ENBRIDGE

Rakesh Torul
Technical Manager
Regulatory Applications
Regulatory Affairs

tel 416-495-5499
EGIRegulatoryProceedings@enbridge.com

Enbridge Gas Inc.
500 Consumers Road
North York, Ontario M2J 1P8
Canada

February 07, 2020

VIA EMAIL, RESS and COURIER

Ms. Christine E. Long
Board Secretary
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Long:

Re: Enbridge Gas Inc. (Enbridge Gas)
Ontario Energy Board ("OEB or the "Board") File No.: EB-2020-0074
2020 Storage Enhancement Project – Application and Evidence

Enbridge Gas is proposing to increase the maximum operating pressure ("MOP") of three storage pools (the "Project"). The three pools are: the Black Creek pool, the Coveny Pool and the Wilkesport pool ("Pools"). All three pools are part of Enbridge Gas' Tecumseh storage operations. Each of the pools is a designated storage area as defined in the *Ontario Energy Board Act, 1998.*

The Project will include delta pressuring the Pools to a maximum pressure gradient of 17.2 kPa/m (0.76 psi/ft). There are no pipelines to be constructed and no other new facilities required for this Project. Enbridge Gas is applying to the Board for leave to vary the MOP of each of the three storage pools.

Enclosed, please find two copies of the redacted application and evidence for the above noted proceeding. The names of Individuals have been removed from the following exhibits:

- Exhibit E, Tab 1, Schedule 1, Attachment 1 - Working Area
- Exhibit E, Tab 1, Schedule 1, Attachment 2 - Affidavit of Title Search

The confidential unredacted exhibits will be provided to the Board in a sealed envelope.

Please contact the undersigned if you have any questions.

Yours truly,

(Original Signed)

Rakesh Torul
Technical Manager,
Regulatory Applications

EXHIBIT LIST

A – GENERAL

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
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	2	1	Application & Approvals Requested

B – PURPOSE, NEED, PROPOSED FACILITIES & TIMING

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
B	1	1	Purpose, Need, Proposed Facilities & Timing

C – ENVIRONMENTAL

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
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		2	Archaeological Assessment

D – RATES & PROJECT FINANCING

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
D	1	1	Rates and Project Financing

E- LAND MATTERS

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
E	1	1	Land Matters

F- INDIGENOUS CONSULTATION

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
F	1	1	Indigenous Consultation

G – RISK ASSESSMENT

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
G	1	1	Risk Assessment

H – MNRF REQUIREMENTS

EXHIBIT	TAB	SCHEDULE	DESCRIPTION
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ONTARIO ENERGY BOARD

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

AND IN THE MATTER OF an Application by Enbridge Gas Inc. for an Order to vary the maximum operating pressure ("MOP") of the Black Creek pool, the Coveny pool and the Wilkesport pool which are part of the Enbridge Gas' Tecumseh storage operations;

ENBRIDGE GAS INC.

1. Enbridge Gas Inc. ("Enbridge Gas") is proposing changes to the Black Creek pool, the Coveny pool and the Wilkesport pool ("Project") which are part of the Enbridge Gas' Tecumseh storage operations. Each of the pools is a designated storage area ("DSA") as defined in the *Ontario Energy Board Act, 1998*.

2. Enbridge Gas wishes to operate the Black Creek, Coveny and Wilkesport pools ("Pools") to a maximum pressure gradient of 17.2 kPa/m (0.76 psi/ft) during the 2020 injection season as permitted under the CSA Standard Z341.1-18. Increasing the Maximum Operating Pressure ("MOP") of the storage pools will allow Enbridge Gas to store additional natural gas. The additional storage capacity created by the Project will be sold to third parties as part of the Enbridge Gas unregulated storage portfolio.

3. The Project will include the installation of wellhead upgrades and the installation of emergency shut-down valves on each of the natural gas storage wells within each DSA.

4. Enbridge Gas therefore applies to the Ontario Energy Board ("OEB" or the "Board") for leave to operate the Black Creek[1] and Coveny[1] and Wilkesport[2] pools above the current 15.8 KPa/m (0.7 psi/ft).

5. Enbridge Gas requests that the following condition be placed on the Black Creek, Coveny and Wilkesport pool similar to the condition that was attached to the OEB's approval in EB-2017-0362 proceeding for delta pressuring of the Sarnia Airport Pool:

   Enbridge Gas shall not operate the storage pool above a pressure representing a pressure gradient of 17.2 kPa/m (0.76 psi/ft) of depth without leave of the OEB. Enbridge Gas shall provide summaries of an engineering study and geological study in support of any leave applications 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.

6. Attached hereto as Attachment 1 is a map showing the location of these pools.

7. In order to meet the proposed in-service date of November 2020, Enbridge Gas requests an approval by June 2020. Enbridge Gas therefore applies to the Board for a timely approval of this Application.

8. Enbridge Gas requests that a copy of every document filed with the Board in this proceeding be served on the Applicant and the Applicant's counsel, as follows:

[1] The Current MOP for Black Creek and Coveny was approved in EBLO 258, ENRM 108, EBO 196/197/198.
[2] The Wilkesport pool does not have a condition of approval limiting the pressure. However, EBRM 91 established a guideline that limited all pools to a pressure gradient of 0.7 psi/ft (15.9 kPa/m) without requiring leave from the OEB.

The Applicant:

Regulatory Contact:

Mr. Rakesh Torul
Technical Manager, Regulatory Applications
Enbridge Gas Inc.

Address for personal service:	500 Consumers Road Willowdale, Ontario M2J 1P8
Mailing address:	P. O. Box 650 Scarborough, Ontario M1K 5E3
Telephone:	416-495-5499 or 1-888-659-0685
Email:	EGIregulatoryProceedings@enbridge.com

The Applicant's counsel:

Ms. Tania Persad
Senior Legal Counsel
Enbridge Gas Inc.

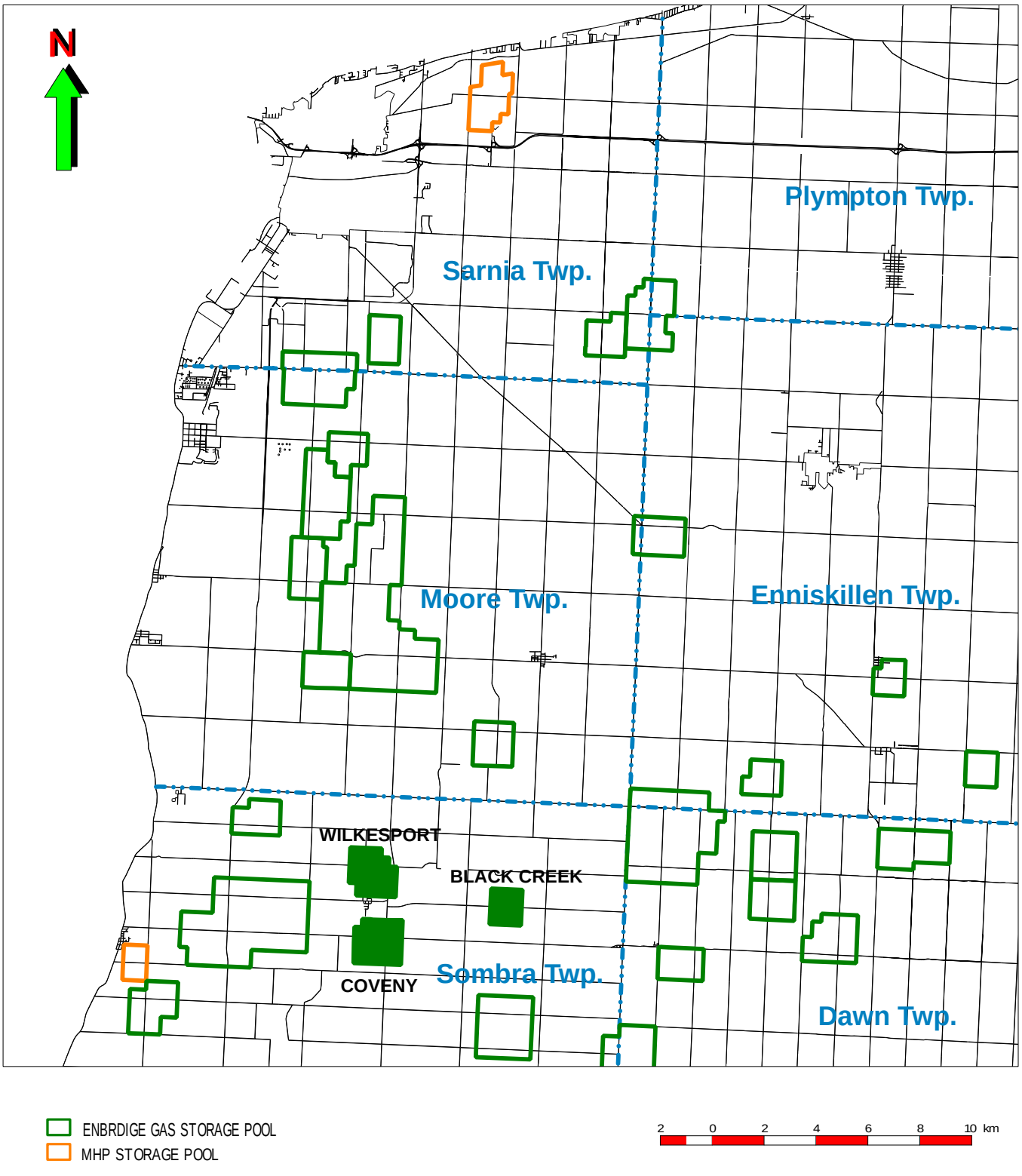
Address for personal service:	500 Consumers Road Willowdale, Ontario M2J 1P8
Mailing address:	P. O. Box 650 Scarborough, Ontario M1K 5E3
Telephone:	(416) 495-5891
Email:	tania.persad@enbridge.com

Dated at the City of Toronto, Ontario this 7th day of February, 2020.

(Original Signed)

_____

Tania Persad
Senior Legal Counsel



POOL LOCATION MAP

PURPOSE, NEED, PROPOSED FACILITIES & TIMING

Purpose and Need

1. Enbridge Gas Inc. ("Enbridge Gas") is proposing the 2020 Storage Enhancement Project ("Project"), in order to meet growing market demand for incremental storage space.

2. The Project will include delta pressuring the Black Creek, Coveny and Wilkesport pools ("Pools") to a maximum pressure gradient of 17.2 kPa/m (0.76 psi/ft) during the 2020 injection season as permitted under CSA Standard Z341.1-18. A map showing the location of these Pools can be found at Attachment 1 to this Exhibit.

3. Attachment 2 to this Exhibit is a table summarizing the current delta pressure of Enbridge Gas's pools with pressure gradients of 16.5 kPa/m (0.73 psi/ft) or greater.

4. In the past the Ontario Energy Board ("OEB" or the "Board") has imposed conditions of approval limiting the maximum operating pressure on certain storage pools operated by Enbridge Gas.

5. Enbridge Gas is applying for leave to vary the conditions of approval in relation to delta pressuring the Black Creek and Coveny pools. The original conditions state:

> Consumers Gas shall not operate the Black Creek Pool above a pressure representing a pressure gradient of 0.7 psi per ft. depth (15.9 kPa/m) without leave of the Board.
>
> Consumers Gas shall not operate the Coveny Pool above a pressure representing a pressure gradient of 0.7 psi per ft. depth (15.9 kPa/m) without the leave of the Board.

The Wilkesport pool does not have a condition of approval limiting the pressure similar to the Black Creek and Wilksport pools. However, EBRM 91 established a guideline that limited all pools to a pressure gradient of 0.7 psi/ft (15.9 kPa/m) without requiring leave from the Board.

6. The current and future proposed gradients in the pools are summarized below.

	Current Gradient	Proposed Gradient
Black Creek	15.8 kPa/m 0.7 psi/ft	17.2 kPa/m 0.76 psi/ft
Coveny	15.8 kPa/m 0.7 psi/ft	17.2 kPa/m 0.76 psi/ft
Wilkesport	15.8 kPa/m 0.7 psi/ft	17.2 kPa/m 0.76 psi/ft

7. If the Board approves the Project, Enbridge Gas will accept the same condition that was attached to the approval in the EB-2017-0362 proceeding for Sarnia Airport Storage Pool Limited Partnership Limited Partnership[1]. Enbridge Gas therefore requests that the following condition be placed on Board approval of the Project:

> Enbridge Gas shall not operate the storage pool above a pressure representing a pressure gradient of 17.2 kPa/m (0.76 psi/ft) of depth without leave of the OEB. Enbridge Gas shall provide summaries of an engineering study and geological study in support of any leave applications 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.

