. Drill 0.5 m into the A-2 Anhydrite (504.6m) with 203 mm bit.
    Note: Geologist will be onsite to verify top of A-2 Anhydrite or Guelph formation.
    Note: IF A GAS SHOW IS ENCOUNTERED, STOP DRILLING IMMEDIATELY AND CONTACT INPSECTOR
55. Run 177.8 mm production casing to 503.6mKB 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 5110 N-m (3760 ft-lb) and the maximum makeup torque is 5610 N-m (4130 ft-lb). Ensure that a collar is not positioned where the wellhead seals need to be installed.
56. Set slips inside casing bowl. Set secondary seals. Use Plate above seals for cementing.
57. Record production casing OD, weight, grade, placement of cementing hardware and set depth.
58. Hold safety meeting.
59. Prepare to cement 177.8 mm production casing to surface.
60. Pressure test surface equipment to 15 MPag for 1 minute. Ensure no leaks.
61. Pump citric acid followed by fresh water pre-flush. Cement to surface as per Cementing Program -

DRILLING PROCEDURE

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177.8 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.

62. W.O.C. for 48 hours.
63. Set primary seals. Cut off casing to proper height. Install casing spool.
64. Hold safety meeting. Cased Hole Logging. *See LOGGING PROGRAM, Log Run 2.*
65. Hold Safety meeting. Perform wellhead, production casing and BOP pressure test in accordance with Pressure Test Program- Production Casing - Pressure Test.

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.

66. Drill 0.5m of new formation. Hold safety meeting. Perform Pressure Integrity Test in accordance with the Pressure Test Program - Production Hole - Pressure Intagrity Test (PIT)
67. Bail hole dry.
68. Drill under lubricator to 585 m with a 158.8 mm bit
69. Bail hole dry
70. Hold safety meeting. Open Hole Logging See *LOGGING PROGRAM*, Log Run #3
71. Rig out cable tool drilling rig
72. Install blind flange on top of master valve.
73. Underground Storage to notify M.N.R. with 48 hours after TD

CASING PROGRAM

Union Dawn 286, 1-33-I

CONDUCTOR CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	26.2	mKB	86.0	ftKB
Outside Diameter	406.40	mm	16.000	inches
Weight	76.49	kg/m	51.4	lb/ft
Drift Diameter	390.60	mm	15.378	inches
Inside Diameter	390.60	mm	15.378	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

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	40.2	mKB	131.9	ftKB
Outside Diameter	339.70	mm	13.374	inches
Weight	71.43	kg/m	48.0	lb/ft
Drift Diameter	319.00	mm	12.559	inches
Inside Diameter	322.96	mm	12.715	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,930	kPa	1,730	psi
Collapse	5,100	kPa	740	psi
Pipe Body Yield Strength	280,000	daN	541,000	lb-f
Joint Strength	187,000	daN	322,000	lb-f
Torque - Optimum	4,370	N-m	3,220	ft-lb
Torque - Maximum	5,470	N-m	4,030	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 Dawn 286, 1-33-I

RETRIEVABLE INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	161.6	mKB	530.2	ftKB
Outside Diameter	273.10	mm	10.752	inches
Weight	60.27	kg/m	40.5	lb/ft
Drift Diameter	251.31	mm	9.894	inches
Inside Diameter	255.27	mm	10.050	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,580	kPa	3,130	psi
Collapse	10,890	kPa	1,580	psi
Pipe Body Yield Strength	279,780	daN	629,000	lb-f
Joint Strength	200,160	daN	450,000	lb-f
Torque - Optimum	6,110	N-m	4,500	ft-lb
Torque - Maximum	7,650	N-m	5,630	ft-lb
Condition	Used			
Float Equipment	None			
Centralizers	2 m above shoe & joints 2 & 4			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

CASING PROGRAM

Union Dawn 286, 1-33-I

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	387.6	mKB	1271.7	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	35.72	kg/m	24.0	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	ST & C		ST & C	
Burst	20,340	kPa	2,950	psi
Collapse	9,450	kPa	1,370	psi
Pipe Body Yield Strength	169,500	daN	381,000	lb-f
Joint Strength	117,000	daN	263,000	lb-f
Torque - Optimum	3,570	N-m	2,630	ft-lb
Torque - Maximum	5,320	N-m	3,920	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	504.1	mKB	1653.9	ftKB
Outside Diameter	177.80	mm	7.000	inches
Weight	34.23	kg/m	23.0	lb/ft
Drift Diameter	158.52	mm	6.241	inches
Inside Diameter	161.70	mm	6.366	inches
Grade	K-55		K-55	
Thread	Proprietary		Proprietary	
Coupling	Integral		Integral	
Burst	30,060	kPa	4,360	psi
Collapse	22,550	kPa	3,270	psi
Pipe Body Yield Strength	162,800	daN	366,000	lb-f
Joint Strength	83,600	daN	188,000	lb-f
Torque - Optimum	5,110	N-m	3,760	ft-lb
Torque - Maximum	5,610	N-m	4,130	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 Dawn 287, 2-33-I

CONDUCTOR CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	24.8	mKB	81.4	ftKB
Outside Diameter	406.40	mm	16.000	inches
Weight	76.49	kg/m	51.4	lb/ft
Drift Diameter	390.60	mm	15.378	inches
Inside Diameter	390.60	mm	15.378	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

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	38.8	mKB	127.3	ftKB
Outside Diameter	339.70	mm	13.374	inches
Weight	71.43	kg/m	48.0	lb/ft
Drift Diameter	319.00	mm	12.559	inches
Inside Diameter	322.96	mm	12.715	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,930	kPa	1,730	psi
Collapse	5,100	kPa	740	psi
Pipe Body Yield Strength	280,000	daN	541,000	lb-f
Joint Strength	187,000	daN	322,000	lb-f
Torque - Optimum	4,370	N-m	3,220	ft-lb
Torque - Maximum	5,470	N-m	4,030	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 Dawn 287, 2-33-I

RETRIEVABLE INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	167.2	mKB	548.6	ftKB
Outside Diameter	273.10	mm	10.752	inches
Weight	60.27	kg/m	40.5	lb/ft
Drift Diameter	251.31	mm	9.894	inches
Inside Diameter	255.27	mm	10.050	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,580	kPa	3,130	psi
Collapse	10,890	kPa	1,580	psi
Pipe Body Yield Strength	279,780	daN	629,000	lb-f
Joint Strength	200,160	daN	450,000	lb-f
Torque - Optimum	6,110	N-m	4,500	ft-lb
Torque - Maximum	7,650	N-m	5,630	ft-lb
Condition	Used			
Float Equipment	None			
Centralizers	2 m above shoe & joints 2 & 4			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	392.6	mKB	1288.1	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	35.72	kg/m	24.0	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	ST & C		ST & C	
Burst	20,340	kPa	2,950	psi
Collapse	9,450	kPa	1,370	psi
Pipe Body Yield Strength	169,500	daN	381,000	lb-f
Joint Strength	117,000	daN	263,000	lb-f
Torque - Optimum	3,570	N-m	2,630	ft-lb
Torque - Maximum	5,320	N-m	3,920	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			

CASING PROGRAM

Union Dawn 287, 2-33-I

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	519.8	mKB	1705.4	ftKB
Outside Diameter	177.80	mm	7.000	inches
Weight	34.23	kg/m	23.0	lb/ft
Drift Diameter	158.52	mm	6.241	inches
Inside Diameter	161.70	mm	6.366	inches
Grade	K-55		K-55	
Thread	Proprietary		Proprietary	
Coupling	Integral		Integral	
Burst	30,060	kPa	4,360	psi
Collapse	22,550	kPa	3,270	psi
Pipe Body Yield Strength	162,800	daN	366,000	lb-f
Joint Strength	83,600	daN	188,000	lb-f
Torque - Optimum	5,110	N-m	3,760	ft-lb
Torque - Maximum	5,610	N-m	4,130	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 Dawn 288, 2-32-I

CONDUCTOR CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	28.2	mKB	92.5	ftKB
Outside Diameter	406.40	mm	16.000	inches
Weight	76.49	kg/m	51.4	lb/ft
Drift Diameter	390.60	mm	15.378	inches
Inside Diameter	390.60	mm	15.378	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

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	42.2	mKB	138.5	ftKB
Outside Diameter	339.70	mm	13.374	inches
Weight	71.43	kg/m	48.0	lb/ft
Drift Diameter	319.00	mm	12.559	inches
Inside Diameter	322.96	mm	12.715	inches
Grade	H-40		H-40	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,930	kPa	1,730	psi
Collapse	5,100	kPa	740	psi
Pipe Body Yield Strength	280,000	daN	541,000	lb-f
Joint Strength	187,000	daN	322,000	lb-f
Torque - Optimum	4,370	N-m	3,220	ft-lb
Torque - Maximum	5,470	N-m	4,030	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 Dawn 288, 2-32-I

RETRIEVABLE INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	170.7	mKB	560.0	ftKB
Outside Diameter	273.10	mm	10.752	inches
Weight	60.27	kg/m	40.5	lb/ft
Drift Diameter	251.31	mm	9.894	inches
Inside Diameter	255.27	mm	10.050	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,580	kPa	3,130	psi
Collapse	10,890	kPa	1,580	psi
Pipe Body Yield Strength	279,780	daN	629,000	lb-f
Joint Strength	200,160	daN	450,000	lb-f
Torque - Optimum	6,110	N-m	4,500	ft-lb
Torque - Maximum	7,650	N-m	5,630	ft-lb
Condition	Used			
Float Equipment	None			
Centralizers	2 m above shoe & joints 2 & 4			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

CASING PROGRAM

Union Dawn 288, 2-32-I

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	386.2	mKB	1267.1	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	35.72	kg/m	24.0	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	ST & C		ST & C	
Burst	20,340	kPa	2,950	psi
Collapse	9,450	kPa	1,370	psi
Pipe Body Yield Strength	169,500	daN	381,000	lb-f
Joint Strength	117,000	daN	263,000	lb-f
Torque - Optimum	3,570	N-m	2,630	ft-lb
Torque - Maximum	5,320	N-m	3,920	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	503.6	mKB	1652.2	ftKB
Outside Diameter	177.80	mm	7.000	inches
Weight	34.23	kg/m	23.0	lb/ft
Drift Diameter	158.52	mm	6.241	inches
Inside Diameter	161.70	mm	6.366	inches
Grade	K-55		K-55	
Thread	Proprietary		Proprietary	
Coupling	Integral		Integral	
Burst	30,060	kPa	4,360	psi
Collapse	22,550	kPa	3,270	psi
Pipe Body Yield Strength	162,800	daN	366,000	lb-f
Joint Strength	83,600	daN	188,000	lb-f
Torque - Optimum	5,110	N-m	3,760	ft-lb
Torque - Maximum	5,610	N-m	4,130	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 Bentpath 13, Dawn 8-32-V

PRODUCTION CASING SUMMARY (Cable: 1.9 m KB-GL)

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	498.5	mKB	1635.5	ftKB
Outside Diameter	177.8	mm	7.000	inches
Weight	34.23	kg/m	23.0	lb/ft
Drift Diameter	156.2	mm	6.151	inches
Inside Diameter	161.7	mm	6.366	inches
Grade	K-55		K-55	
Thread	Proprietary		Proprietary	
Coupling	Integral		Integral	
Burst	30,060	kPa	4,360	psi
Collapse	22,550	kPa	3,270	psi
Thread	162,800	daN	366,000	lb-f
Joint Strength	137,400	daN	309,000	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	Insert Float (Top of 1st joint)			
Centralizers	2 m above shoe & joints 2,4 & 5; every 5th joint to surface; 10 m from surface			
Shoe	Guide			
Threadlock	Tack weld guide shoe to bottom joint of casing			

CASING PROGRAM

Union Bentpath 14, Dawn 7-31-V

CONDUCTOR CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	21.1	mKB	69.2	ftKB
Outside Diameter	508.00	mm	20.000	inches
Weight		kg/m	0.0	lb/ft
Drift Diameter		mm	0.000	inches
Inside Diameter	498.50	mm	19.626	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

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	35.1	mKB	115.2	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 Bentpath 14, Dawn 7-31-V

RETRIEVABLE INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	114.1	mKB	374.3	ftKB
Outside Diameter	339.70	mm	10.752	inches
Weight	71.43	kg/m	40.5	lb/ft
Drift Diameter	319.00	mm	9.894	inches
Inside Diameter	322.96	mm	10.050	inches
Grade	H-40		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	11,930	kPa	1,730	psi
Collapse	5,100	kPa	740	psi
Pipe Body Yield Strength	240,640	daN	541,000	lb-f
Joint Strength	143,230	daN	322,000	lb-f
Torque - Optimum	4,370	N-m	3,220	ft-lb
Torque - Maximum	5,470	N-m	4,030	ft-lb
Condition	Used			
Float Equipment	None			
Centralizers	2 m above shoe & joints 2 & 4			
Shoe	Drive			
Threadlock	Tack weld drive shoe on bottom joint of casing			

CASING PROGRAM

Union Bentpath 14, Dawn 7-31-V

INTERMEDIATE CASING SUMMARY

	Metric		Imperial	
Description	**Value**	**Unit**	**Value**	**Unit**
Top	0.0	mKB	0.0	ftKB
Bottom	335.1	mKB	1099.4	ftKB
Outside Diameter	273.10	mm	10.752	inches
Weight	60.27	kg/m	24.0	lb/ft
Drift Diameter	251.31	mm	9.894	inches
Inside Diameter	255.27	mm	10.050	inches
Grade	K-55		K-55	
Thread	8 Rd.		8 Rd.	
Coupling	ST & C		ST & C	
Burst	21,580	kPa	3,130	psi
Collapse	10,890	kPa	1,580	psi
Pipe Body Yield Strength	279,800	daN	629,000	lb-f
Joint Strength	200,200	daN	450,000	lb-f
Torque - Optimum	6,110	N-m	4,500	ft-lb
Torque - Maximum	7,650	N-m	5,630	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	498.1	mKB	1634.2	ftKB
Outside Diameter	219.10	mm	8.626	inches
Weight	35.72	kg/m	24.0	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	ST & C		ST & 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			

2017 Storage Enhancement Project - Proposed Schedule

MAJOR TASKS	2016							2017								
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
OEB																
ENVIRONMENTAL ASSESSMENT & REPORT	■	■	■	■												
FILE APPLICATION					◆											
DECISION									◆							
ENGINEERING & PROCUREMENT																
MATERIAL PROCUREMENT						■	■	■	■	■						
DESIGN WELLS		■	■	■												
LAND RIGHTS NEGOTIATIONS																
OBTAIN LETTER OF ACKNOWLEDGEMENT		■	■	■	■											
PRECONSTRUCTION INTERVIEWS										■	■	■				
CONSTRUCTION																
WELL PAD, ROAD					■	■										
WELL DRILLING										■	■	■	■	■		
PIPELINE CONSTRUCTION												■	■	■	■	
IN-SERVICE																◆
FINAL CLEANUP														■	■	

Dawn Storage Enhancement Project

DESIGN AND PIPE SPECIFICATIONS

Design Specifications: NPS 12

Class Location (existing)	-	Class 1
Design Class Location	-	Class 2
Design Factor	-	0.8
Location Factor (General)	-	0.900
Location Factor (Roads)	-	0.625
Maximum Design Pressure	-	9930 kPa
Maximum Operating Pressure	-	8620 kPa
Test Medium	-	Water
Test Pressure	-	13902 kPa
Valves/Fittings	-	PN 100
Minimum Depth of Cover (General)	-	1.2 m
Minimum Depth of Cover (Roads)	-	1.2m

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	-	Fusion Bond Epoxy
% SMYS	-	47%

GENERAL TECHNIQUES AND METHODS OF CONSTRUCTION

1. Pipeline construction is divided into several crews that create a mobile assembly line. Each crew performs a different function, with a finished product left behind when the last crew has completed its work.

2. Union Gas will provide its own inspection staff to ensure the contractor meets its contractual obligations.

3. Where possible, trees are cleared in the winter before construction to avoid avian nesting concerns. If the land cannot be accessed in the winter due to incomplete easement negotiations or other reason, an ornithologist will inspect the site and direct any avian mitigation needed. Logs are stacked at the side of the easement for landowner use, if requested.

4. The contractor's clearing crew braces and cuts all fences crossing the easement and installs any required temporary gates. This crew clears small brush and crops on the easement and temporary working areas.

5. The grading crew constructs approaches through road, highway, and railway ditches to allow equipment onto the working side of the easement. This crew also builds roads through wet areas to allow heavy equipment operation. The grading crew strips a certain width of topsoil with bulldozers and graders so that it will not be mixed with the subsoil later removed from the trench. In hilly terrain, the grade is levelled to provide a stable working surface.

6. The contractor erects safety barricades around excavations adjacent to roads. Flagmen and signs are used for traffic control. The easement is fenced nightly at all access points.

7. The stringing crew then lays pipe on wooden skids on the working side of the easement adjacent to the proposed trench area. Wherever possible, the stringing trucks hauling the pipe travel down the centre of the proposed trench to minimize soil compaction effects.

8. The contractor, by use of a trenching machine or hoe excavator, will excavate a trench approximately 1.1 metre in width for the pipeline, depending on ground conditions at the time. Accesses across the easement including laneways are left unexcavated where requested by the landowner. All tile cut during trench excavation is flagged at the trench and easement limits to signify to the tile repair crew that a repair is required. All utilities that will be crossed or paralleled closely by the pipeline will be located prior to trenching.

9. Bedrock will be removed by mechanical means such as excavators using a rock bucket or a "hoe ram".

10. Concurrent to trenching, the contractor will have separate crews to install the pipe at road and railway crossings. This operation will be accomplished by trenchless technology techniques such as Jack and Bore (auger) or Horizontal Directional Drill (HDD). These trenchless technology techniques do not disrupt the surface features at the crossing site. These installations involve an excavation on both sides of the proposed crossing to allow room for the equipment to be operated and the pipe to be installed at the proper elevation.

11. Next, the pipe between roads, accesses, laneways, and streams is welded into one continuous length. All welds are ultrasonically and/or radiographically inspected and then coated and lowered into the trench. After sections of pipe are lowered into the trench, subsoil is backfilled by a drag line, bulldozer or backhoe. If the excavated material contains too much rock for direct backfilling, it may be sifted to separate the fine parts from the rock. If such separation is not possible due to the consistency of the material or if a large quantity of rock remains, the unsuitable materials will be hauled away and sand brought in for backfilling.

12. The tie-in crew is responsible for the installation of pipe across accesses and laneways to minimize the length of time that these accesses are out of service to the landowner. The tie-in crew is also responsible for the pipeline installation at most river and stream crossings.

13. The pipe is filled with water and hydrostatically tested to prove its integrity. After the test water is removed and the line dried, an electronic sizing tool is run through the pipeline to check for ovality and dents. Cathodic protection is applied to the completed pipeline.

14. 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.

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.

PIPELINE ABANDONMENT CHECKLIST

PLANNING

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

IMPLEMENTATION

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

LIABILITY/RISK MANAGEMENT

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

2017 STORAGE ENHANCEMENT PROJECT

ENVIRONMENTAL PROTECTION PLAN

Prepared By: Union Gas Limited
Environmental Planning
September 2016

TABLE OF CONTENTS

2017 Storage Enhancement Project
Environmental Protection Plan

1.0 INTRODUCTION

This Environmental Protection Plan (EPP) has been prepared for the development of the 2017 Storage Enhancement Project ("the Project"), as proposed by Union Gas Limited ("Union Gas"). The Project involves work in the Bentpath Storage Pool and the Dawn 156 Storage Pool to increase the deliverability in each pool as well as to increase the allowable operating pressure in the Dawn 156 Storage Pool.

This report will document a plan for the protection of the environment during the completion of the following activities: deepening (drilling) of two existing wells, drilling of four new wells, installation of new gathering pipelines to wells not currently connected to the gathering system, construction of access roads to the new wells, construction of temporary drilling pads, improvements to seventeen well heads, and abandonment of two wells and their associated gathering pipelines.

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.

A well drilling application will be submitted to the Ministry of Natural Resources and Forestry by Union Gas. As Union Gas is the operator of the Bentpath and Dawn 156 Storage Pools, all aspects of the Project will be completed by Union Gas. This includes determining the locations of the new wells and depths to deepen the existing wells, developing and adhering to well drilling specifications, operating and maintaining the facilities, identifying and mitigating any environmental concerns, and working with the landowners in the storage pool.

In addition to providing a formal plan for the protection of the environment, this report provides the landowners and 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 Bentpath Pool was discovered in 1970, and it was designated as a Storage Pool in 1974. Wells were first drilled in 1970 and there are currently twelve wells (7 injection/withdrawal and 5 observation) in the pool. The Bentpath Designated Storage Area is 319 hectares in size and is located in Lots 30-33 of Concessions 4 and 5 in the Township of Dawn-Euphemia, Lambton County. This area is predominately agricultural with scattered residential dwellings. The proposed well drillings, pipeline installations and associated works are located on Lots 31-32, Concession 5, Township of Dawn-Euphemia in Lambton County and are identified in Appendix A.

The Dawn 156 Storage Pool was discovered in 1952 with the drilling of the Dawn 156 well by Union Gas. Between 1954 and 1960, there were an additional twenty-four wells drilled into the reservoir and surrounding area. The pool was converted to storage operations in 1962. Currently there are twenty two active injection/withdrawal wells and five observation wells for a total of 27 wells. The pool is Union Gas's largest storage pool with a total capacity of 1,023.3 10^6m^3 (36.1 Bcf) and working capacity of 746.7 10^6m^3 (26.4 Bcf). The proposed well drillings, pipeline installations and associated works are located on Lots 32-33, Concession 1, Township of Dawn-Euphemia in Lambton County and are identified in Appendix A. This area is also predominately agricultural with scattered residential dwellings.

Drilling four new I/W wells and deepening two existing wells (one I/W well and one observation well to be converted to an I/W well) is required to increase the allowable operating pressure in the Dawn 156 Storage Pool and to increase the deliverability in the Dawn 156 Storage Pool and Bentpath Storage Pool in order to meet growing market demand for increased storage deliverability and space.

3.0 PROJECT DESCRIPTION

The Project will include:

- Drilling of four new I/W wells
- Deepening (drilling) of two wells (one I/W well and observation well) and converting the observation well to an I/W well
- Construction of six temporary drilling pads
- Installation of new gathering pipelines to wells not currently connected to the gathering system
- Construction of access roads
- Improvements to seventeen wellheads
- Abandonment of two I/W wells and the associated gathering pipelines

The work proposed in the Bentpath Storage Pool includes drilling of a new I/W well (proposed Union Bentpath 14), deepening of an existing injection/withdrawal (I/W) well (Union Bentpath 12), and deepening of an observation well (Union Bentpath 13) and converting it to a 7" I/W well, and installing approximately 200 m of new NPS (Nominal Pipe Size) 12 inch pipeline to connect UB 13 and UB 14 to the existing gathering system. A new access road will also be constructed to the proposed UB 14 and temporary gravel drilling pads will be required for all three wells. Please see Appendix A for a detailed map of the proposed facilities located in the Bentpath Storage Pool.

The work proposed in the Dawn 156 Storage Pool includes drilling of three new I/W wells (proposed UD 286, UD 287, and UD 288), and installing approximately 400 m of new NPS 12 inch pipeline to connect the new wells to the existing gathering system. New access roads and temporary gravel drilling pads will be required for all three wells. Please see Appendix A for a detailed map of the proposed facilities located in the Dawn 156 Storage Pool. Improvements to seventeen wellheads will be made during construction of the above facilities and two I/W wells (D190 and D223) and their associated gathering pipelines will also be abandoned.

4.0 PLANNING PROCESS

4.1 Key Activities

The following is a summary of the key activities for the development of the 2017 Storage Enhancement Project:

Determine well locations	Spring 2016
Initiate EPP for the Project	Spring 2016
Finalize well locations	Summer 2016
Finalize EPP for the Project	Fall 2016
Submit Applications:	
Ministry of Natural Resources and Forestry (MNRF)	Fall 2016
Ontario Energy Board	Fall 2016
Ontario Energy Board Hearing	Winter 2016/17
Ontario Energy Board Decision	Winter 2016/17
Construction:	
Drilling Pad Construction	Fall 2016
Access Road Construction	Fall 2016
Well Drilling	Spring 2017
Pipeline Installation	Spring 2017
Wellhead Improvements	Spring 2017
Well and Pipeline Abandonment	Spring 2017

5.0 LANDOWNER INPUT

Union Gas has met, and will continue to meet, with the landowners and tenants who are directly affected by the Project and other landowners who are adjacent to the work area to inform them of the Project. Discussions with the directly affected landowners and tenants included compensation, new well and pipeline locations, access road and temporary drilling pad locations, topsoil stripping, and fencing for cattle. During these discussions, the landowners and tenants had the opportunity to comment on Union

Gas's proposal and any concerns identified have been addressed in the mitigation section of this report. Union Gas will continue to work with the landowners and tenants regarding these items.