8. Enbridge Gas' request will result in an average increase in pool pressure of approximately 770 kPa for Black Creek, 690 kPa for Coveny and 700 kPa for

[1] EB-2017-0362, Decision and Order, April 26, 2018, p. 2.

Wilkesport. These increases are within the limits as prescribed by CSA standard Z341.1-18.

9. The proposed pressure increase in the Pools will create an additional working capacity of 46,800 10^3m^3. This capacity will be used to meet the requirements of Enbridge Gas' storage service customers.

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

11. It is Enbridge Gas' understanding that the Board approvals will require the application to conform to CSA Z341.1-18 Storage of Hydrocarbons in Underground Formations to the satisfaction of the Ministry of Natural Resources and Forestry ("MNRF"). Further information about consultations with the MNRF are provided in Exhibit H, Tab 1, Schedule 1.

12. The Project is the first phase of a larger project to increase deliverability and storage capacity at Enbridge Gas' storage facilities. The additional deliverability and storage capacity will be sold as part of Enbridge Gas' unregulated storage portfolio. In developing this Project, Enbridge Gas determined that these Pools were preferred for increases in pressure.

13. Economics have not been completed for the Project as the increased storage capacity will be part of Enbridge Gas' un-regulated storage business.

14. If this application is approved, Enbridge Gas plans to begin operating the Pools at higher pressure gradients during the 2020 injection season.

15. As there are no pipelines to be constructed, a leave to construct application to the Board is not required. There are no new wells proposed as part of this Project, therefore a favourable well drilling report from the MNRF is not required.

16. Enbridge Gas will review and update operating procedures and emergency response plans prior to operating the Pools at the increased pressure levels.

17. Emergency shut-down ("ESD") valves capable of isolating the storage facility from the transmission pipeline are currently in place at each pool station with remote operation from the Tecumseh and Dawn Operations Centre in accordance with CSA Z341.1-18 Clause 9.3. In addition, Enbridge Gas proposes to install ESD valves on each natural gas storage well in the Pools.

18. All above ground piping and wells have been reviewed to ensure compliance with all codes and standards at the increased operating pressure.

Proposed Facilities

19. The Project facilities include:
    a. New master valves on 10 wells;
    b. New wellheads on 7 wells; and
    c. The installation of ESD valves on 8 natural gas storage wells within the Pools;

Geology and Reservoir Engineering

Black Creek Pool

20. The Black Creek pool was discovered in 1978 with the drilling of Bluewater True Sombra 2-23-XII (BTS.2-23-12) and was converted to natural gas storage in 1997. A location map showing the Black Creek pool is shown in Attachment 3 to this Exhibit. Currently the pool is operated and monitored using two natural gas storage wells and one observation well. The Black Creek pool has a total capacity of 34,300 10^3m^3 and a working capacity of 26,000 10^3m^3. The pool currently operates between a cushion pressure of 2,512 kPaa and a maximum pressure of 9,090 kPaa.

21. A map showing the Black Creek DSA, Guelph structure and depth-to-crest is included at Attachment 4 to this Exhibit. 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 20 metres above the regional Guelph surface. The minimum depth-to-crest is 604.4 metres.

22. A cross section illustrating the reef structure of the Black Creek pool is provided at Attachment 5 to this Exhibit. The cross section illustrates the relationship of the incipient reef to the surrounding formations. The A2 Salt is present over the entire reef. The A1 Carbonate and A1 Anhydrite drape over the reef forming an effective caprock seal ranging in thickness from 26.5 to 33.7 metres. The A1 Anhydrite is thin but continuous over the reef and ranges in thickness from 0.5 to 2.7 metres.

23. Enbridge Gas is proposing to operate the Black Creek pool at 9,860 kPaa. This equates to a pressure gradient of 17.2 kPa/m (0.76 psi/ft). This will increase the working capacity from 26,000 10^3m^3 to 29,400 10^3m^3, which is an incremental capacity gain of 3,400 10^3m^3.

24. The MOP of the gathering lines in the pool is 9,928 kPag (1,440 psig).

25. In order to ensure the proposed maximum pressure gradient complies with CSA Z341.1-18, an engineering study was conducted by Geofirma Engineering Ltd. for the Black Creek pool. This engineering study incorporated data from geomechanical and regional in-situ tests completed on the reservoir and caprock formations.

26. In addition, a review of well casings, wellheads, gathering pipelines and other related surface facilities was completed. As a result of this review, well TBC1 in the Black Creek pool will receive a new wellhead, a new master valve and an ESD valve. This work is scheduled to be completed prior to delta pressuring. No other upgrades are required.

Coveny Pool

27. The Coveny pool was discovered in 1971 with the drilling of Union Sombra 1-15-XI and was converted to natural gas storage in 1997. A location map showing the Coveny pool is shown in Attachment 6 to this Exhibit. Currently the pool is operated and monitored using four natural gas storage wells and two Guelph observation wells. The Coveny pool has a total capacity of 132,600 10^3m^3 and a working capacity of 100,200 10^3m^3. The pool currently operates between a cushion pressure of 2,247 kPaa and a maximum pressure of 8,140 kPaa.

28. A map showing the Coveny DSA, Guelph structure and depth-to-crest is included at Attachment 7 to this Exhibit. 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 isn 537.6 metres.

29. A cross section illustrating the reef structure of the Coveny pool is provided at Attachment 8 to this Exhibit. The cross section illustrates the relationship of the reef to the surrounding formations. The A2 Salt is present over the entire reef. The A2 Carbonate and A2 Anhydrite drape over the reef forming an effective caprock seal ranging in thickness from 30.5 to 40.5 metres. The A2 Anhydrite is continuous over the reef and ranges in thickness from 4.5 to 8.0 metres.

30. Enbridge Gas is proposing to operate the Coveny pool at 8,830 kPaa. This equates to a pressure gradient of 17.2 kPa/m (0.76 psi/ft). This will increase the working capacity from 100,200 10^3m^3 to 113,300 10^3m^3, which is an incremental capacity gain of 13,100 10^3m^3.

31. The MOP of the gathering lines in the pool is 9,928 kPag (1,440 psig).

32. In order to ensure the proposed maximum pressure gradient complies with CSA Z341.1-18, an engineering study was conducted by Geofirma Engineering Ltd. for the Coveny pool. This engineering study incorporated data from geomechanical and regional in-situ tests completed on the reservoir and caprock formations.

33. In addition, a review of well casings, wellheads, gathering pipelines and other related surface facilities was completed. As a result of this review, six wells in the Coveny pool will receive new master valves and five will receive new wellheads. Four of these are natural gas storage wells and will also have ESD valves installed. This work is scheduled to be completed prior to delta pressuring. No other upgrades are required.

Wilkesport Pool

34. The Wilkesport pool was discovered in 1965 with the drilling of Imperial Oil Enterprises No. 905, Sombra 14-XIV (I.905) and was converted to natural gas storage in 1978. A location map showing the Wilkesport pool is shown in Attachment 9 to this Exhibit. Currently the pool is operated and monitored using seven natural gas storage wells and one observation well. The Wilkesport pool has a total capacity of 307,200 10^3m^3 and a working capacity of 233,100 10^3m^3. The pool currently operates between a cushion pressure of 2,247 kPaa and a maximum pressure of 8,230 kPaa.

35. A map showing the Wilkesport DSA, Guelph structure and depth-to-crest is included at Attachment 10 to this Exhibit. 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 120 metres above the regional Guelph surface. The minimum depth-to-crest is 544.1 metres.

36. A cross section illustrating the reef structure of the Wilkesport pool is provided at Attachment 11 to this Exhibit. 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 reef forming an effective caprock seal ranging in thickness from 28.4 to 42.4 metres. The A2 Anhydrite is thin but continuous over the reef and ranges in thickness from 1.5 to 9.4 metres.

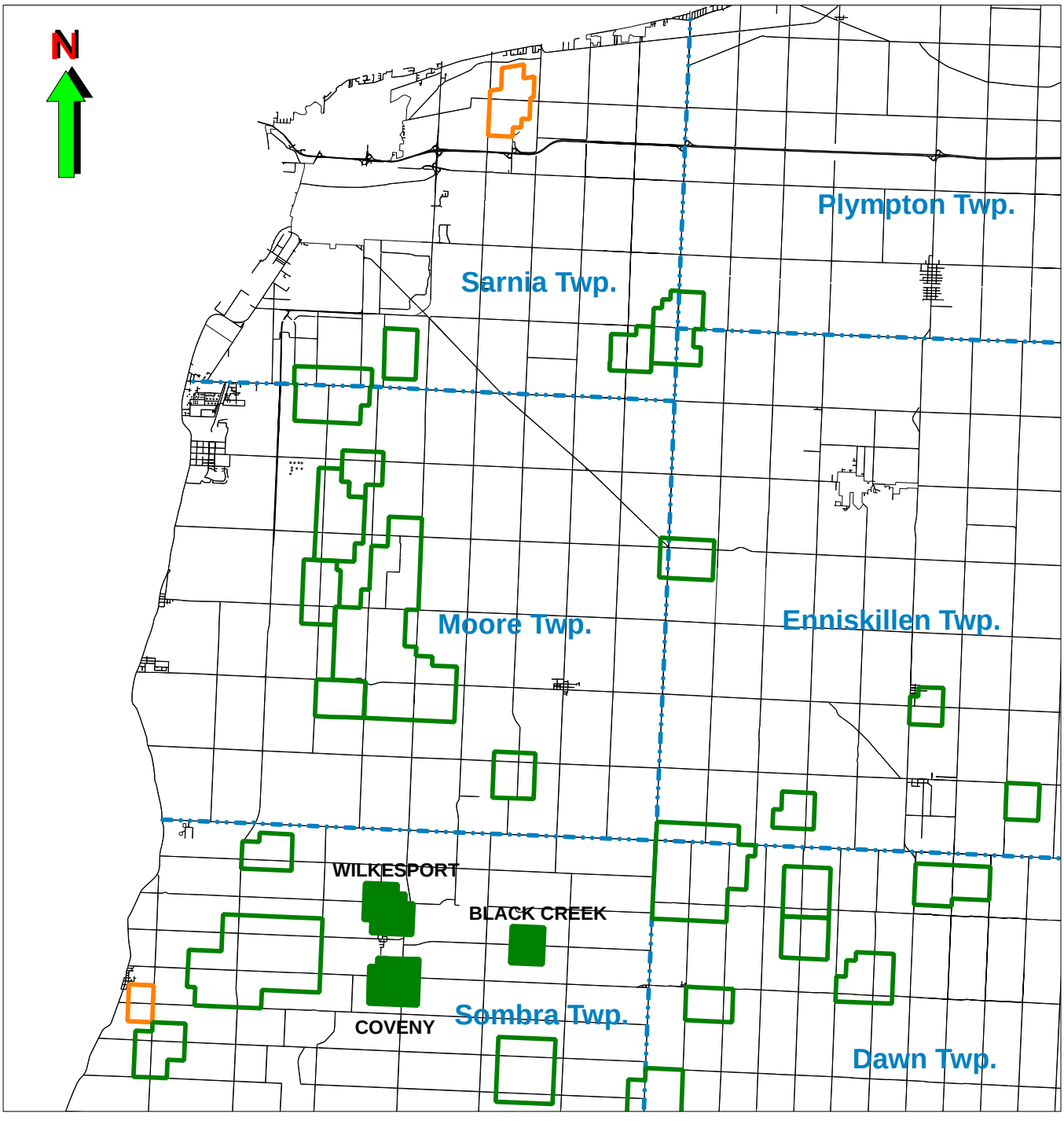
37. Enbridge Gas is proposing to operate the Wilkesport pool at 8,930 kPaa. This equates to a pressure gradient of 17.2 kPa/m (0.76 psi/ft). This will increase the

working capacity from 233,100 10^3m^3 to 263,400 10^3m^3, which is an incremental capacity gain of 30,300 10^3m^3.