Both the affected and 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 directly affected landowner as well as 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 extend or construct new "all weather" access roads within the storage pools to allow Union Gas access to the new wellheads. Union Gas will negotiate the locations, layouts and designs of the permanent, all weather access roads with the landowners and tenants. Permanent access roads allow Union Gas to perform routine maintenance such as dead weight testing, corrosion logging, well stimulations and pressure tests without disturbing agricultural soils and crops.

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

- Location of the permanent road network is determined in consultation with the landowner and tenant
- 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 35 cm

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 road will be hauled to another location on the landowner's property or will be taken to an approved site mutually agreed on by the landowner and Union Gas if the landowner refuses the topsoil.

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 60 m by 80 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 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 in consultation with the landowner.

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 the Energy Act.

Restoration
It is Union'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 personnel after storage pools are in operation.

Locates
Union provides a free locate service to any person or business who may be working near a pipeline. The pipeline locator is comprised of two parts, a transmitter and a receiver. To perform 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 pools. This report discusses the net and cumulative effects that can be expected from this type of project.

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

Union Gas believes that due to the limited impact the Project will have on the surrounding environment, the implementation of Union Gas's standard mitigation measures combined with the landowner compensation package for temporary crop loss and disturbances will result in no significant cumulative impacts.

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

Agricultural Areas

Well drilling, pipeline installation, and well pad and access road construction will all occur on or adjacent to agricultural lands and therefore have the potential to impact them. Potential impacts to agricultural lands include: compaction, topsoil/subsoil mixing, and reduction of crop yields.

To mitigate potential compaction, Union Gas will implement appropriate compaction relief using an agricultural subsoiler prior to replacing topsoil if soils have been compacted by heavy equipment. Union Gas will also strip topsoil separately from subsoil to ensure there is adequate separation between the stockpiles. Topsoil stripping and soil compaction will be monitored during construction. Union Gas will also follow a wet soils shut down practice when working directly on agricultural lands to ensure there are no adverse effects due to equipment working on wet soils. Additionally, the Landowner will be compensated for any crop losses as a result of the Project.

Fencing

Prior to the construction of the access road and well pad, Union Gas will work with the landowner and tenant farmer to establish the appropriate location and to install temporary livestock fencing at UB 12 and UB 13. The fencing will remain in place until all drilling activities have been completed. Following well drilling activities, Union Gas will work with the landowner and tenant to establish new permanent fencing.

Soybean Cyst Nematode

Prior to the construction of the access road and well pad, Union Gas will conduct soil sampling in agricultural fields associated with the Project. The samples will be tested and analyzed for the presence of Soybean Cyst Nematode (SCN). SCN is a microscopic worm-like organism found in soils that obtain their nutrients by feeding on the roots systems of soybeans. Once a field has been infested, there is significant potential for soybean crop loss.

If any properties are found to contain SCN, a construction protocol developed by Union Gas to deal with SCN will be implemented. The protocol involves complete topsoil stripping and washing of all construction equipment involved before leaving the site.

Water Well Monitoring

Water wells may be impacted by well drilling and pipeline construction. These activities could impact on 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 agricultural areas and 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 will retain the services of a Cultural Heritage Consultant 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.

Union Gas will retain the services of an Archaeological Consultant to initiate a Stage I and Stage II Archaeological Assessment prior to construction 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 survey will serve to confirm the presence of significant archaeological resources subject to potential impact from the proposed Project activities.

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

Tree clearing is not anticipated for this project.

Should tree clearing become necessary, it 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.

Species at Risk

Union 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. The review determined that there are no SAR in the Project study area and therefore no impacts are anticipated. Please see Appendix D for the SAR Report.

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".

This Project will include drilling of four new I/W wells, construction of four new 12 m by 12 m well pads, construction of three new permanent access roads approximately 66 m, 75 m (2) in length, and the installation of approximately 600 m of gathering pipelines.

Agricultural land is the most significant feature impacted by this Project. Potential cumulative impacts to be considered are the impacts to agricultural soils and socio-economic impacts to the landowners.

Union believes that the standard mitigation measures for topsoil conservation, wet soils shut down and rehabilitation of agricultural lands as outlined in this report will ensure that the agricultural productivity of the lands impacted is maintained. Union has worked with the landowners on the proposed locations of the wells, access roads, and pipelines and will sign a letter of understanding with the landowners for this Project.

9.0 SUMMARY AND RECOMMENDATIONS

This Environmental Protection Plan (EPP) provides a strategy for the protection of the environment during the 2017 Storage Enhancement 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 2017 Storage Enhancement 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) Pre-Construction	Ancillary facilities such as wellheads and access roads may be an inconvenience to landowners and farming operations.	• Prior to any activity associated with the development, the Lands Agent will meet with the directly affected landowners and review items such as the drilling schedule, as well as the location of the wellheads, pipelines and the permanent access roads. The facilities will be located so as to minimize any inconvenience to the farming operation.
b) Surveying	Surveying may be disruptive to the landowner.	• The landowners will be notified of intent to enter the property.
c) 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.	• The location of the access roads will be reviewed with the landowners. Roads will be constructed in such a way as to minimize disruption to farm operations. • 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.
d) Grading	Grading will be necessary for the construction of access roads, drilling pads and pipeline work areas. On agricultural land, grading has the potential to impact soil productivity by disrupting tile drains and causing soil mixing, rutting and compaction, particularly during wet soil conditions.	• Pre-construction tiling will be undertaken prior to the start of any operations, if necessary. • Disrupted or broken tile will be repaired following the Company's documented procedures for tile repair. • Grading will not be conducted on wet soils. Wet soils shutdown practices will be adhered to. • In drilling and pipeline work areas where land will be returned to its former use (agricultural), topsoil will be stripped and stockpiled along the edges of the work area following documented Company procedures. • An Environmental Inspector will be on site at a regular basis to observe operations such as topsoil stripping, trenching, dewatering and any other procedures that may have an impact to the environment.
e) 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.

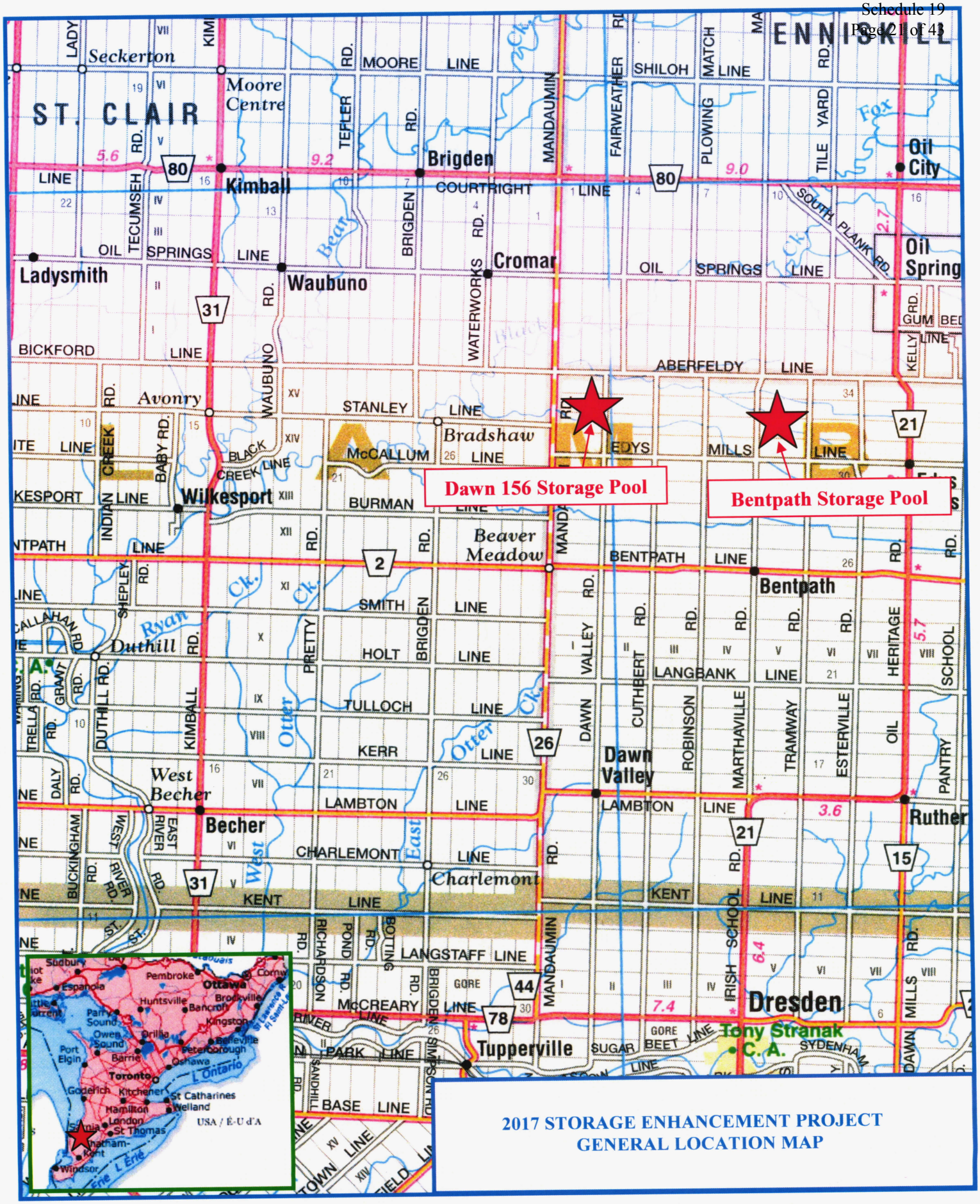
TABLE 1: MITIGATION SUMMARY
WELL DRILLING AND PIPELINE CONSTRUCTION

Activity	Potential Impact	Mitigation
f) Site Restoration	Improper site restoration may permanently affect soil productivity.	• Areas disrupted by drilling and pipeline construction will be restored by re-grading followed by chisel ploughing and disking. • The Lands Agent will review and discuss site restoration measures with the landowner prior to implementation to obtain any concerns or suggestions with regard to these measures. • Upon completion, the Lands Agent will review the area with the landowner to ensure restoration has been completed to the landowner's satisfaction.
g) 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.
h) 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.
i) Landowner Concerns	Disruption to landowners and tenants.	• Union Gas will provide the landowners with the telephone numbers of Company personnel. • A Landowner Relations Program will be established to track complaints during construction.
j) Road Side Ditches	Water quality concerns.	• Will ensure ditches are returned to pre-construction conditions or better, as quickly as possible.
k) Nuisance Dust	Disruption to landowners and tenants.	• Control dust as required.
l) Fences	Disruption to landowners and tenants. Loss of control of animals inside fenced areas.	• Landowners and tenants will be contacted before any fences are disturbed. • Temporary fencing will be erected if requested by landowner or tenant. • Fences will be replaced as soon as possible.
m) Underground	Disruption of services	• Obtain "locates" from all utilities.

TABLE 1: MITIGATION SUMMARY WELL DRILLING AND PIPELINE CONSTRUCTION		
Activity	**Potential Impact**	**Mitigation**
Utilities		• If utilities are damaged, repair as soon as possible.
n) Archaeology, Cultural Heritage Landscapes and Built Heritage Resources	Disturbance of heritage resources	• An archaeological assessment will be 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.
o) 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.
p) Trees	Damage to Trees Disturbance to wildlife	• Minimal tree removal is anticipated. • Trees to be removed outside of avian nesting window. • Discuss restoration plans with landowner.
q) Natural Areas	Sedimentation run-off	• Ensure sediment barriers such as straw bales/sediment fencing are used where there is a potential for run-off.
r) Vegetative Cover	Loss of vegetative cover leading to soil erosion	• Restore cover by means of seeding or hydro-seeding as soon as possible.
s) Soils: Erosion	Introduction of sediment/silt to adjacent lands	• Restore disturbed soils as soon as possible after construction.
t) 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.

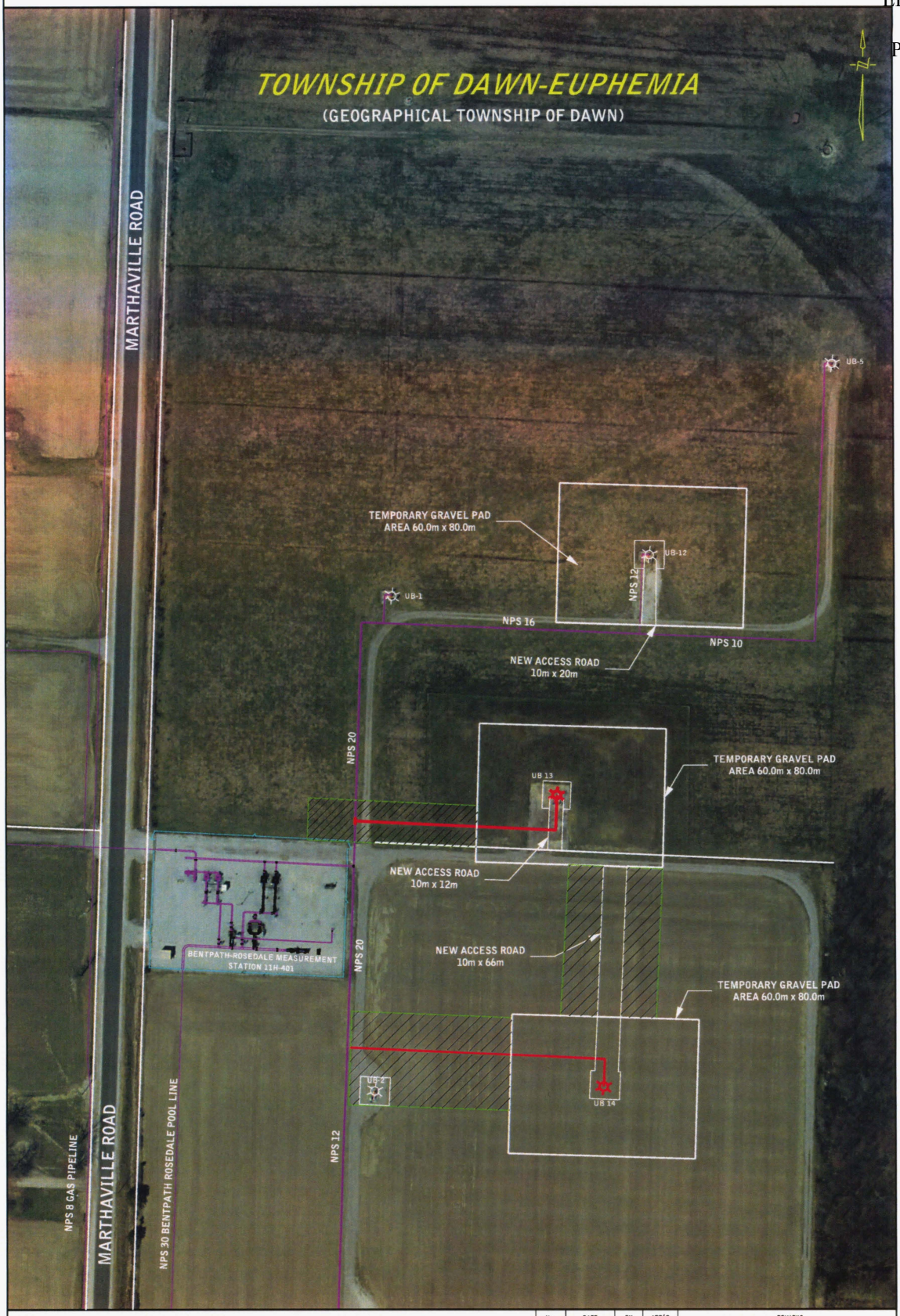
APPENDIX A

PROJECT MAPPING



2017 STORAGE ENHANCEMENT PROJECT
GENERAL LOCATION MAP

PROPOSED FACILITIES: BENTPATH POOL



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
				REVISIONS

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PROPOSED FACILITIES
BENTPATH POOL

DRAWN BY: T. James	DATE: 2016/09/21	PLOT SPEC: 1/2000
CHECKED BY	DATE	CAD CODE: M797
APPROVED BY	DATE	FILE REVISION DATE: 2016-00-00
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: M797 OEB

PROPOSED FACILITIES: DAWN 156 POOL

LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WELLS TO BE ABANDONED
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
01				

REVISIONS

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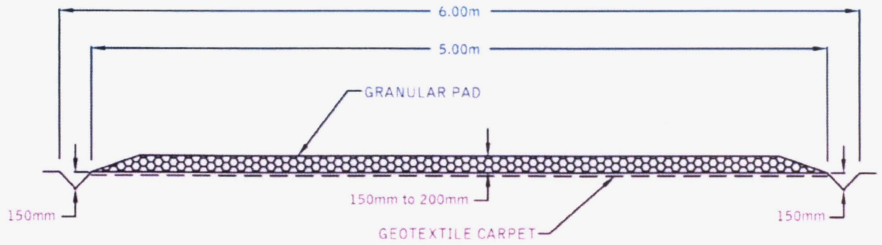
PROPOSED FACILITIES
DAWN 156 POOL

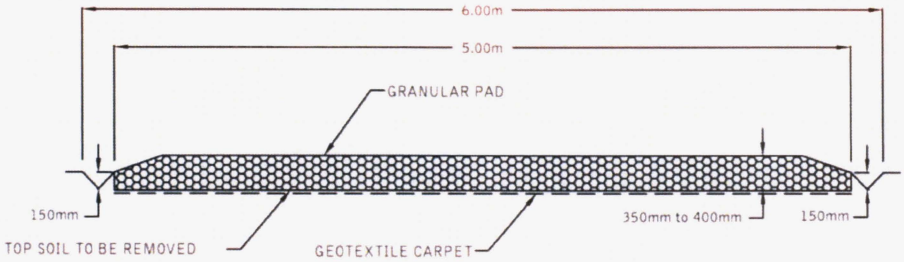
DRAWN BY: T. James	DATE: 2016/09/21	PLOT SPEC: 1/4000
CHECKED BY:	DATE:	CAD CODE: PL1476
APPROVED BY:	DATE:	FILE REVISION DATE: 2016-00-00
SHEET No.: 1 OF 1	SYSTEM:	DRAWING No.: PL1476 OEB

APPENDIX B

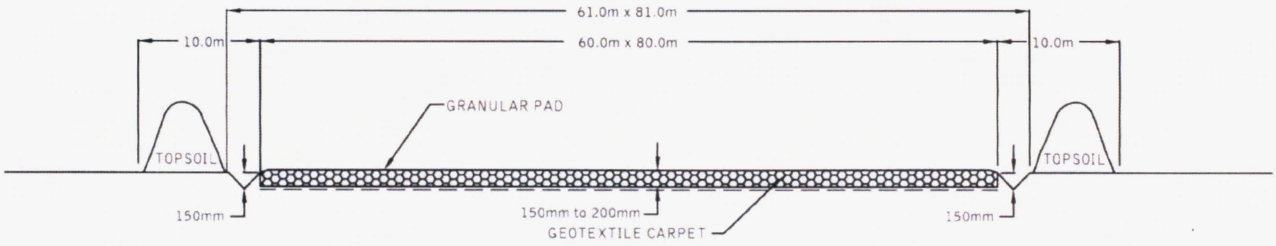
TYPICAL DRAWINGS



TYPICAL TEMPORARY ACCESS ROAD



TYPICAL PERMANENT ACCESS ROAD



TYPICAL WELL DRILLING WORK AREA

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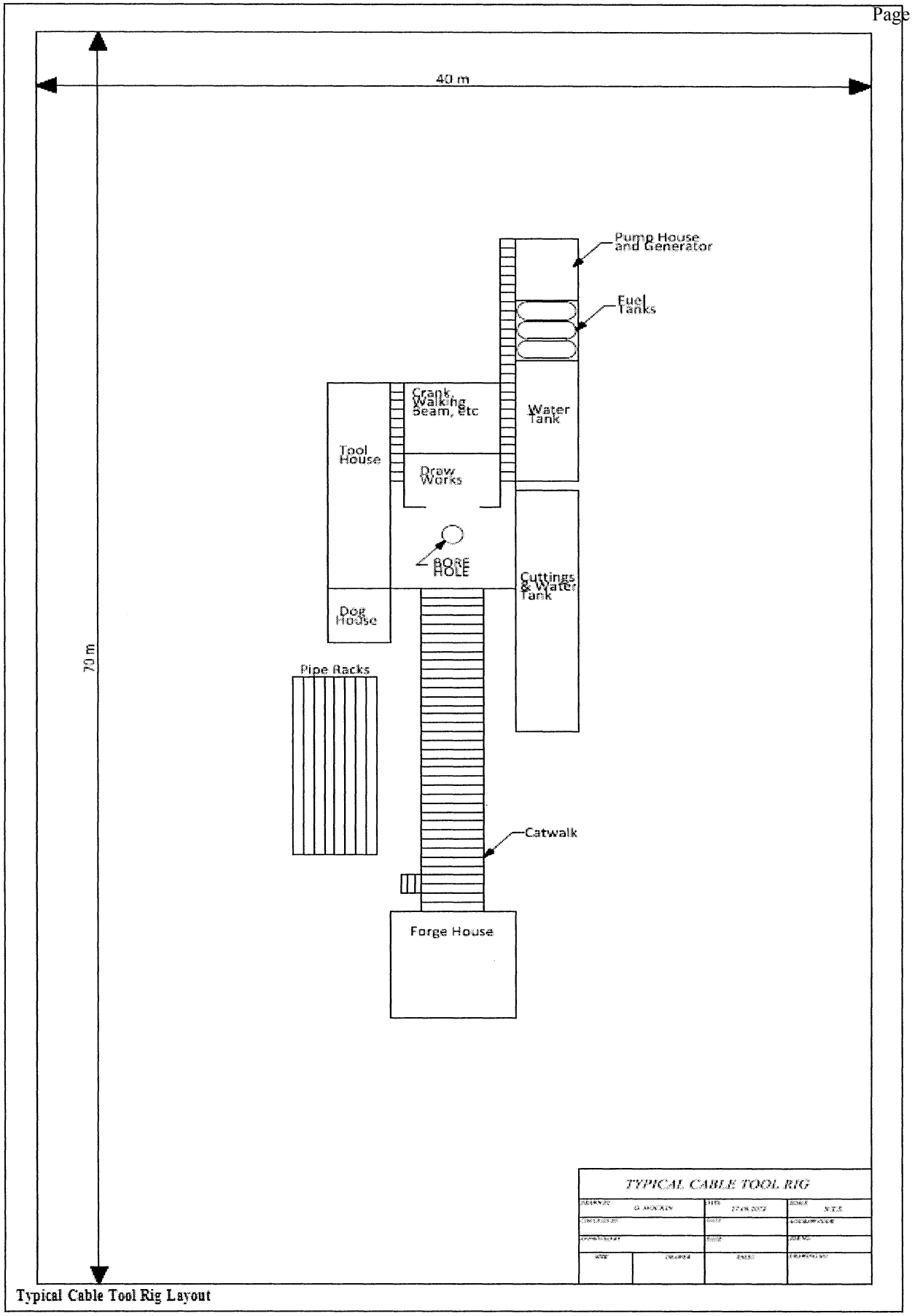
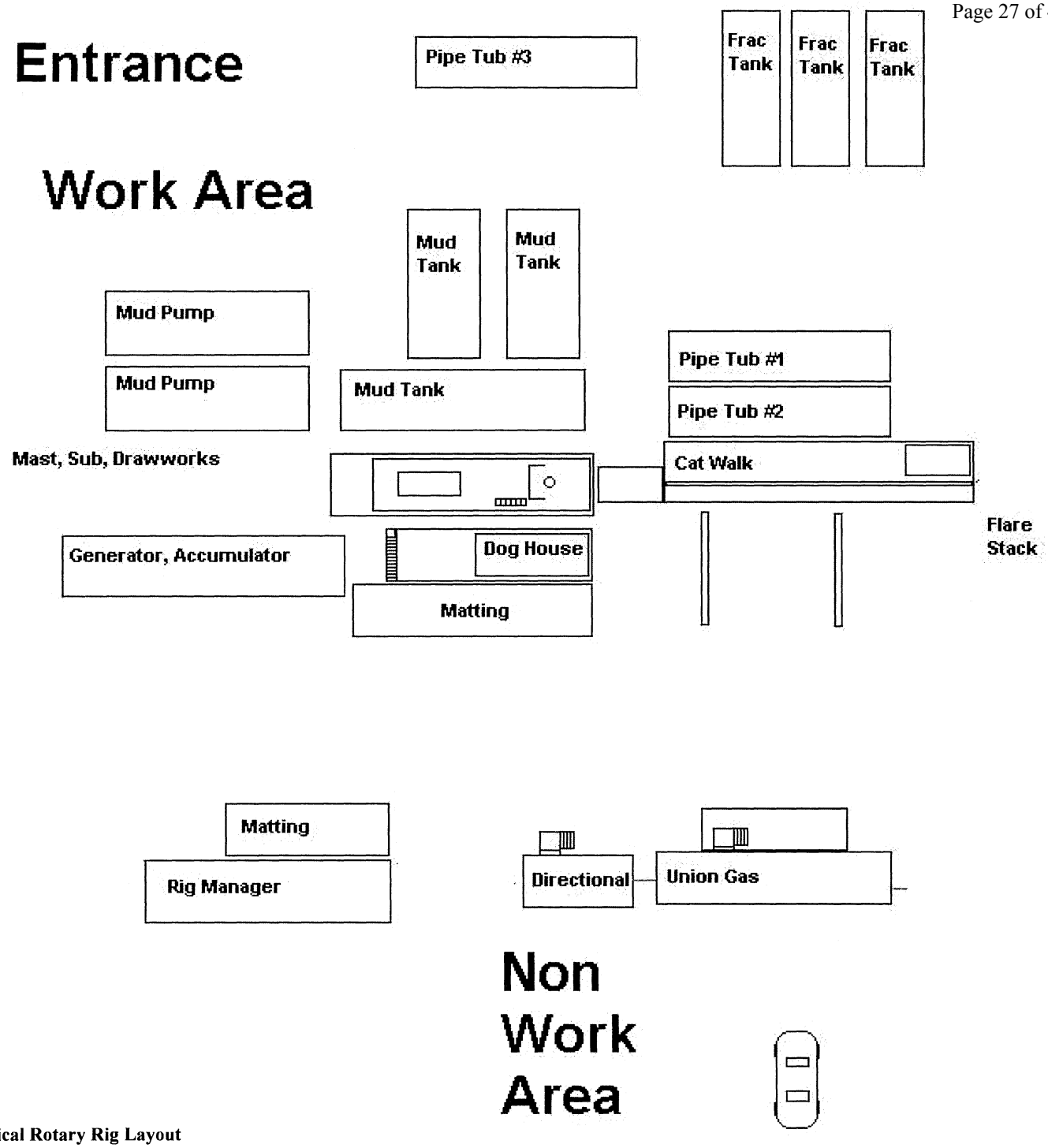
TYPICAL ACCESS ROAD AND WORK AREA DETAIL