38. The MOP of the gathering lines in the pool is 9,205 kPag (1,335 psig).

39. In order to ensure the proposed maximum pressure gradient complies with CSA Z341.1-18, an engineering study was conducted by Geofirma Engineering Ltd. for the Wilkesport pool. This engineering study incorporated data from geomechanical and regional in-situ tests completed on the reservoir and caprock formations.

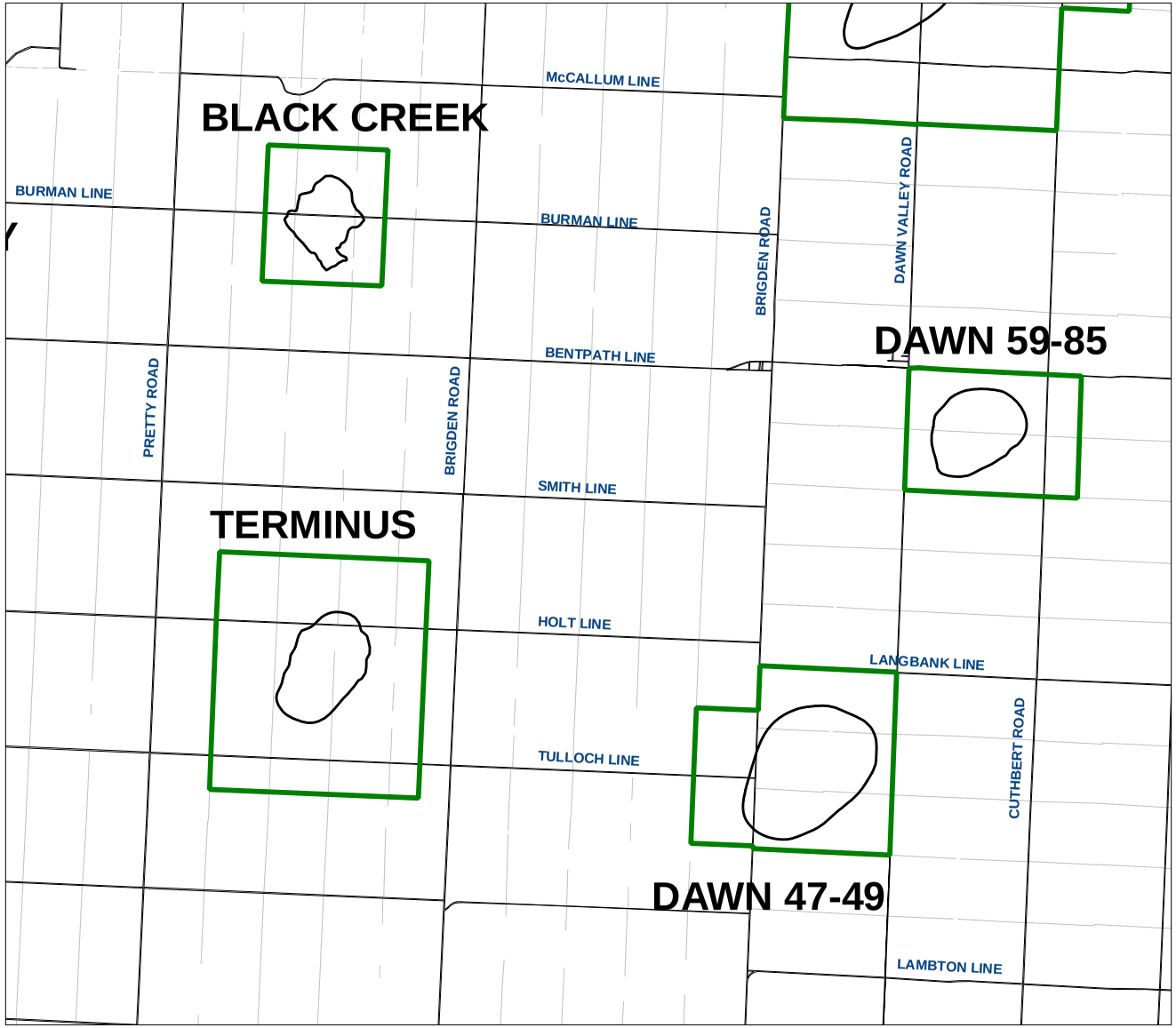
40. In addition, a review of well casings, wellheads, gathering pipelines and other related surface facilities was completed. As a result of this review, three wells in the Wilkesport pool will receive new master valves, one well will receive a new wellhead and all three will have ESD valves installed. This work is scheduled to be completed prior to delta pressuring. No other upgrades are required.



POOL LOCATION MAP

Enbridge Gas Inc. 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)
Airport	17.2	2018	11,580
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 156	17.2	2017	8,290
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