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

PHOTOGRAPHS

1. Location of UB 12 (looking north)

2. Location of proposed gathering pipeline to UB 13

3. Proposed location of UB 14 (looking southeast)

4. Proposed location of UD 286 (looking west)

5. Proposed location of UD 287 (looking west)

6. Proposed location of UD 288 (looking west)

APPENDIX D

SPECIES AT RISK REPORT

NEEGAN BURNSIDE

2017 Storage Enhancement Project
Species at Risk Report

Township of Dawn-Euphemia, Ontario

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

September 2016
300039355.0000

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
0	Yes	Yes	Union Gas Limited

Record of Revisions

Revision	Date	Description
0	September 28, 2016	Initial Submission to MNRF

Neegan Burnside Ltd.

Report Prepared By:

Kevin Butt, B.Sc. (Env.), Rest. Cert.
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KB:mp

Report Reviewed By:

Nicholle Smith, B.A., EMPD
Senior Terrestrial Ecologist
NS:mp

Table of Contents

Tables

Figures

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 2017 Storage Enhancement Project. Neegan Burnside reviewed background natural heritage information and completed an onsite assessment of the study areas for existing conditions and natural heritage constraints.

The study areas are comprised of 5 rural properties: 3 contiguous properties on the west side of Dawn Valley Road (Dawn 156 Storage Pool) and 2 contiguous properties east of Marthaville Road (Bentpath Storage Pool).

This SAR Report is to be read in conjunction with the Environmental Protection Plan prepared by Union Gas Limited (dated September 2016) that provides a complete description of the proposed work.

2.0 Background Information

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

- 2017 Storage Enhancement Project, Environmental Protection Plan prepared by Union Gas Limited (dated September 2016); and
- Proposed well locations mapping prepared by Union Gas Limited (dated September 2016).

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, gravel pads and temporary work areas.

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 areas was completed on July 13, 2016. The records for these two areas are provided below.

3.1.1 Dawn 156 Storage Pool

Table 1: NHIC Tracked Species within the Three Subject Properties of the Dawn 156 Storage Pool (NHIC Squares 17LH9933 and 17LH9934)

Scientific Name	Common Name	Srank	COSEWIC Status	COSSARO Status	Last Observation Date	Required Habitat
Arisaema dracontium	Green Dragon	S3	SC	SC	1977	The Green Dragon grows in somewhat wet to wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees.[1]
Colinus virginianus	Northern Bobwhite	S1	END		5/25/1983	Northern bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging. Bobwhites lay up to 16 eggs in a shallow natural depression that they line with plant material and conceal with grasses and vines.[1]
Crataegus nitidula	Ontario Hawthorn	S2			6/1/1978	Forests (beech-maple, oak, aspen, jack pine) and borders, swamps, river banks and bottoms; roadsides, fencerows, fields. A common and readily recognized species that can grow to considerable size on rich bottomlands, but survives also on dry hillsides.[2]

[1]From www.ontario.ca (accessed July 2016)
[2]From http://michiganflora.net (accessed July 2016)

3.1.2 Bentpath Storage Pool

Table 2: NHIC Tracked Species within the Two Subject Properties of the Bentpath Storage Pool (NHIC Squares 17MH0333 and 17MH0433)

Scientific Name	Common Name	Srank	COSEWIC Status	COSSARO Status	Last Observation Date	Required Habitat
Arisaema dracontium	Green Dragon	S3	SC	SC	1977	The Green Dragon grows in somewhat wet to wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees. 1
Colinus virginianus	Northern Bobwhite	S1	END		5/25/1983	Northern bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging. Bobwhites lay up to 16 eggs in a shallow natural depression that they line with plant material and conceal with grasses and vines.[1]
Bidens trichosperma	Crowned Beggarticks	SH			9/6/1920	In the same habitats as B. cernua, but more frequently than that species in peatlands (bogs, fens, tamarack swamps).[2]
Crataegus nitidula	Ontario Hawthorn	S2			6/1/1978	Forests (beech-maple, oak, aspen, Jack pine) and borders, swamps, river banks and bottoms; roadsides, fencerows, fields. A common and readily recognized species that can grow to considerable size on rich bottomlands, but survives also on dry hillsides. [2]
Vicia caroliniana	Carolina Vetch	S2			6/16/1960	Oak and oak-hickory forests, borders of forests, dry open ground and clearings; less often in moist places, banks of streams and lakes. [2]
Krigia biflora	Two-flowered Dwarf-dandelion				7/1/1907	Savannas, especially oak or jack pine, sometimes spruce, often in moist ground and on banks and borders; fens, wet meadows. [2]

[1]From www.ontario.ca (accessed July 2016)
[2]From http://michiganflora.net (accessed July 2016)

3.2 Natural Heritage Field Investigation

Investigations of the site conditions were completed by a Neegan Burnside biologist on July 15, 2016 in order to identify potential presence of SAR or their habitat.

3.2.1 Dawn 156 Storage Pool

The three properties within this study area where being managed as croplands at the time of the assessment. The northernmost lot (PIN 433840055) was soybeans, the middle lot (PIN 433840056) was wheat, and the southernmost lot (PIN 433840059) was alfalfa. Access roads, temporary work areas and gravel pads were investigated and only existing farm accesses and croplands are present within these proposed work zones. The only suitable habitat identified immediately adjacent to the study area was found on the northernmost property which contains a White Elm – Hawthorn dominated hedgerow. The workzone will be laid out to prevent removal of any vegetation within this hedgerow, and no impacts to hedgerow vegetation are anticipated.

All temporary workzones are greater than 100 metres from the wooded areas to the west and the watercourse found to the south of the study areas.

No impacts to documented SAR or their habitat are anticipated as a result of the proposed work.

The study areas are illustrated on Figure 1.

3.2.2 Bentpath Storage Pool

The northernmost lot (PIN 433830091) was being managed as pasture land dominated by cool season grasses (Smooth Brome, Fescue spp.) with presence of common meadow forbs such as Curled Dock, Wild Carrot, Birdsfoot Trefoil and Annual Sowthistle. Evidence of cattle pasturing within the last year was seen. The southernmost lot (PIN 433830148) was being managed as soybeans.

No presence of the above listed SAR or their supporting habitat were identified on the sites.

The temporary workzone associated with the northernmost property is greater than 100 metres from the wooded areas to the east. The temporary workzone associated with the southernmost property is approximately 60 metres from the woodland.

No impacts to documented SAR or their habitat are anticipated as a result of the proposed work.

The study area and proposed work is illustrated on Figures 2 and 3.

4.0 Potential Impacts and Proposed Mitigation

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

4.1 Impacts and Mitigation to Vegetation

4.1.1 Potential Impact

Construction may result in disruption of grassland bird nests, contravening the Migratory Birds Convention Act (1994) and the Endangered Species Act (2007) in lands being managed as pasture.

4.1.2 Recommended Mitigation

It is recommended that the workzones with the gravel pads are constructed 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 workzone 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 re-establish.

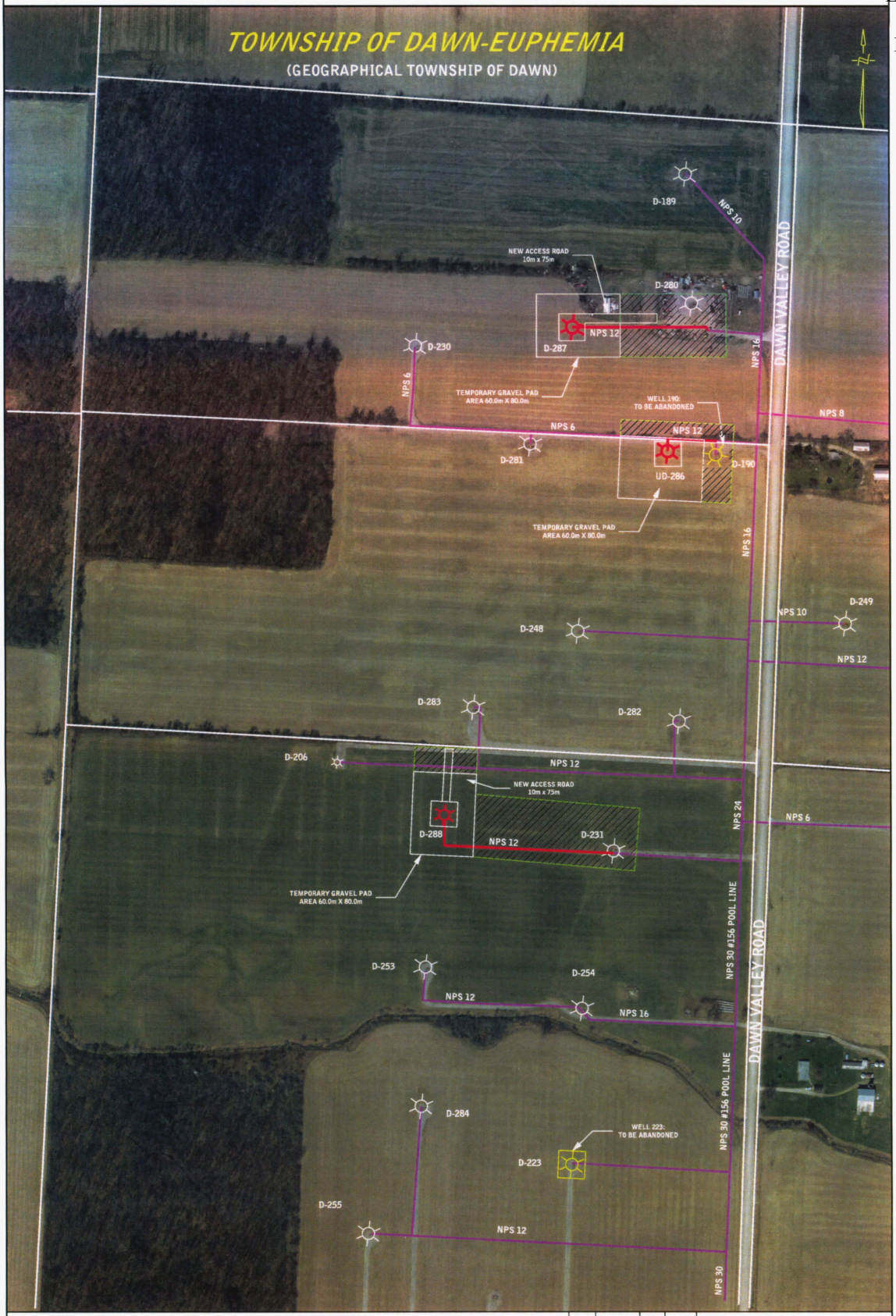
5.0 Conclusion

With the implementation of the recommended mitigation the environmental effects associated with the proposed enhancement project are short-term and minimal.