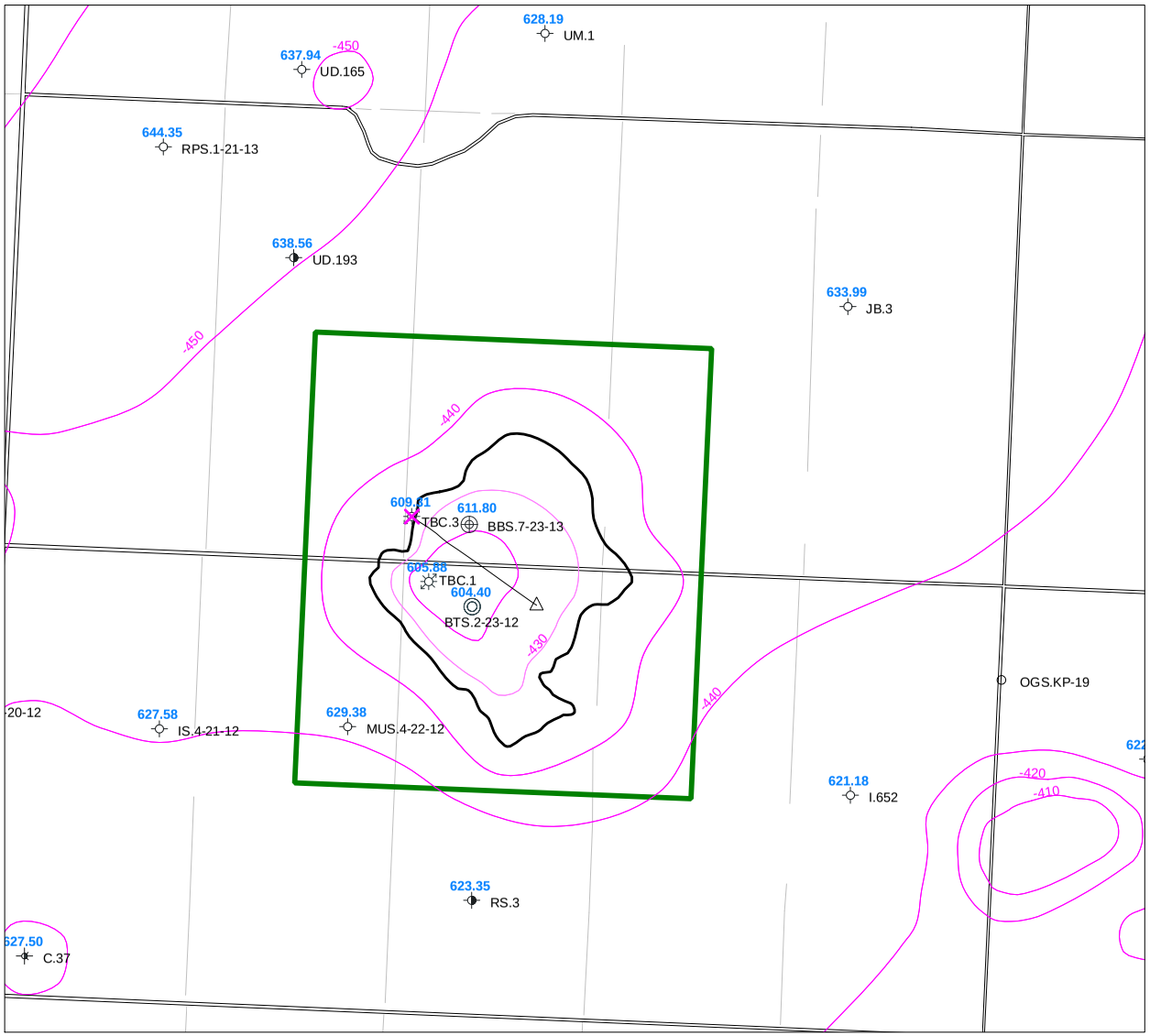
REEF FOOTPRINT

DSA - ENBRIDGE GAS INC

SCALE

1 0 1 2 3 km

REMARKS	BLACK CREEK POOL
	LOCATION MAP
	DRAWN BY / DATE / SCALE AS SHOWN
	CHECKED BY / DATE / PROJECT CODE



LEGEND

611.80 GUELPH DEPTH TO CREST

GUELPH CONTOUR

DSA - ENBRIDGE GAS INC

GUELPH INTERCEPT

REEF FOOTPRINT

DRY HOLE, ABANDONED

NATURAL GAS STORAGE

OBSERVATION, ABANDONED

OBSERVATION

OIL SHOW, ABANDONED

STRATIGRAPHIC WELL, ABANDONED

OIL SHOW, GAS SHOW, ABANDONED

Top Hole

Bottom Hole

HORIZONTAL WELL

SCALE

250 0 250 500 750 m

REMARKS

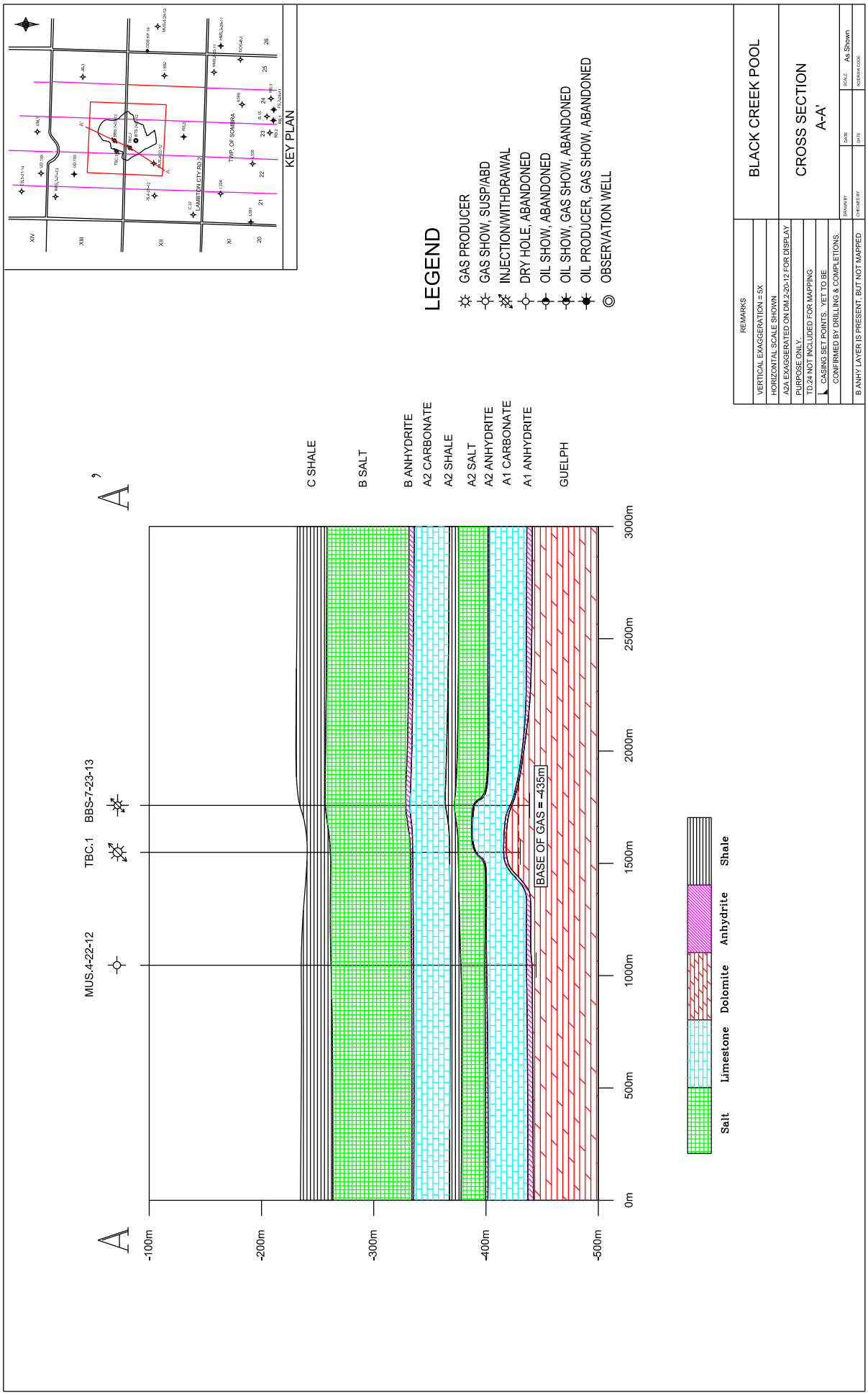
BLACK CREEK POOL

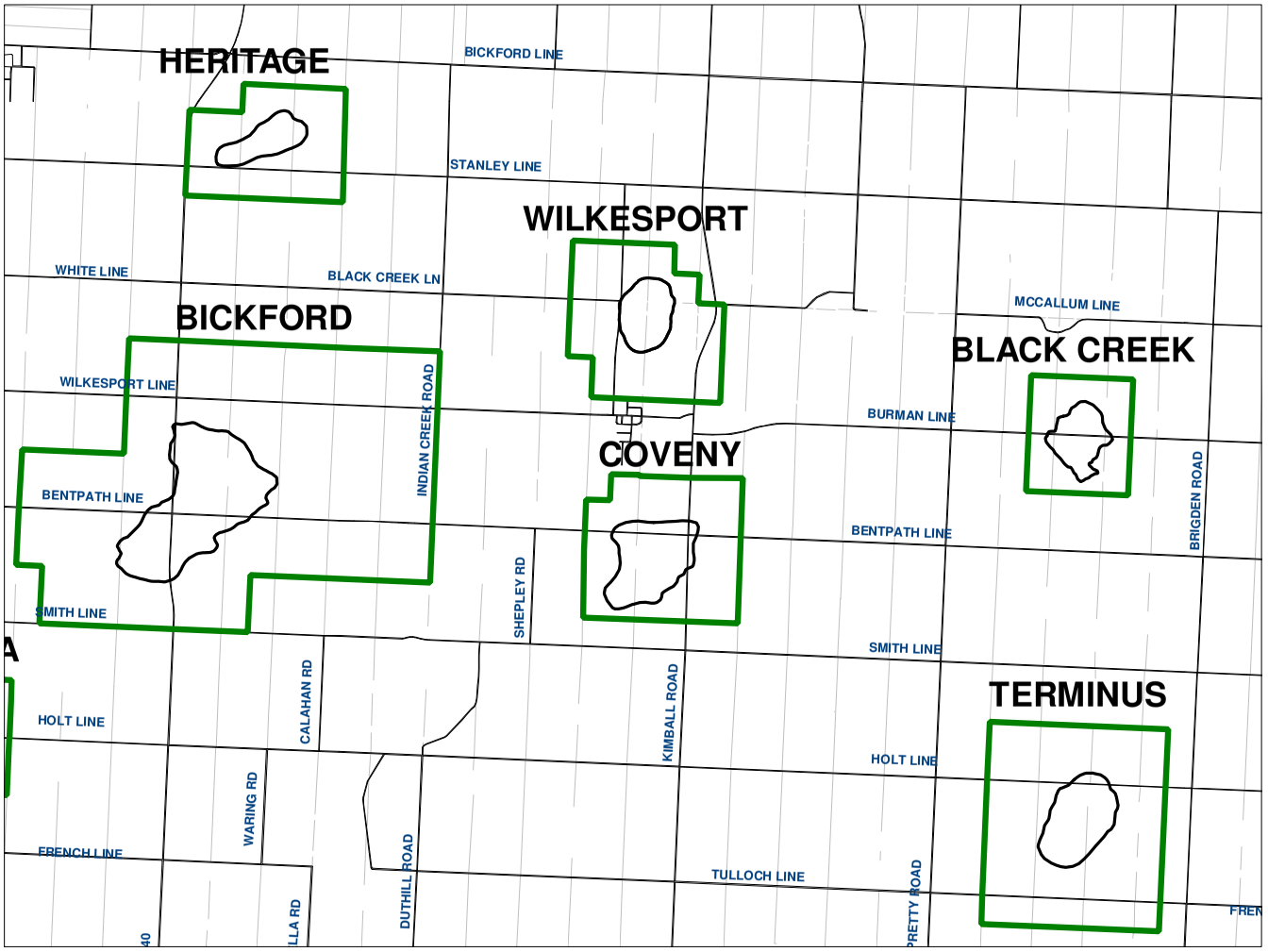
GUELPH STRUCTURE AND DEPTH TO CREST

DRAWN BY | DATE | SCALE AS SHOWN

CHECKED BY | DATE | PROJECT CODE

Filed: 2020-02-07. EB-2020-0074, Exhibit B, Tab 1, Schedule 1, Attachment 4, Page 1 of 1


KEY PLAN
LAMBTON CTY RD 7
TWP. OF SOMBRA
LEGEND
GAS PRODUCER
GAS SHOW, SUSP/ABD
INJECTION/WITHDRAWAL
DRY HOLE, ABANDONED
OIL SHOW, ABANDONED
OIL SHOW, GAS SHOW, ABANDONED
OIL PRODUCER, GAS SHOW, ABANDONED
OBSERVATION WELL
REMARKS
VERTICAL EXAGGERATION = 5X
HORIZONTAL SCALE SHOWN
A2A EXAGGERATED ON DM 2-20-12 FOR DISPLAY PURPOSE ONLY.
TD:24 NOT INCLUDED FOR MAPPING
CASING SET POINTS. YET TO BE CONFIRMED BY DRILLING & COMPLETIONS.
B ANHY LAYER IS PRESENT, BUT NOT MAPPED
BLACK CREEK POOL
CROSS SECTION
A-A'
SCALE As Shown
A
A'
MUS.4-22-12
TBC.1
BBS-7-23-13
C SHALE
B SALT
B ANHYDRITE
A2 CARBONATE
A2 SHALE
A2 SALT
A2 ANHYDRITE
A1 CARBONATE
A1 ANHYDRITE
GUELPH
BASE OF GAS = -435m
-100m
-200m
-300m
-400m
-500m
0m
500m
1000m
1500m
2000m
2500m
3000m
Salt
Limestone
Dolomite
Anhydrite
Shale