NEEGAN BURNSIDE

Figures

Figure 1: *PROPOSED FACILITIES: DAWN 156 POOL*



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- WELLS TO BE ABANDONED
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
01				

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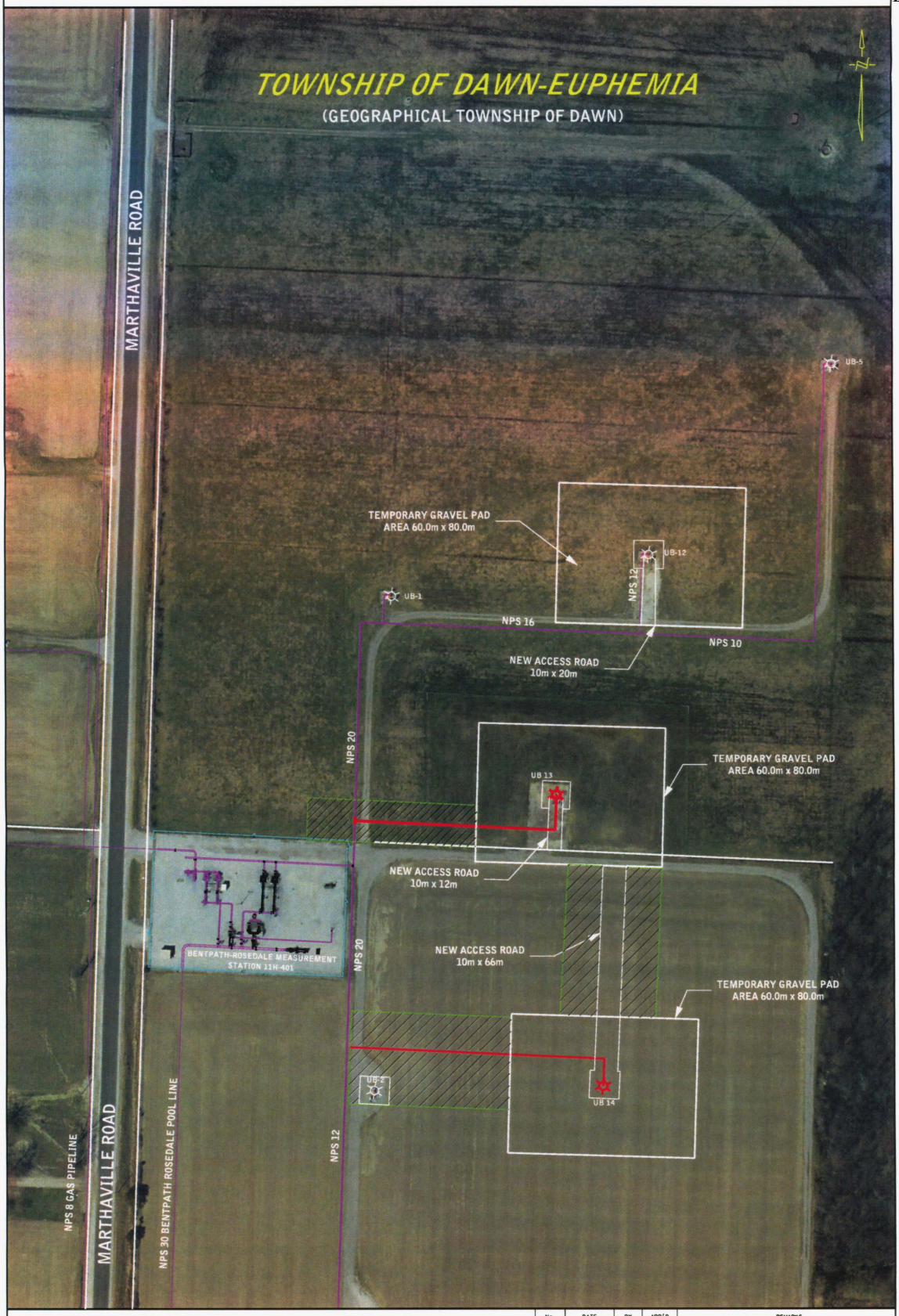
PROPOSED FACILITIES
DAWN 156 POOL

DRAWN BY: T. James	DATE: 2016/09/21	PLOT SPEC: 1/4000
CHECKED BY	DATE	CAD CODE: PL1476
APPROVED BY	DATE	FILE REVISION DATE: 2016-00-00
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: PL1476 OEB

Figure 2: *PROPOSED FACILITIES: BENTPATH POOL*



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
				REVISIONS

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PROPOSED FACILITIES
BENTPATH POOL

DRAWN BY: T. James	DATE: 2016/09/21	PLOT SPEC: 1/2000
CHECKED BY	DATE	CAD CODE: M797
APPROVED BY	DATE	FILE REVISION DATE: 2016-00-00
SHEET No.: 1 OF 1	SYSTEM	DRAWING No.: M797 OEB

October 25, 2016

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<<Address1>>
<<City>> <<Pr>> <<Postal>>

Re: Union Gas Limited
2017 Storage Enhancement Project: Addendum

Dear <<Title>> <<Last Name>>,

You were recently informed about the proposed 2017 Storage Enhancement Project ("the Project") on a letter dated October 3rd, 2016 with an enclosed Environmental Protection Plan (EPP). The Project, as described in the letter and EPP, included drilling four new wells, deepening two existing wells, abandoning two existing wells, and constructing approximately 615 m of NPS 12 inch pipeline in the Dawn 156 and Bentpath Storage Pools in the Township of Dawn-Euphemia, Lambton County.

To increase the deliverability in the Bentpath Storage Pool, two additional wells (UB 1 and UB 8) will also be deepened. Please refer to the EPP for information regarding well drilling.

The following will describe the locations of UB 1 and UB 8 in the Bentpath Storage Pool and will describe the efforts that will be taken to ensure potential Species at Risk (SAR), cultural and archaeological resources, and the general environment will not be impacted by construction activities.

Well Locations

UB 1 is located in the Bentpath Storage Pool on Lot 32, Concession 5 in the Township of Dawn-Euphemia, Lambton County. UB 1 is located approximately 100 m west of UB 12 and approximately 100 m northwest of UB 13 (see attached map). The land is currently being managed as pasture land.

UB 8 is located in the Bentpath Storage Pool on Lot 31, Concession 5 in the Township of Dawn-Euphemia, Lambton County. UB 8 is located approximately 75 m west of Marthaville Road, directly across from the Bentpath-Rosedale Measurement Station (see attached map). The land is currently being managed as agricultural crop land and does not have any crops growing at this present time.

Species at Risk

The Project Area was assessed by a Neegan Burnside Ltd. biologist for potential SAR or supporting habitat on July 15th, 2016. No SAR or supporting habitat were identified in the Project Area and therefore no impacts are anticipated. Please refer to the SAR Report completed by Neegan Burnside Ltd. appended in the EPP for more information.

With the addition of UB 1 and UB 8, a Neegan Burnside Ltd. biologist assessed the new work areas for potential SAR or supporting habitat on October 21st, 2016. No SAR or supporting habitat were identified at these locations and therefore no impacts are anticipated.

Cultural and Archaeological Resources

Stantec Consulting Ltd. (Stantec) completed a Cultural Heritage Review of the Project Area to identify potential cultural heritage landscapes and built heritage resources and to develop mitigation measures if necessary to minimize potential impacts from construction activities. The area encompassing UB 1 and UB 8 was included during this review, thus no further work is required.

Stantec also completed a Stage 1 and 2 Archaeological Assessment of the Project Area according to the specifications of the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists*. No further archaeological assessments will be required for UB 1 and UB 8 as it was determined that well drilling operations at these locations will not impact archaeological resources.

General Environmental Mitigation

Please refer to the EPP for more information regarding the environmental mitigation measures that will be adhered to during construction to minimize potential impacts on the environment.

Conclusion

With the implementation of the environmental mitigation measures described in the EPP and by executing the actions described above, it is anticipated that the Project will not have any significant adverse environmental or socio-economic effects.

If you have any comments or questions, please contact the undersigned.

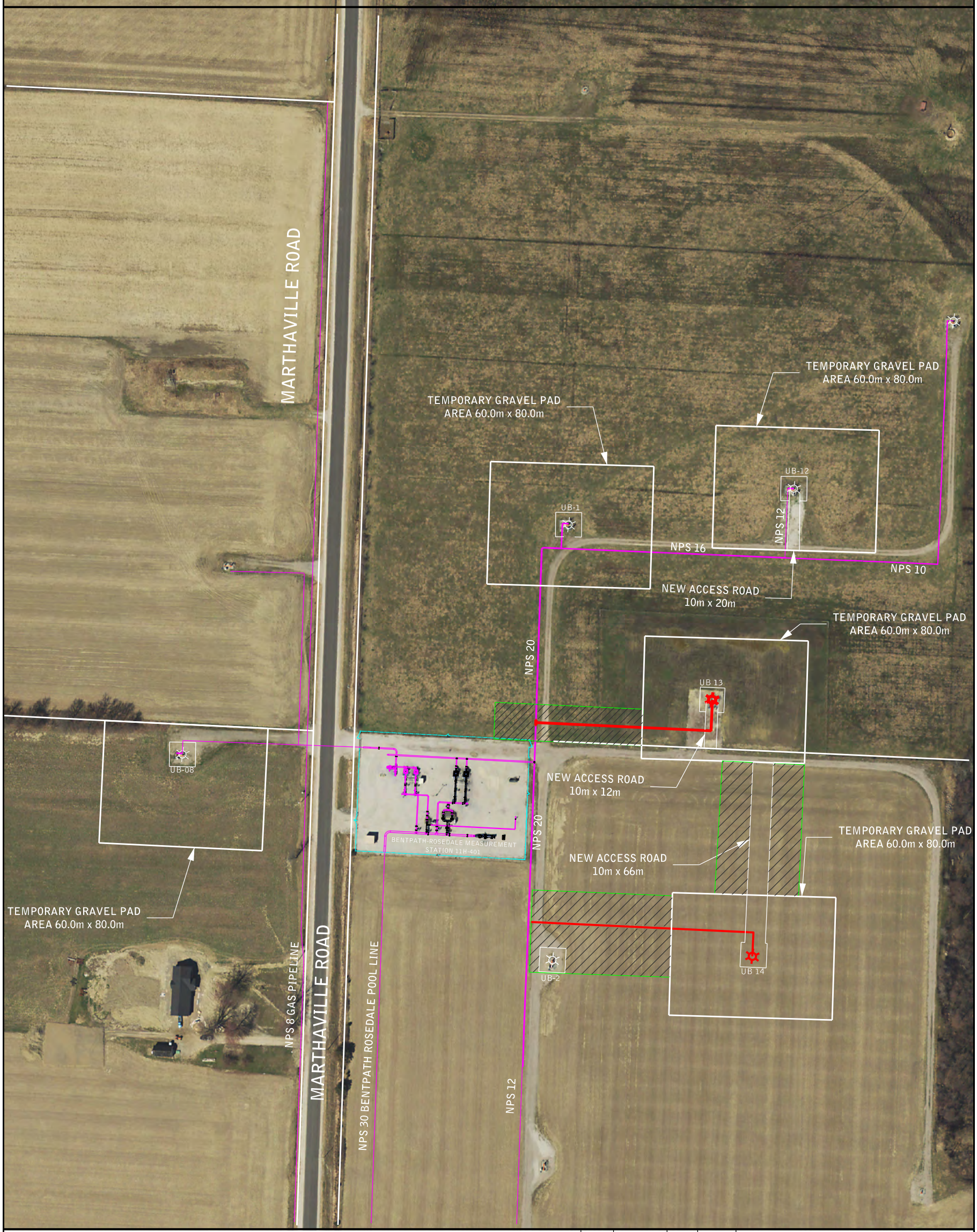
Yours very truly,

Evan Tomek
Environmental Planner
Union Gas Limited
745 Richmond Street
Chatham, ON N7M 5J5
Tel: 519.436.2460 ext. 5236904
Cell: 226.229.9598
Email: etomek@uniongas.com

PROPOSED FACILITIES: BENTPATH POOL

TOWNSHIP OF DAWN-EUPHEMIA

(GEOGRAPHICAL TOWNSHIP OF DAWN)



LEGEND

- NEW PIPING TO BE INSTALLED
- EXISTING PIPING
- PROPOSED NEW WELLS
- EXISTING WELLS
- TEMPORARY LAND USE

No.	DATE	BY	APP'D	REMARKS
	REVISIONS			

uniongas
A Spectra Energy Company

PROPOSED FACILITIES
BENTPATH POOL

DRAWN BY: T. James	DATE: 2016/10/15	PLOT SPEC: 1/2500
CHECKED BY	DATE	CAD CODE: M797
APPROVED BY	DATE	FILE REVISION DATE: 2016-00-00

SHEET No.	SYSTEM	DRAWING No.
1 OF 1		M797 OEB

PIPELINE EASEMENT

(Hereinafter called the “Easement”)

Between

(hereinafter called the “Transferor”)

and

UNION GAS LIMITED
(hereinafter called the “Transferee”)

This is an Easement in Gross.