LEGEND

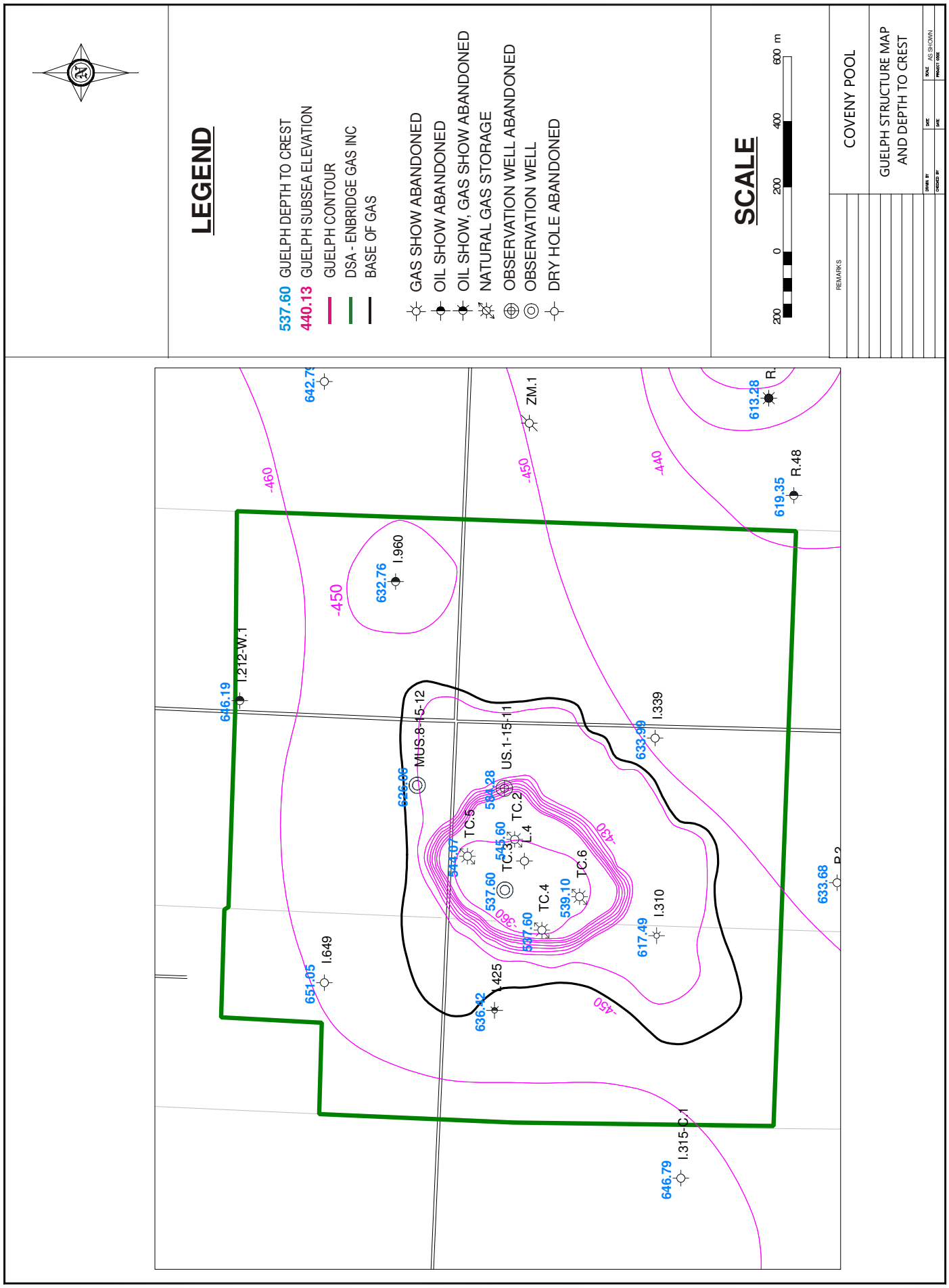
DSA - ENBRIDGE GAS INC

REEF OUTLINE

SCALE

1000 0 1000 2000 3000 m

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


LEGEND
537.60 GUELPH DEPTH TO CREST
440.13 GUELPH SUBSEA ELEVATION
GUELPH CONTOUR
DSA - ENBRIDGE GAS INC
BASE OF GAS
GAS SHOW ABANDONED
OIL SHOW ABANDONED
OIL SHOW, GAS SHOW ABANDONED
NATURAL GAS STORAGE
OBSERVATION WELL ABANDONED
OBSERVATION WELL
DRY HOLE ABANDONED
SCALE
200 0 200 400 600 m
REMARKS
COVENY POOL
GUELPH STRUCTURE MAP
AND DEPTH TO CREST
DRAWN BY
CHECKED BY
DATE
DATE
SCALE AS SHOWN
PROJECT CODE
-460
-450
-440
-430
-420
642.79
632.76
I.960
646.19
I.212-W.1
651.05
I.649
626.86
MUS.8-15-12
US.1-15-11
584.28
574.07
545.60
537.60
539.10
527.60
TC.5
TC.2
TC.3
L.4
TC.4
TC.6
636.42
I.425
ZM.1
633.99
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617.49
I.310
633.68
613.28
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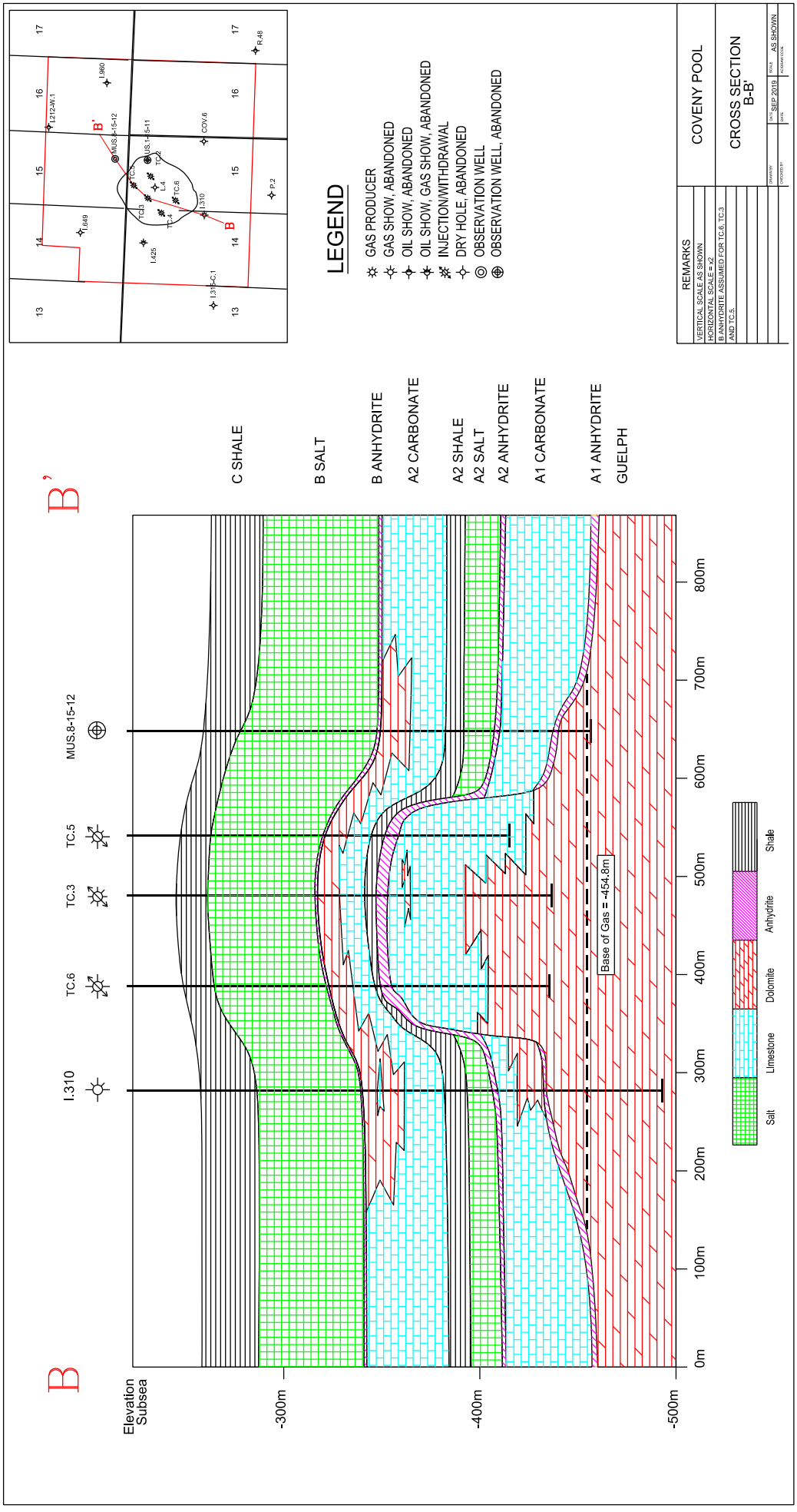
R.48
646.79
I.315-C.1


LEGEND
GAS PRODUCER
GAS SHOW, ABANDONED
OIL SHOW, ABANDONED
OIL SHOW, GAS SHOW, ABANDONED
INJECTION/WITHDRAWAL
DRY HOLE, ABANDONED
OBSERVATION WELL
OBSERVATION WELL, ABANDONED
REMARKS
VERTICAL SCALE AS SHOWN
HORIZONTAL SCALE = x2
B ANHYDRITE ASSUMED FOR TC.6, TC.3 AND TC.5.
COVENY POOL
CROSS SECTION B-B'
SEP 2019
AS SHOWN
B
B'
I.310
TC.6
TC.3
TC.5
MUS.8-15-12
C SHALE
B SALT
B ANHYDRITE
A2 CARBONATE
A2 SHALE
A2 SALT
A2 ANHYDRITE
A1 CARBONATE
A1 ANHYDRITE
GUELPH
Base of Gas = -454.8m
Salt
Limestone
Dolomite
Anhydrite
Shale
Elevation Subsea
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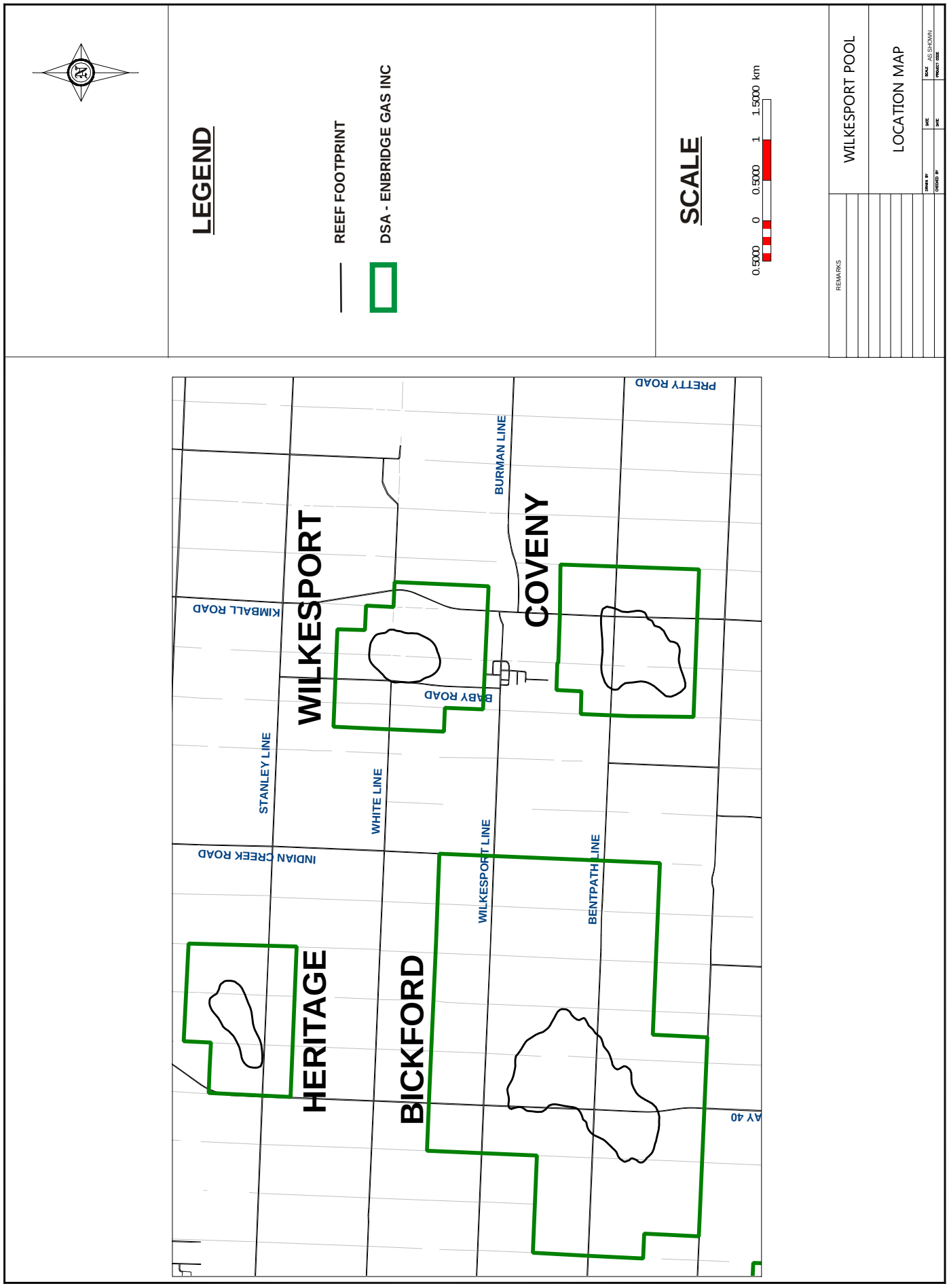
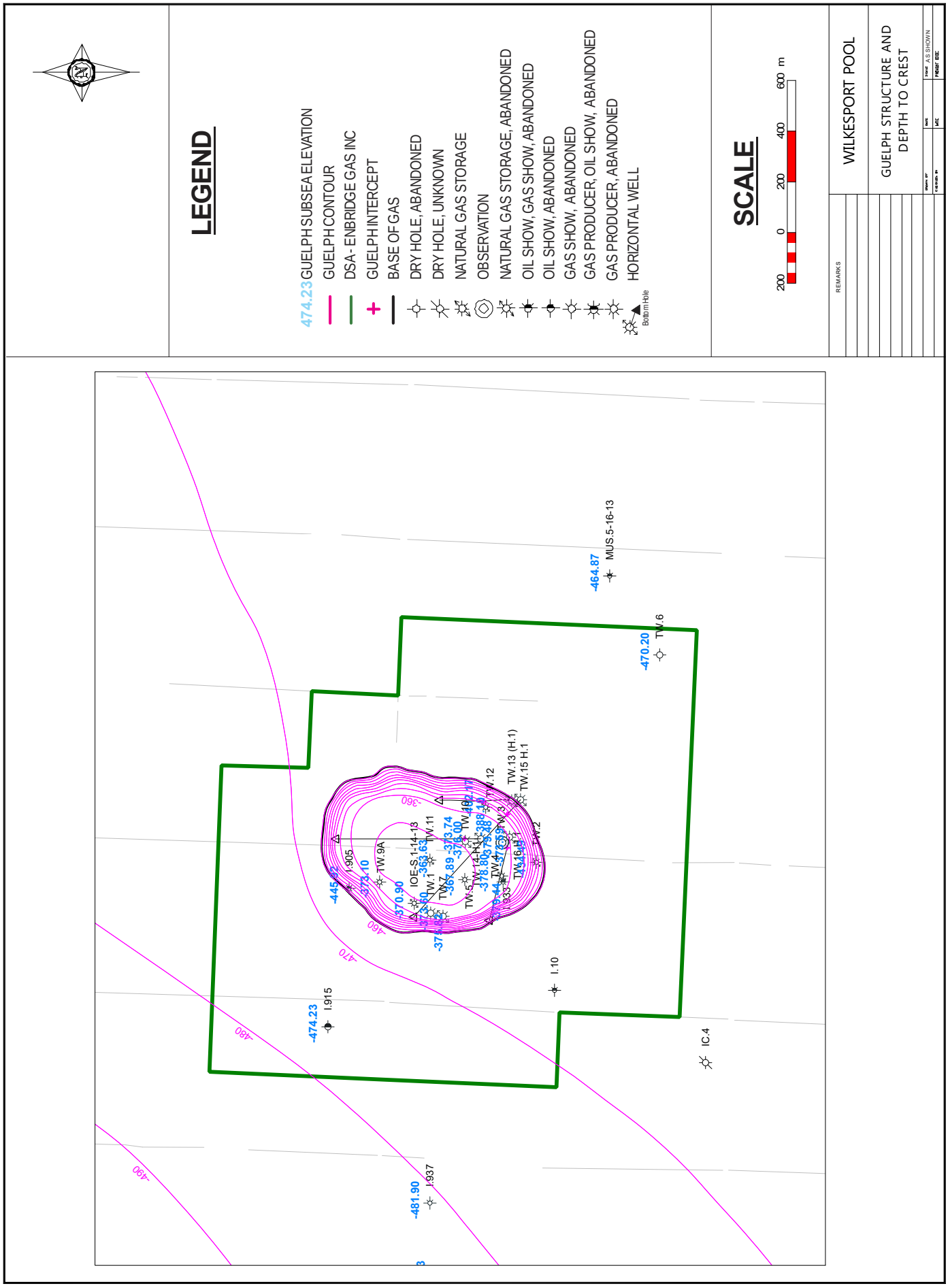
-400m
-500m
0m
100m
200m
300m
400m
500m
600m
700m
800m