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

PIN:

Legal Description:

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

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

BEING THE PIN/PART OF THE PIN:

Legal Description:

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

1. In Consideration of the sum of XX/100 Dollars ($) (hereinafter called the "Consideration"), which sum is payment in full for the rights and interest hereby granted and for the rights and interest, if any, acquired by the Transferee by expropriation, including in either or both cases payment in full for all such matters as injurious affection to remaining lands and the effect, if any, of registration on title of this document and where applicable, of the expropriation documents, subject to Clause 12 hereof to be paid by the Transferee to the Transferor within 90 days from the date of these presents or prior to the exercise by the Transferee of any of its rights hereunder other than the right to survey (whichever may be the earlier date), the rights, privileges and easement hereby granted shall continue in perpetuity or until the Transferee, with the express written consent of the Transferor, shall execute and deliver a surrender thereof. Prior to such surrender, the Transferee shall remove all debris as may have resulted from the Transferee's use of the Lands from the Lands and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible , save and except for items in respect of which compensation is due under Clause 2, hereof. As part of the Transferee’s obligation to restore the Lands upon surrender of its easement, the Transferee agrees at the option of the Transferor to remove the Pipeline from the Lands. The Transferee and the Transferor shall surrender the Easement and the Transferee shall remove the Pipeline at the Transferor’s option where the Pipeline has been abandoned. The Pipeline shall be deemed to be abandoned where: (a) corrosion protection is no longer applied to the Pipeline, or, (b) the Pipeline becomes unfit for service in accordance with Ontario standards. The Transferee shall, within 60 days of either of these events occurring, provide the Transferor with notice of the event. Upon removal of the Pipeline and restoration of the Lands as required by this agreement, the Transferor shall release the Transferee from further obligations in respect of restoration.

2. The Transferee shall make to the Transferor (or the person or persons entitled thereto) due compensation for any damages to the Lands resulting from the exercise of any of the rights herein granted, and if the compensation is not agreed upon by the Transferee and the Transferor, it shall be determined by arbitration in the manner prescribed by the Expropriations Act, R.S.O. 1990,

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

3. The Pipeline (including attachments, equipment and appliances for cathodic protection but excluding valves, take-offs and fencing installed under Clause 9 hereof) shall be laid to such a depth that upon completion of installation it will not obstruct the natural surface run-off from the Lands nor ordinary cultivation of the Lands nor any tile drainage system existing in the Lands at the time of installation of the Pipeline nor any planned tile drainage system to be laid in the Lands in accordance with standard drainage practice, if the Transferee is given at least thirty (30) days notice of such planned system prior to the installation of the Pipeline. The Transferee agrees to make reasonable efforts to accommodate the planning and installation of future tile drainage systems following installation of the Pipeline so as not to obstruct or interfere with such tile installation. In the event there is a change in the use of all, or a portion of the Transferor Lands adjacent to the Lands which results in the pipeline no longer being in compliance with the pipeline design class location requirements, then the Transferee shall be responsible for any costs associated with any changes to the Pipeline required to ensure compliance with the class location requirements.

4. As soon as reasonably possible after the construction of the Pipeline, the Transferee shall level the Lands and unless otherwise agreed to by the Transferor, shall remove all debris as may have resulted from the Transferee's use of the Lands therefrom and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible, save and except for items in respect of which compensation is due under Clause 2 hereof.

5. It is further agreed that the Transferee shall assume all liability and obligations for any and all loss, damage or injury, (including death) to persons or property that would not have happened but for this Easement or anything done or maintained by the Transferee hereunder or intended so to be and the Transferee shall at all times indemnify and save harmless the Transferor from and against all such loss, damage or injury and all actions, suits, proceedings, costs, charges, damages, expenses, claims or demands arising therefrom or connected therewith provided that the Transferee shall not be liable under the clause to the extent to which such loss, damage or injury is caused or contributed to by the gross negligence or wilful misconduct of the Transferor.

6. In the event that the Transferee fails to comply with any of the requirements set out in Clauses 2, 3, or 4 hereof within a reasonable time of the receipt of notice in writing from the Transferor setting forth the failure complained of, the Transferee shall compensate the Transferor (or the person or persons entitled thereto) for any damage, if any, necessarily resulting from such failure and the reasonable costs if any, incurred in the recovery of those damages.

7. Except in case of emergency, the Transferee shall not enter upon any of the Transferor’s Lands, other than the Lands, without the consent of the Transferor. In case of emergency the right of entry upon the Transferor's Lands for ingress and egress to and from the Lands is hereby granted. The determination of what circumstances constitute an emergency, for purposes of this paragraph is within the absolute discretion of the Transferee, but is a situation in which the Transferee has a need to access the Pipeline in the public interest without notice to the Transferor, subject to the provisions of Clause 2 herein. The Transferee will, within 72 hours of entry upon such lands, advise the Transferor of the said emergency circumstances and thereafter provide a written report to Transferor with respect to the resolution of the emergency situation The Transferee shall restore the lands of the Transferor at its expense as closely as reasonably practicable to the condition in which they existed immediately prior to such interference by the Transferee and in the case of tile drains, such restoration shall be performed in accordance with good drainage practice.

8. The Transferor shall have the right to fully use and enjoy the Lands except for planting trees over the lesser of the Lands or a six (6) meter strip centered over the Pipeline, and except as may be necessary for any of the purposes hereby granted to the Transferee, provided that the Transferor shall not excavate, drill, install, erect or permit to be excavated, drilled, installed or erected in, on, over or through the Lands any pit, well, foundation, building, mobile homes or other structure or installation and the Transferor shall not deposit or store any flammable material, solid or liquid spoil, refuse, waste or effluent on the Lands. Notwithstanding the foregoing the Transferee upon request shall consent to the Transferor erecting or repairing fences, hedges, pavement, lockstone constructing or repairing tile drains and domestic sewer pipes, water pipes, and utility pipes and constructing or repairing lanes, roads, driveways, pathways, and walks across, on and in the Lands

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

9. The rights, privileges and easement herein granted shall include the right to install, keep, use, operate, service, maintain, repair, remove and/or replace in, on and above the Lands any valves and/or take-offs subject to additional agreements and to fence in such valves and/or take-offs and to keep same fenced in, but for this right the Transferee shall pay to the Transferor (or the person or persons entitled thereto) such additional compensation as may be agreed upon and in default of agreement as may be settled by arbitration under the provisions of The Ontario Energy Board Act, S.O. 1998, or any Act passed in amendment thereof or substitution therefore. The Transferee shall keep down weeds on any lands removed from cultivation by reason of locating any valves and/or take-offs in the Lands.

10. Notwithstanding any rule of law or equity and even though the Pipeline and its appurtenances may become annexed or affixed to the realty, title thereto shall nevertheless remain in the Transferee.

11. Neither this Agreement nor anything herein contained nor anything done hereunder shall affect or prejudice the Transferee's rights to acquire the Lands or any other portion or portions of the Transferor's lands under the provisions of The Ontario Energy Board Act, S.O. 1998, or any other laws, which rights the Transferee may exercise at its discretion in the event of the Transferor being unable or unwilling for any reason to perform this Agreement or give to the Transferee a clear and unencumbered title to the easement herein granted.

12. The Transferor covenants that he has the right to convey this Easement notwithstanding any act on his part, that he will execute such further assurances of this Easement as may be requisite and which the Transferee may at its expense prepare and that the Transferee, performing and observing the covenants and conditions on its part to be performed, shall have quiet possession and enjoyment of the rights, privileges and easement hereby granted. If it shall appear that at the date hereof the Transferor is not the sole owner of the Lands, this Easement shall nevertheless bind the Transferor to the full extent of his interest therein and shall also extend to any after-acquired interest, but all moneys payable hereunder shall be paid to the Transferor only in the proportion that his interest in the Lands bears to the entire interest therein.

13. In the event that the Transferee fails to pay the Consideration as hereinbefore provided, the Transferor shall have the right to declare this Easement cancelled after the expiration of 15 days from personal service upon the Manager, Land Services of the Transferee at its Executive Head Office in Chatham, Ontario, (or at such other point in Ontario as the Transferee may from time to time specify by notice in writing to the Transferor) of notice in writing of such default, unless during such 15 day period the Transferee shall pay the Consideration; upon failing to pay as aforesaid, the Transferee shall forthwith after the expiration of 15 days from the service of such notice execute and deliver to the Transferor at the expense of the Transferee, a valid and registrable release and discharge of this Easement.

14. All payments under these presents may be made either in cash or by cheque of the Transferee and may be made to the Transferor (or person or persons entitled thereto) either personally or by mail. All notices and mail sent pursuant to these presents shall be addressed to:

    the Transferor at:

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

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

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

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

16. (a) The Transferee represents that it is registered for the purposes of the Harmonized Goods and Services Tax (hereinafter called "HST") in accordance with the applicable provisions in that regard and pursuant to the Excise Tax Act, (R.S.C., 1985, c. E-15), (hereinafter called "Excise Tax Act"), as amended.

    (b) The Transferee covenants to deliver a Statutory Declaration, Undertaking and Indemnity confirming its HST registration number, which shall be conclusive evidence of such HST registration, and shall preclude the Transferor from collection of HST from the Transferee.

    (c) The Transferee shall undertake to self-assess the HST payable in respect of this transaction pursuant to subparagraphs 221(2) and 228(4) of the Excise Tax Act, and to remit and file a return in respect of HST owing as required under the said Act for the reporting period in which the HST in this transaction became payable.

    (d) The Transferee shall indemnify and save harmless the Transferor from and against any and all claims, liabilities, penalties, interest, costs and other legal expenses incurred, directly or indirectly, in connection with the assessment of HST payable in respect of the transaction contemplated by this Easement. The Transferee's obligations under this Clause shall survive this Easement.

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

Dated this _____ day of _____ 20__.

[Insert name of Individuals or Corporation]

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

UNION GAS LIMITED

_____

_____
Name & Title (Union Gas Limited)

I have authority to bind the Corporation.

519-436-4673
Telephone Number (Union Gas Limited)

Additional Information: (if applicable):

Property Address:

HST Registration Number:

Choose an item.

Province of Ontario

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

I, , of the Choose an item., in the Province of Ontario;

DO SOLEMNLY DECLARE THAT:

1. I am a Choose an item., Lands Department of Union Gas Limited, the Transferee in the attached Grant of Easement and as such have knowledge of the matters herein deposed to.

2. The use of or right in the land described in the said Grant of Easement being:

   PIN/Part of the PIN:

   Legal Description:

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

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

DECLARED before me at the)
)
_____)
) _____
in the Province of Ontario)
)
this ____day of _____ 20__)

_____
A Commissioner, etc.

Letter of Acknowledgement

To: Union Gas Limited "Union"

From: [redacted]

Re: Deliverability 2017 "Project"

We, [redacted], are the owners of the property legally described as owner of PIN: [redacted] being part of Lot 32, Concession 1, Geographic Township of Dawn-Euphemia, Municipality of Lambton, (insert municipal address) have been informed by Union of the Project, as more particularly outlined on Schedule A attached hereto, and specifically confirm that Union has advised the undersigned of the following matters regarding the Project:

1. Union intends to drill Union Dawn Well No. UD288 as shown on Schedule "A".
2. Union will construct a maximum, six meter wide Permanent All Weather Access Road, in accordance with the terms and conditions of Union's form of Roadway Agreement, to well number UD288 being approximately (75) meters in length as shown on Schedule A .
3. Construct a temporary well pad, and for a term of 2 years, as shown on Schedule A.
4. Construct a permanent well pad for the well, as shown on Schedule A.
5. Construct a 12" NPS natural gas pipeline(s) as shown on Schedule A ("Pipeline").
6. Register Union's standard form of easement for the construction of the Pipeline.
7. If any field tile exist within the lands to be occupied by the Proposed Union Gas Facility. A qualified tile contractor will repair all field tiles to the satisfaction of the Landowner. If necessary, Union will engage the services of a drainage consultant to recommend changes to any systematic tile to ensure proper drainage of the land following the installation of the above facilities. This may be done by having pre- construction tiling completed or wait until after all the construction is done.
8. Union will have an Ontario lands surveyor, complete all survey's necessary for the completion of this work

We have reviewed the above proposal with a Union representative. We have no objectives to the drilling of the well as referenced above and the construction of a Permanent All Weather Access Road. In exchange for these rights and privileges Union will compensation us in the amount of $[redacted] now tendered. Further payments will be made in accordance with Schedule "B" attached.