LEGEND
REEF FOOTPRINT
DSA - ENBRIDGE GAS INC
SCALE
0.5000 0 0.5000 1 1.5000 km
WILKESPORT POOL
LOCATION MAP
REMARKS
AS SHOWN
PRETTY ROAD
BURMAN LINE
COVENY
WILKESPORT
KIMBALL ROAD
BABY ROAD
STANLEY LINE
WHITE LINE
INDIAN CREEK ROAD
WILKESPORT LINE
BENTPATH LINE
HERITAGE
BICKFORD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474.23 GUELPH SUBSEA ELEVATION
GUELPH CONTOUR
DSA - ENBRIDGE GAS INC
GUELPH INTERCEPT
BASE OF GAS
DRY HOLE, ABANDONED
DRY HOLE, UNKNOWN
NATURAL GAS STORAGE
OBSERVATION
NATURAL GAS STORAGE, ABANDONED
OIL SHOW, GAS SHOW, ABANDONED
OIL SHOW, ABANDONED
GAS SHOW, ABANDONED
GAS PRODUCER, OIL SHOW, ABANDONED
GAS PRODUCER, ABANDONED
HORIZONTAL WELL
Bottom Hole
SCALE
200 0 200 400 600 m
REMARKS
WILKESPORT POOL
GUELPH STRUCTURE AND DEPTH TO CREST
AS SHOWN
-464.87
MUS.5-16-13
-470.20
TW.6
TW.13 (H.1)
TW.15 H.1
TW.12
TW.2
TW.3
TW.4
TW.16 H.1
TW.14 H.1
TW.5
TW.7
TW.1
TW.11
IOE-S.1-14-18
TW.9A
I.905
-445.22
-373.10
-370.90
-363.63
-367.89
-373.74
-376.00
-378.80
-379.38
-382.17
-374.60
-376.44
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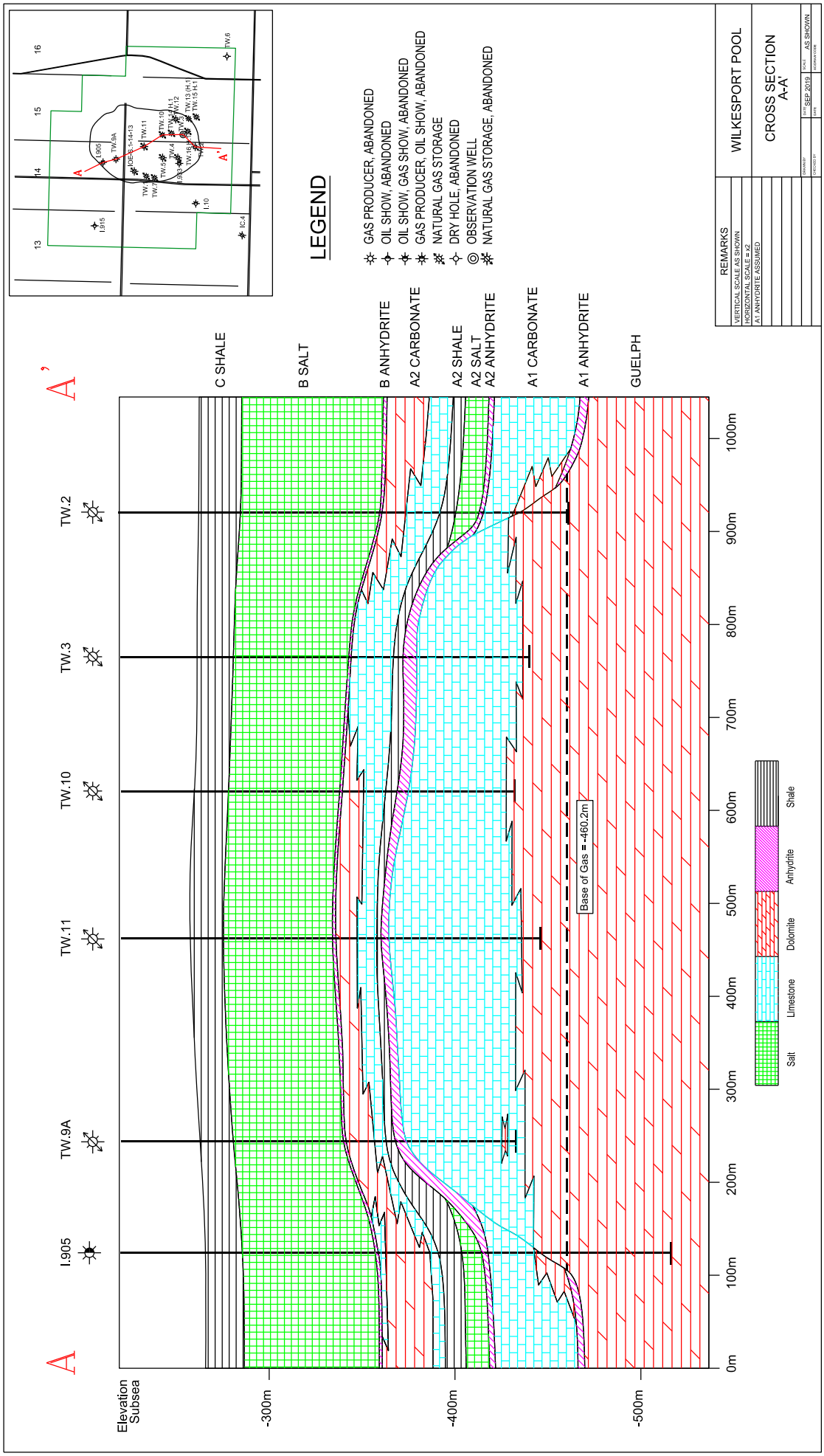
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GAS PRODUCER, ABANDONED
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GAS PRODUCER, OIL SHOW, ABANDONED
NATURAL GAS STORAGE
DRY HOLE, ABANDONED
OBSERVATION WELL
NATURAL GAS STORAGE, ABANDONED
REMARKS
VERTICAL SCALE AS SHOWN
HORIZONTAL SCALE = x2
A1 ANHYDRITE ASSUMED
WILKESPORT POOL
CROSS SECTION
A-A'
SEP 2019
AS SHOWN
C SHALE
B SALT
B ANHYDRITE
A2 CARBONATE
A2 SHALE
A2 SALT
A2 ANHYDRITE
A1 CARBONATE
A1 ANHYDRITE
GUELPH
I.905
TW.9A
TW.11
TW.10
TW.3
TW.2
Base of Gas = -460.2m
Elevation Subsea
0m
100m
200m
300m
400m
500m
600m
700m
800m
900m
1000m
-300m
-400m
-500m
Salt
Limestone
Dolomite
Anhydrite
Shale

ENVIRONMENTAL SCREENING REPORT

1. Stantec Consulting Ltd. ("Stantec") was retained by Enbridge Gas to undertake an Environmental Screening to identify potential environmental and socio-economic impacts associated with the installation of temporary access roads, well pad enlargements and wellhead upgrades for the Delta Pressuring Project, in the Black Creek, Coveny and Wilkesport storage pools ("Pools")[1].

   Part of the screening process was to review Environmental Reports ("ER") generated during past projects within the Pools.

2. Temporary access roads and drill pad enlargement will be required for TW1 and TW7 within the Wilkesport storage pool. The remainder of the wellhead upgrades as part of the Project does not involve construction activities, however, Environmental Screening Reports ("ESR") were generated for all Pools to ensure the environmental and socio-economic settings were understood, impacts identified, if any and to prepare mitigation measures, as required.

   The wellhead upgrades and construction of the temporary access roads and enlarged drill pads will be completed in Spring 2020. The Environmental Screening was completed in October 2019.

3. Mitigation measures designed to minimize environmental and socio-economic impacts were also developed as part of the screening. The screening results have been documented in the ESRs attached to this Exhibit. The ESRs conform to the

[1] The Pools are designated storage areas ("DSA") as defined in s. 36.1(1)(a) of the Ontario Energy Board Act ("OEB Act").

Ontario Energy Board ("OEB" or the "Board") *"Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario"* (Seventh Edition, 2016) and the generally accepted principles of Environmental Screening Principles for Distribution System Expansion Projects by Ontario Natural Gas Utilities, as outlined in the OEB's E.B.O. 188 Report.

4. The ESRs for the Black Creek and Coveny/Wilkesport storage pools are included as Attachment 1 and 2 respectively to this Exhibit.

5. The ESRs did not result in any significant environmental or socio-economic features being identified other than the potential occurrence of select Species at Risk ("SAR") and/or their habitat (as identified in Table 2-1 of the ESRs).

6. Based on results of a background records review, habitat assessment and consultants experience for the surrounding landscape, Butler's Gartersnake and Eastern Foxsnake are the only SAR that may be impacted by the Project. In order to limit impacts to this species, Enbridge Gas has began consultation with the Ministry of Environment, Conservation and Parks ("MECP") to confirm recommended mitigation measures. Enbridge Gas provided the MECP recommendations to be implemented during the Project on December 3, 2019, which can be found in Attachment 3 to this Exhibit. These recommendations are included within Section 2.2.2 of the ESRs.

7. Enbridge Gas will follow the recommendations provided to the MECP as well as any further mitigation measures and advice provided by the MECP.

8. With the implementation of the mitigation measures recommended in the ESRs, the mitigation plan for Butler's Gartersnake and Eastern Gartersnake and adherence to permit, regulatory and/or legislative requirements, the potential environmental and / or socio-economic impacts of the Project are not anticipated to be significant.

Stantec

Storage Enhancement Project: Black Creek Designated Storage Area – Environmental Screening Report Update

FINAL REPORT

December 3, 2019

File: 160951156

Prepared for:

Enbridge Gas Inc.
101 Honda Boulevard
Markham, ON L6C 0M6

Prepared by:

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham, ON L3R 0B8

This document entitled Storage Enhancement Project: Black Creek Designated Storage Area – Environmental Screening Report Update was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Enbridge Gas Inc. (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

Chris Foster-Pengelly, M.Sc., CAN-CISEC
Environmental Planner

Reviewed by 
(signature)

Mark Knight, MA, MCIP, RPP
Associate, Environmental Planner

Approved by 
(signature)

Rooly Georgopoulos, B.Sc.
Senior Associate, Environmental Services

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Executive Summary

Enbridge Gas Inc. (“Enbridge”) is proposing to increase the maximum pressure gradient at their Black Creek Designated Storage Area (DSA) in the Township of St. Clair, Ontario (“the Project”). The Project is necessary in order to meet growing market demand for incremental storage space. The Project includes upgrades to each wellhead within the Black Creek DSA. The wells are not being deepened or modified in the subsurface, and ground disturbance is not required. Existing access roads will used to access each wellhead and construction will be completed within existing gravelled well pads. Although no ground disturbance or temporary access roads are required, an environmental screening report was prepared as part of the Ontario Energy Board (OEB) application to identify biophysical and socio-economic features and develop appropriate mitigation measures, where needed.

Stantec has reviewed the Environmental Report previously completed for the Black Creek storage area, “Black Creek Storage Pool Environmental Assessment,” (Acres International Limited (Acres), 1994) and the “Black Creek Storage Pool Environmental Assessment Addendum 1” (Acres, 1996).” Desktop environmental and socio-economic reviews were completed to confirm the details and data in the environmental assessment and to determine where updates were required. Sections in this updated report were revised in accordance with the current guidelines set out in the Enbridge Reference Manual for the Environmental Screening Checklist, July 2012 (2012).

The Study Area is as described in the Acres, 1994 report, and is bounded on the west side by Pretty Road, on the north by Mccallum Line, on the east by Dawn Valley Road, and on the south parallel and just south of Lambton County Road No. 2.

Physical, natural, and socio-economic features were identified within the Study Area. A review of the potential effects of the project on these features is provided in the Environment Screening Report (ESR). As no ground disturbance or work outside of existing gravel access roads and well pads is required, potential impacts are limited to wildlife Species at Risk. Accordingly, mitigation measures have not been developed for physical, natural, and socio-economic features, with the exception of Species at Risk.

It is Stantec’s opinion that the proposed Project will be operated in a manner that protects the environment and manages potential effects through the implementation of the proposed mitigation measures outlined in this report.