Dated this 12th day of October 2016.

[redacted]

Janee O'Donohue
Manager Land Services
Union Gas Limited

Landowner

If notification of a tenant is required please provide their contact information in the lines below:

Tenant

Phone #

SCHEDULE A: PROPOSED WELL LOCATION FOR NO. 156 POOL UD 286

Property Sketch - Showing Approximate Location of Proposed Temporary Land Use Rights For E 1/2 LT 32 Con 1 Dawn S/T L114667 & L571345; S/T L248038; S/T Easement In Gross Over E 1/2 LT 32 Con 1 Dawn Designated PTS 5,10,11,12,15,17,19,20,21,22,23,25,26,27,31 PLAN 25R9644 AS IN LA57566; S/T Easement In Gross Over E 1/2 LT 32 Con 1 Dawn Designated Pts 1,2,3,4,5,6,7,8,9,10,12,13,14,15,16,17,18,19,20,22,23,24,25,28,29,30,31,32,33 Plan 25R9644 As In LA57568 Subject To An Easement In Gross Over E 1/2 LT 32 Con 1 Designated Pts 3,4 Plan 25R10252 & PT 4 Plan 25R9644 As In LA146877 Subject To An Easement In Gross Over E 1/2 LT 32 Con 1 Designated Pts 1,2 Plan 10252 & PT 2 Plan 25R9644 As In LA146879 Township Of Dawn-Euphemia

PART	APPROX. SIZE (metres)		APPROX. AREA		PART	APPROX. SIZE (metres)		APPROX. AREA	
	(width)	(length)	(hectares)	(acres)		(width)	(length)	(hectares)	(acres)
PART 1:	60.0	165.0	0.99	2.45					
PART 2:	60.0	80.0	0.48	1.19					
PART 3:	25.0	60.0	0.15	0.37					
ACCESS ROAD	10.0	75.0	0.08	0.19					
NPS 12	N/A	195.0							

PIN: [redacted] | SCALE: 1:4000 | *ALL DISTANCES ARE APPROXIMATE. | DATE: SEPTEMBER 29, 2016 | CAD NUMBER: PL1476

Letter of Acknowledgement

To: Union Gas Limited "Union"

From: [redacted]

Re: Deliverability 2017 "Project"

We, [redacted] are the owners of the property legally described as owner of PIN: [redacted] being part of Lot 33, Concession 1, Geographic Township of Dawn-Euphemia, Municipality of Lambton, (insert municipal address) have been informed by Union of the Project, as more particularly outlined on Schedule A attached hereto, and specifically confirm that Union has advised the undersigned of the following matters regarding the Project:

1. Union intends to drill Union Dawn Well No. 286 as shown on Schedule "A".
2. Union will construct a maximum, six meter wide Permanent All Weather Access Road, in accordance with the terms and conditions of Union's form of Roadway Agreement, to well number _____ being approximately ( ) meters in length as shown on Schedule A .
3. Construct a temporary well pad, and for a term of 2 years, as shown on Schedule A.
4. Construct a permanent well pad for the well, as shown on Schedule A.
5. Construct a 12" NPS natural gas pipeline(s) as shown on Schedule A ("Pipeline").
6. Register Union's standard form of easement for the construction of the Pipeline.
7. If any field tile exist within the lands to be occupied by the Proposed Union Gas Facility. A qualified tile contractor will repair all field tiles to the satisfaction of the Landowner. If necessary, Union will engage the services of a drainage consultant to recommend changes to any systematic tile to ensure proper drainage of the land following the installation of the above facilities. This may be done by having pre- construction tiling completed or wait until after all the construction is done.
8. Union will have an Ontario lands surveyor, complete all survey's necessary for the completion of this work

We have reviewed the above proposal with a Union representative. We have no objectives to the drilling of the well as referenced above and the construction of a Permanent All Weather Access Road. In exchange for these rights and privileges Union will compensation us in the amount of $[redacted] now tendered. Further payments will be made in accordance with Schedule "B" attached.

Dated this 12 day of August 2016.

[redacted]

[redacted]

Janee O'Donohue
Manager Land Services
Union Gas Limited

If notification of a tenant is required please provide their contact information in the lines below:

Tenant

Phone #

SCHEDULE A

PROPOSED WELL LOCATIONS FOR NO. 156 POOL UD 286

Property Sketch
Showing Approximate Location of
Proposed Temporary Land Use Rights For
Lot 33, Concession 1,
SE 1/4 Lot 33 CON 1 Dawn S/T L568056; S/T L862124; Dawn-Euphemia Subject To An Easement In Gross Over PTS 2,6,7,9,10,11,12,16,17 Plan 25R9640 As In LA71096 Subject To An Easement In Gross Over PTS 1,2,5,6,7,8,9,13,15,17,18 Plan 25R9640 As In LA71097

OWNER: [redacted]

PART	APPROX. SIZE (metres)		APPROX. AREA		PART	APPROX. SIZE (metres)		APPROX. AREA	
	(width)	(length)	(hectares)	(acres)		(width)	(length)	(hectares)	(acres)
1 (TEMP)	IRR.	114.000	0.601	1.485					
2 (ACCESS)	10.000	10.000	0.01	0.03					

PIN: [redacted] | SCALE: 1:4000 | *ALL DISTANCES ARE APPROXIMATE. | DATE: JUNE 22, 2016 | CAD NUMBER: PL1476

Letter of Acknowledgement

To: Union Gas Limited "Union"

From: [redacted]

Re: Deliverability 2017 "Project"

We, [redacted], are the owners of the property legally described as owner of PIN: 43383-0148 being part of Lot 31, Concession 5, Geographic Township of Dawn-Euphemia, Municipality of Lambton, (insert municipal address) have been informed by Union of the Project, as more particularly outlined on Schedule A attached hereto, and specifically confirm that Union has advised the undersigned of the following matters regarding the Project:

1. Union intends to drill Union Dawn Well No. UB14 as shown on Schedule "A".

2. Union will construct a maximum, six meter wide Permanent All Weather Access Road, in accordance with the terms and conditions of Union's form of Roadway Agreement, to well number UB14 being approximately (66) meters in length as shown on Schedule A .

3. Construct a temporary well pad, and for a term of 2 years, as shown on Schedule A.

4. Construct a permanent well pad for the well, as shown on Schedule A.

5. Construct a 12" NPS natural gas pipeline(s) as shown on Schedule A ("Pipeline").

6. Register Union's standard form of easement for the construction of the Pipeline.

7. If any field tile exist within the lands to be occupied by the Proposed Union Gas Facility. A qualified tile contractor will repair all field tiles to the satisfaction of the Landowner. If necessary, Union will engage the services of a drainage consultant to recommend changes to any systematic tile to ensure proper drainage of the land following the installation of the above facilities. This may be done by having pre- construction tiling completed or wait until after all the construction is done.

8. Union will have an Ontario lands surveyor, complete all survey's necessary for the completion of this work

We have reviewed the above proposal with a Union representative. We have no objectives to the drilling of the well as referenced above and the construction of a Permanent All Weather Access Road. In exchange for these rights and privileges Union will compensation us in the amount of $[redacted] now tendered. Further payments will be made in accordance with Schedule "B" attached.

Dated this 24th day of October 2016.

[redacted]

Janee O'Donohue
Manager Land Services
Union Gas Limited

Landowner

If notification of a tenant is required please provide their contact information in the lines below:

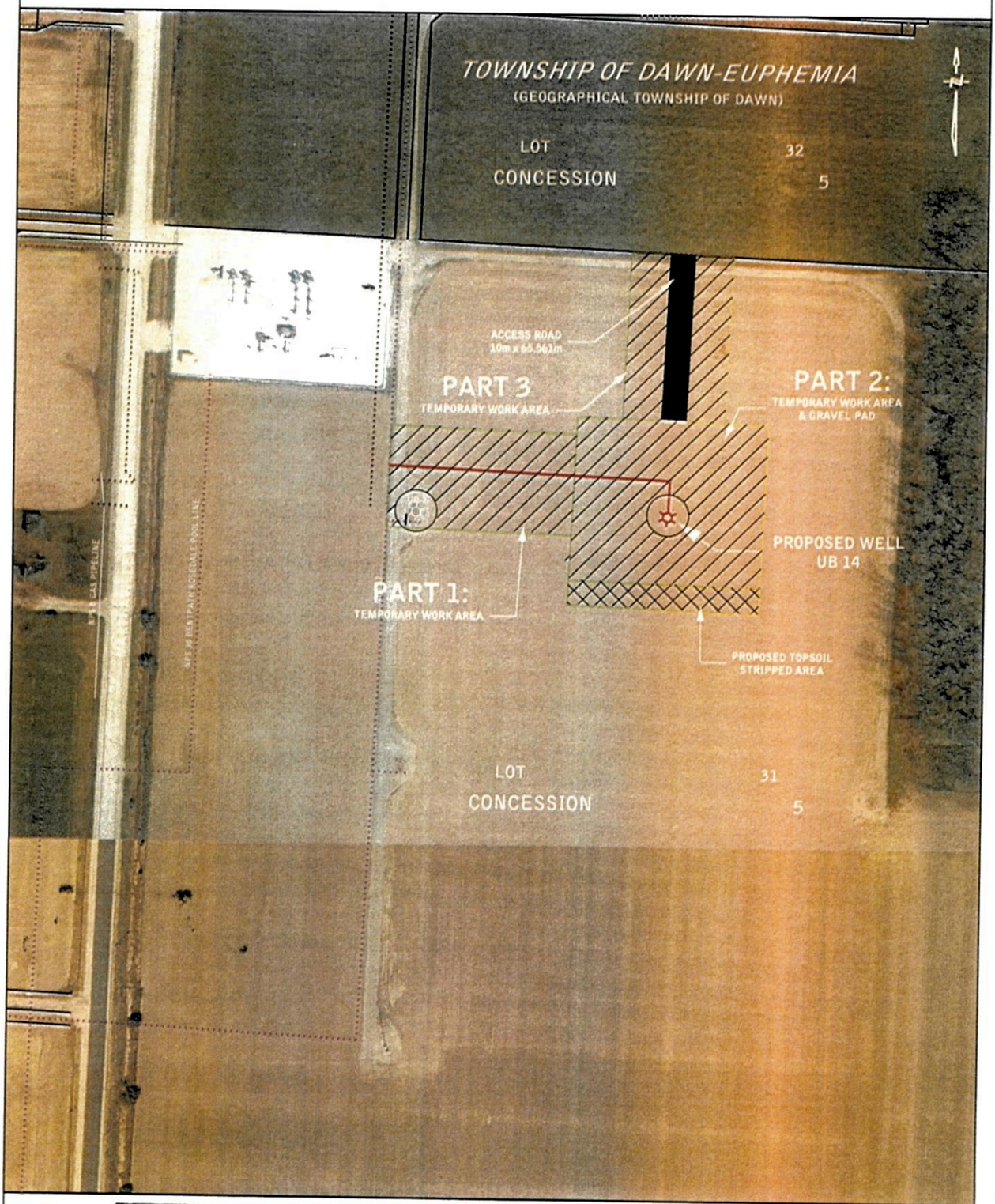
Tenant

Phone #

SCHEDULE A

PROPOSED NPS 12 GATHERING LINE TO WELL UB14

PROPERTY SKETCH
SHOWING APPROXIMATE LOCATION OF
PROPOSED TEMPORARY LAND USE RIGHTS
Description: W 1/2 LT 31 CON 5 SURFACE RIGHTS ONLY DAWN EXCEPT PARTS 1 & 2, 25R7354; S/T L794103, L811682, L812226; DAWN-EUPHEMIA



OWNER: [redacted]

PART	APPROX. SIZE (metres)		APPROX. AREA		PART	APPROX. SIZE (metres)		APPROX. AREA	
	(width)	(length)	(hectares)	(acres)		(width)	(length)	(hectares)	(acres)
1 (TEMP)	40.000	72.626	0.290	0.717					
2 (TEMP)	75.000	75.000	0.562	1.389					
3 (TEMP)	40.000	65.399	0.261	0.646					

PIN # [redacted] | SCALE: 1:2000 | *ALL DISTANCES ARE APPROXIMATE. | DATE: 2016/06/27 | CAD NUMBER: M797