Abbreviations

Acres	Acres International Limited
ANSIs	areas of natural and scientific interest
a.s.l	above sea level
CLI	Canada Land Inventory
DSA	Designated Storage Area
EA	Environmental Assessment
Enbridge	Enbridge Gas Inc.
ESA	*Endangered Species Act*
ESR	Environment Screening Report
MECP	Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
NHIC	Natural Heritage Information Centre
OBBA	Ontario Breeding Bird Atlas
OEB	Ontario Energy Board
O. Reg.	Ontario Regulation
PTTW	Permit to Take Water

SAR	Species at Risk
SARA	*Species at Risk Act*
SCN	Soybean Cyst Nematode
SCRCA	St. Clair Region Conservation Authority
Stantec	Stantec Consulting Ltd.
WWR	Water Well Record

1.0 INTRODUCTION

1.1 DESCRIPTION AND PURPOSE OF THE PROJECT

Enbridge Gas Inc. ("Enbridge") is proposing to increase the maximum pressure gradient at their Black Creek Designated Storage Area (DSA) in the Township of St. Clair, Ontario ("the Project"). The Project is necessary in order to meet growing market demand for incremental storage space. The Project includes upgrades to each wellhead (referred to as wells TBC 1, TBC 3, and BT 2-23-XII) within the Black Creek DSA. The wells are not being deepened or modified in the subsurface, and ground disturbance is not required. Existing access roads will used to access each wellhead and construction will be completed within existing gravelled well pads. Although no ground disturbance or temporary access roads are required, an environmental screening report was prepared as part of the Ontario Energy Board (OEB) application to identify biophysical and socio-economic features and develop appropriate mitigation measures, where needed.

Stantec Consulting Ltd. (Stantec) was retained by Enbridge to review an Environmental Assessment (EA) previously completed for the area ("Black Creek Storage Pool Environmental Assessment," (Acres 1994) and "Black Creek Storage Pool Environmental Assessment Addendum 1," (Acres 1996)). Stantec completed a desktop review and updated the reports' findings.

1.2 DEFINITION OF THE STUDY AREA

The Study Area for the Project is the same as from the 1994 and 1996 Acres reports. The study area falls within the jurisdiction of two townships (St. Clair and Dawn-Euphemia) in Lambton County. The study area encompasses lands bounded on the west side by Pretty Road, on the north by Mccallum Line, on the east by Dawn Valley Road, and on the south parallel and just south of Lambton County Road No. 2. The Study Area is shown on Figure 1 (Appendix A).

1.3 REPORT OBJECTIVES

Stantec has reviewed the 1994 and 1996 reports and completed a desktop environmental and socio-economic reviews to determine where updates were required. The purpose of the Environmental Screening is to:

- Identify the environmental issues associated with the proposed wellhead upgrades; and
- Determine the environmental mitigation and/or restorative techniques required to mitigate impacts on the environment caused by the Project.

The Environmental Screening for this project was prepared following generally accepted principles of Environmental Screening Principles for Distribution System Expansion Projects by Ontario Natural Gas Utilities, as outlined in the Ontario Energy Board's "("OEB") E.B.O. 188 Report.

Environmental and socio-economic features were reviewed in this report were in accordance with the guidelines set out in the Enbridge Reference Manual for the Environmental Screening Checklist, July 2012 (2012).

1.4 APPROVAL PROCESS AND REGULATORY REQUIREMENTS

This Project is being planned in accordance with OEB and other applicable regulations and requirements. St. Clair Township and the Township of Dawn-Euphemia will be consulted to address any concerns.

The OEB requires that the level of environmental planning, documentation, and reporting applied by the utilities for distribution system expansion projects be determined by the potential environmental impacts associated with each project.

The following permits and regulatory approvals may be required for the Project:

- St. Clair Region Conservation Authority (SCRCA) Permit, under Ontario Regulation (O. Reg.) 171/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Based on a review of publicly available data, the Project is outside of SCRCAs regulated areas, and the absence of ground disturbance would not require a permit under O. Reg. 171/06, however, this should be confirmed with the SCRCA.
- Ministry of the Environment, Conservation and Parks (MECP)
  - If the Project requires pumping/taking from 50,000 Litres (L) to 400,000 L/day of water a day from a lake, river, stream or groundwater source, an Ontario Environmental Activity Sector Registry (EASR) must be obtained.
  - If the Project requires pumping/taking more than 400,000 L of water a day from a lake, river, stream or groundwater source, a Permit to Take Water (PTTW) must be obtained.
- *Endangered Species Act*, 2007
  - May require approval and/or authorization under O. Reg. 242/08 from MECP for terrestrial SAR (e.g., Butler's Gartersnake and Eastern Foxsnake).
- St. Clair Township
  - If the Project will impact traffic, a Traffic Control plan may be required to be submitted to the Township for approval.
- By-Law Number 44 of 20014 of the Corporation of the Township of St. Clair, being a by-law regulating and prohibiting within the Township of St. Clair noise or noises likely to disturb the inhabitants.

2.0 ENVIRONMENTAL SCREENING AND RECOMMENDED MITIGATION MEASURES

For each physical, natural, or socio-economical feature that was identified along the Project, the following information is provided:

- A summary of the feature, as described in Acres (1994 and 1996); and
- If applicable, comments on how the feature has been modified, added, or removed from the Acres (1994 and 1996) reports.

As no ground disturbance or work outside of existing gravel access roads and well pads will be required, potential impacts to the physical, natural, and socio-economic features within the Study Area are limited to wildlife Species at Risk. Accordingly, mitigation measures have not been developed for physical, natural, and socio-economic features, with the exception of Species at Risk.

The following physical, natural, or socio-economical features were not identified within or adjacent to the Study Area during this screening exercise and are not discussed in this report:

- Geological Features and Mineral Resources, including Pits, Quarries, Mineral Deposits, and Mines;
- Significant Geological Features, including Scenic Vistas, Escarpments, Slopes;
- Steep Slopes;
- Valleylands;
- Wetlands;
- Wildlife Management Areas;
- Areas of Natural and Scientific Interest;
- Recreation Areas and Outdoor Education Areas;
- Special Policy Areas; and
- Waste Disposal Sites (Active or Closed).

2.1 PHYSICAL FEATURES

2.1.1 Geological Features and Mineral Resources

As described in Acres (1994), the major surface bedrock layer is the Kettle Point Formation which is a black fissile shale with some green shale of Devonian/Mississippian Age. Subsurface formations include the Dundee, Guelph and Salina beds, and associated with these are oil and natural gas. Also found within the Salina Formations are thick beds of salt.

2.1.1.1 Bedrock Outcroppings

Acres (1994) identified that bedrock is not exposed in the Study Area, and due to the overlying surface material, would not have influence on the routing or pipeline construction. A review of the updated MECP water well records (WWR) indicate that the general depth to bedrock is approximately 20 m to 46 m (MECP, 2019).

2.1.2 Vulnerable Soils

As described in Acres (1994), the Study Area is in the Lambton Clay Plain subregion of the St. Clair Plain (Chapman and Putnam, 1984). The area is defined as a bevelled till plain where the slight 'knoll and sag' character typical of ground moraine has been smoothed by a thin layer of lacustrine material. Lacustrine deposits from both glacial Lakes Whittlesey and Warren settled in the depressions while wave action lowered the higher areas, thus levelling any surface features. Reworking of the ground moraine in certain locations makes it difficult to distinguish between till and lacustrine deposits.

The study area is characterized by a lack of relief, except along the Booth Creek area to the north. The general elevation is approximately 190 m with Booth Creek cutting 10 m down into the plain.

Acres (1994), described soil types within the Study Area, recorded by the Ontario Soil Survey in the Study Area, include Brookstone Clay, Caistor Clay. In addition to the Brookstone Clay and Caistor Clay soils, the Study Area also includes Bottom Land soils.

2.1.2.1 Brookstone Clay

As described in Acres (1994), within the Study Area, Brookston Clay soils are located south of Booth Creek. This poorly drained soil has developed on level to slightly sloping terrain (OMAFRA, 1957).

Agricultural yields on Brookston Clay soils are hindered by drainage problems and, where artificial drainage has not been installed, crops are generally limited to hay, pasture, and some cereal grains. On lands which have been improved with artificial drainage systems the crop productivity is increased and typical crops include winter wheat, cereal grains, alfalfa, corn, soybeans, and sugar beets.

2.1.2.2 Caistor Clay

As described in Acres (1994), in the Study Area, Caistor Clay soils are situated north of Booth Creek. Typically, Caistor Clay occurs on slightly undulating topography. This imperfectly drained soil belongs to the Grey-Brown Podzolic Great Soil Group and represents the transition area between the Brookston Clay and the Bottom Land (OMAFRA, 1957).

The soil is moderately acidic and is inherently low in organic content. Caistor Clay soils are best utilized for livestock farming, legume crops, and rotations that include some row crops.

2.1.2.3 Bottom Land

Bottom land is located immediately adjacent to Booth Creek, subsequently; these lands are subject to seasonal flooding. The soil materials which have been deposited on these lands are a result of recent flooding and consist of layers of silt, sand, and clay intermixed with organic content.

In a typical year, Bottom Land is moist all year. This excess moisture tends to exclude the use of Bottom Land for many farming practices. However, grass can grow in abundance on these lands which makes them quite valuable for use as pasture lands. If serious flooding does not occur over the course of a growing season good crop yields from Bottom Land are possible.

The Canada Land Inventory ("CLI") categories land into seven classes which reflect the soil's capability to produce field and forage crops. Lands classified as Class 1 are considered the most productive, while those classified as Class 7 are the least productive. Class 1 to 4 agricultural lands are generally considered arable lands with Class 1 and 2 considered prime for general field crop production. The classification system reflects limitations such as slope, shallow soils, climate, drainage, and fertility. Organic soils are not rated in the classification system.

Approximately 91% of the Study Area has been classified at CLI Class 2, which is associated with the Brookston Clay soil. Approximately 7% of the Study Area has been classified at CLI Class 3, which is associated with the Caistor Clay soil. Approximately 2% of the Study Area has been classified at CLI Class 5, which is associated with the Bottom Land soils. The agricultural features within the Study Area are illustrated in Appendix A, Figure 3.

2.1.3 Agricultural Resources

2.1.3.1 Specialty Crop Lands and Sensitive Agricultural Operations

Agricultural lands are present within the Study Area. These lands are not considered to be among Ontario's specialty crop lands.

Soybean Cyst Nematode ("SCN")

Once a field has been infested with SCN, there is significant potential for soybean crop yield reductions (Olechowski, 1990). As all equipment and vehicle traffic will be confined to existing gravel access roads and well pads, mitigation for SCN has not been developed.

2.1.3.2 Tile Drainage

As described in Acres (1994), most agricultural land in the Study Area has been improved with artificial drainage systems. Both systematic and random tile systems exist throughout the Study Area, however, systematic systems are much more common. Appendix A, Figure 3 identifies the location and type of artificially drained lands within the Study Area.

2.1.4 Water Wells and Hydrology

2.1.4.1 Water Wells

According to the MECP database, there are eighty-eight wells located within 200 m of the Study Area. The primary uses of the majority of these wells is domestic (twenty-seven wells) and livestock (twenty-seven), while the primary use of the remaining wells are industrial (two), not used (three), and unknown (twenty-nine, primarily consisting of abandoned-supply wells).

As per Acres (1994), Susceptibility of groundwater to contamination is generally low. The clay overburden protects the aquifer, having a low permeability and a high capacity for attenuation of contaminants. The low relief plus the low permeability reduces movement of contaminants into the groundwater.

The MECP WWR indicate static water levels at depths ranging from 4.5 mbg to 12.2 mbg.

2.1.4.2 Hydrology and Hydrogeology

As described in Acres (1994), the major stream in the Study Area is Booth Creek (Appendix A, Figure 2) which drains from east to west in the northern part of the study area. It flows into Black Creek, a tributary of the North Sydenham River. Several tributaries and municipal drains flow into Booth Creek. The rest of the study area is drained by several large municipal drains which then discharge into Otter Creek to the south of the Study Area.

The Study Area is located within the Black Creek and Lower North Sydenham subwatersheds (Thames-Sydenham and Region Source Protection Committee, 2015). The Sydenham River drains approximately 67% of the St. Clair Region watershed to the Chenal Ecarte, which discharges into Lake St. Clair.

The Study Area is not within a significant groundwater recharge or discharge area, highly vulnerable aquifer, or intake protection zone (Thames-Sydenham and Region Source Protection Committee, 2015).

The MECP WWR indicate static water levels at depths ranging from 4.5 mbg to 12.2 mbg.

2.2 NATURAL ENVIRONMENTAL FEATURES

2.2.1 Woodlots

The Study Area is within the Deciduous (Carolinian) Forest Region. As described in Acres (1994), very little woodland remains in Lambton County. Forest land is primarily limited to river valleys, farm woodlots and scattered remnant woods that cannot be drained for agriculture or are too small to be farmed economically.

There are eighteen woodlots greater than 2 hectares (ha) (Appendix A, Figure 2), which includes the riparian zone around Booth Creek. Woodlots located within the Township of Dawn-Euphemia are designated as ‘Significant Woodlots’ (The Corporation of the Township of Dawn-Euphemia, 2014).

2.2.2 Significant Wildlife Habit and Vulnerable, Threatened and Endangered Species

A search of publicly available wildlife records identified records of the following Species at Risk (SAR) with the potential to occur within one (1) km of the Study Area (Table 2-1).

A list of species at risk species designated under the Ontario *Endangered Species Act*, *2007* (ESA, 2007) and/or the federal *Species at Risk Act* (SARA) as endangered, threatened or special concern with potential to occur in or adjacent to the Site was developed by reviewing the following sources:

- Natural Heritage Information Centre (NHIC) database (NHIC, 2019)
- Aquatic Species at Risk Mapping (DFO, 2019)
- Ontario Breeding Bird Atlas (OBBA) (Cadman, 2007)
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2015)
- Atlas of the Mammals of Ontario (Dobbyn, 1994)

Table 2-1: Summary of Species at Risk

Species	Status Ontario ESA, 2007	Status Federal *Species at Risk Act*, Schedule 1
Small-footed myotis (*Myotis leibii*)	Endangered	NA
Little brown myotis (*Myotis lucifungus*)	Endangered	Endangered
Northern myotis (*Myotis septentrionalis*)	Endangered	Endangered
Tri-colored bat (*Perimyotis subflavus*)	Endangered	Endangered
Butler's Gartersnake (*Thamnophis butleri*)[3]	Endangered	Endangered
Eastern Foxsnake (*Pantherophis gloydi*)[4]	Endangered	Endangered
Northern Bobwhite (*Colinus virginianus*)[4]	Endangered	Endangered
Common Nighthawk (*Chordeiles minor*)[2]	Special Concern	Threatened
Chimney Swift (*Chaetura pelagica*)[2]	Threatened	Threatened
Barn Owl (*Tyto alba*)[4]	Endangered	Endangered
Red-headed Woodpecker (*Melanerpes erythrocephalus*)[2]	Special Concern	Threatened
Bank Swallow (*Riparia riparia*)[2]	Threatened	Threatened
Barn Swallow (*Hirundo rustica*)[2]	Threatened	Threatened
Wood Thrush (*Hylocichla mustelina*)[2]	Special Concern	Threatened
Bobolink (*Dolichonyx oryzivorus*)[2,4]	Threatened	Threatened
Eastern Meadowlark (*Sturnella magna*)[2,4]	Threatened	Threatened
Blue Ash (*Fraxinus quadrangulata*)[4]	Threatened	Threatened

Table 2-1: Summary of Species at Risk

Species	Status Ontario ESA, 2007	Status Federal *Species at Risk Act*, Schedule 1
Kentucky Coffee-tree (*Gymnocladus dioicus*)[4]	Threatened	Threatened
Eastern Sand Darter (*Ammocrypta pellucida)*[5]	Endangered	Threatened
Pugnose Minnow (*Opsopoeodus emiliae*)[5]	Threatened	Threatened
Pugnose Shiner (*Notropis anogenus*)[5]	Threatened	Threatened
Lilliput (*Toxolasma parvum*)[5]	Threatened	Endangered

Notes:
1 Atlas of Mammals of Ontario (Dobbyn, 1994)
2 Atlas of Breeding Birds of Ontario (Cadman, 2007) (10 x 10 km squares 17LH93 and 17MH03)
3 Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019) (10 x 10 km squares 17LH93 and 17MH03)
4 NHIC database (1x1km squares 17LH9128 to 17LH9233, 17LH9228 to 17LH9233, 17LH9328 to 17LH9333, 17LH9428 to 17LH9433, 17LH9528 to 17LH9533, 17LH9628 to 17LH9631, 17LH9830 to 17LH9831, 17LH9931 to 17LH9932, and 17MH0030 to 17MH0031) (NHIC, 2019)
5 Aquatic Species at Risk Report (Fisheries and Oceans Canada, 2019)

Bat SAR were not identified in the SAR databases, however, given their distribution within Ontario (iNaturalist, 2019), they have been included as potentially present.

Eastern Foxsnake and Butler's Gartersnake have the potential to occur within the Study Area. Disturbance or destruction of habitat of the two species are not anticipated as the Project Location is comprised of highly disturbed lands (agriculture, existing wells and access roads). However, interactions between equipment (including vehicles) and individuals of the species is possible, if construction occurs during the active season for these species (i.e., March 15 – October 15). Snakes often bask on roadways or may crawl into idle equipment for cover and warmth. As ground disturbance is not proposed, risks are low while snakes are hibernating (i.e., October 16 – March 14).

A Mitigation Plan has been prepared for submission to the MECP and includes the following:

- All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. Continual awareness and avoidance of snakes crossing roadways will be encouraged through training programs for those individuals with access to the Project Location.
- Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit.
- All equipment and machinery that is left idle for over one hour, or overnight, on the property must be visually examined prior to (re)ignition to ensure snakes are not present within the machinery. This visual examination should include all lower components of the machinery, including operational extensions and running gear (only required during active period; March 15 – October 15).
- If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used.
- All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project.

- In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per ***Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*** (MNR No date).
- In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately.

2.2.3 Lakes, Rivers, Headwaters and Spring Sources

As described in Acres (1994), the main watercourse in the Study Area is Booth Creek. A small section of Black Creek is located in the northwest corner of the Study Area. There are several municipal drains within the Study Area.

Booth Creek

As per Acres (1994), Booth Creek drains from east to west in the northern part of the study area. It flows into Black Creek, a tributary of the North Sydenham River. A number of tributaries and municipal drains flow into Booth Creek. Booth Creek has been channelized along some reaches through agricultural fields, but it predominantly follows a meandering course that is entrenched up to 10 m into the flat plain around it, providing the main relief in the area. It is a sluggish stream with a low stream gradient.

Municipal Drains

Several municipal drains occur in the Study Area, the primary purpose of these drains is to assist in the drainage of agricultural fields. With some exceptions, these drains are located adjacent to the County and Township roads in the Study Area. As described in Acres (1994), these drains discharge into Otter Creek to the south of the study area. These drains vary in size up to 3 m deep and 5 m wide with steep banks. The flow in them varies greatly depending on the season, but in summer and fall they may be completely dry. These drains have a low gradient and are typified by in-stream vegetation such as cattails and grasses.

2.3 SOCIO-ECONOMIC FEATURES

2.3.1 Designated Environmental Sensitive Areas

The corridor around Bear Creek (located north of the Study Area) has been designated as a "Group B Feature" in the Lambton County Official Plan (2019). Extending south from here towards Booth Creek in the north section of the Study Area, is an area designated as a 'Primary Corridor (Group "C" Feature)'.

The Lambton County Official Plan defines Group B Features as:

- lands adjacent to Group A features and adjacent to certain Group B features as noted in these policies
- significant woodlands
- significant valleylands
- significant wildlife habitat
- provincially significant areas of natural and scientific interest (ANSIs)
- regionally significant ANSIs

The Lambton County Official Plan described constraints within Group B features as, “development may be permitted if it can be demonstrated through an Environmental Impact Study that no negative impacts on the features or their associated ecological functions will result”.

The Lambton County official plan (2019), defines Primary Corridor (Group “C” Feature), as:

- lands adjacent to other Group B features
- primary corridors, including core areas
- linkage features
- highly vulnerable aquifers
- significant groundwater recharge areas
- other surface water features
- woodlots other than significant woodlands
- other significant natural areas, including shrublands, meadows and prairies

The Lambton Official Plan described constraints within a Group “C” feature as, “local official plans will address general controls on development with the aim of improving the overall health of the natural heritage system including the improvement of linkages within corridors”.

The Township of St. Clair (2005) has designated areas surrounding watercourses and woodlots within the Study Area as Hazard and Environmental Protection areas. The section of Booth Creek that extends into the Township of Dawn-Euphemia is mapped as ‘Hazard Lands’ in the Official Plan (Township of Dawn-Euphemia, 2014).

2.3.2 Heritage Resources

Acres (1996) states that “a Stage 2 Archaeological Assessment was completed along the pipeline route and that no archeological sites or archaeological materials of any kind were discarded along the proposed NPS 16 pipeline route”.

As the Project has no ground disturbance and work is occurring within existing gravel access roads and well pads, no further archaeological work was completed.

2.3.3 Transportation Corridors and Easements

The St. Clair Township Official Plan (2019) identifies Brigden Road as a ‘Collector Road’, defined in the Official Plan as “Collector Roads are intended to connect local roads to arterial roads, and to provide access to abutting properties. These roads carry low to moderate traffic volumes”.

The Township of Dawn-Euphemia (2014) identifies Bentpath Line and Maudaumin Road as arterial roads, which are defined in the Official Plan as having the following function “Arterial Roads transport large volumes of traffic between the different areas within the Municipality and through the Municipality. Direct access is usually from other Arterial Roads and Collector Roads”. Dawn Valley Line, south of Bentpath Line is defined as a collector road, which is defined in the Official Plan as having the following Function “Collector Roads carry traffic volumes to and from major traffic generators or within or between residential neighbourhoods”.

2.3.4 Utility Corridors and Facilities

Various public utilities (i.e., water, sewer, hydro, telephone) will be located throughout the Study Area.

2.3.5 Social Impacts

2.3.5.1 Sensitive Receptors

As described in Acres (1994), the study area is dominated by single-family farm dwellings. The hamlet of Beaver Meadows is located at the junction of County Road No. 2 and No. 26.

2.3.5.2 Ornamental Vegetation

Ornamental Vegetation and hedgerows are present throughout the Study Area.

2.4 SUMMARY OF ISSUES

Table 2-2 below presents a summary of the environmental issues identified in this report and the proposed mitigation measures.

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
Wildlife Habitat and Species at Risk	• Wildlife entering or crossing through the work area.	• Disturbance or injury to wildlife through construction activities.	• Restrict vehicles, machinery and personnel to the road RoW and approved work areas to limit construction disturbances to wildlife and wildlife habitat. • Nuisance wildlife should be reported to the Ministry of Natural Resources and Forestry (MNRF) district ecologist. • If larger wildlife (e.g., deer) are struck with vehicles or equipment, notify the MNRF. • Food waste and other debris will be properly contained, and will be collected and removed from the site daily to an approved facility. • Wildlife should not be fed or other interactions promoted with wildlife. • The possession of firearms will be prohibited. • Pets will not be allowed on the Project site. • Follow Mitigation Plan (detailed below) and any additional measures required by MECP. • All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. Continual awareness and avoidance of snakes crossing roadways will be encouraged through training programs for those individuals with access to the Project Location. • Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit. • All equipment and machinery that is left idle for over one hour, or overnight, on the property must be visually examined prior to (re)ignition to ensure snakes are not present within the machinery. This visual examination should include all lower components of the machinery, including operational extensions and running gear

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			(only required during active period; March 15 – October 15). • If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used. • All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project. • In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per ***Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*** (MNR No date). • In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately.
Transportation Corridors	• Shared use of municipal and provincial roads by construction and local traffic.	• Disturbance to local traffic.	• The Project must be conducted in accordance with the local municipal requirements. • It is recommended that Enbridge consult with the Municipality to determine if road access/ occupancy permits or traffic control plans are required.

3.0 CONCLUSION

It is Stantec's opinion that the proposed Project can be operated in a manner that protects the environment and manages potential effects. Potential negative environmental effects are limited to snake SAR, and are anticipated to be managed and protected through the implementation of the proposed mitigation measures outlined in this report.

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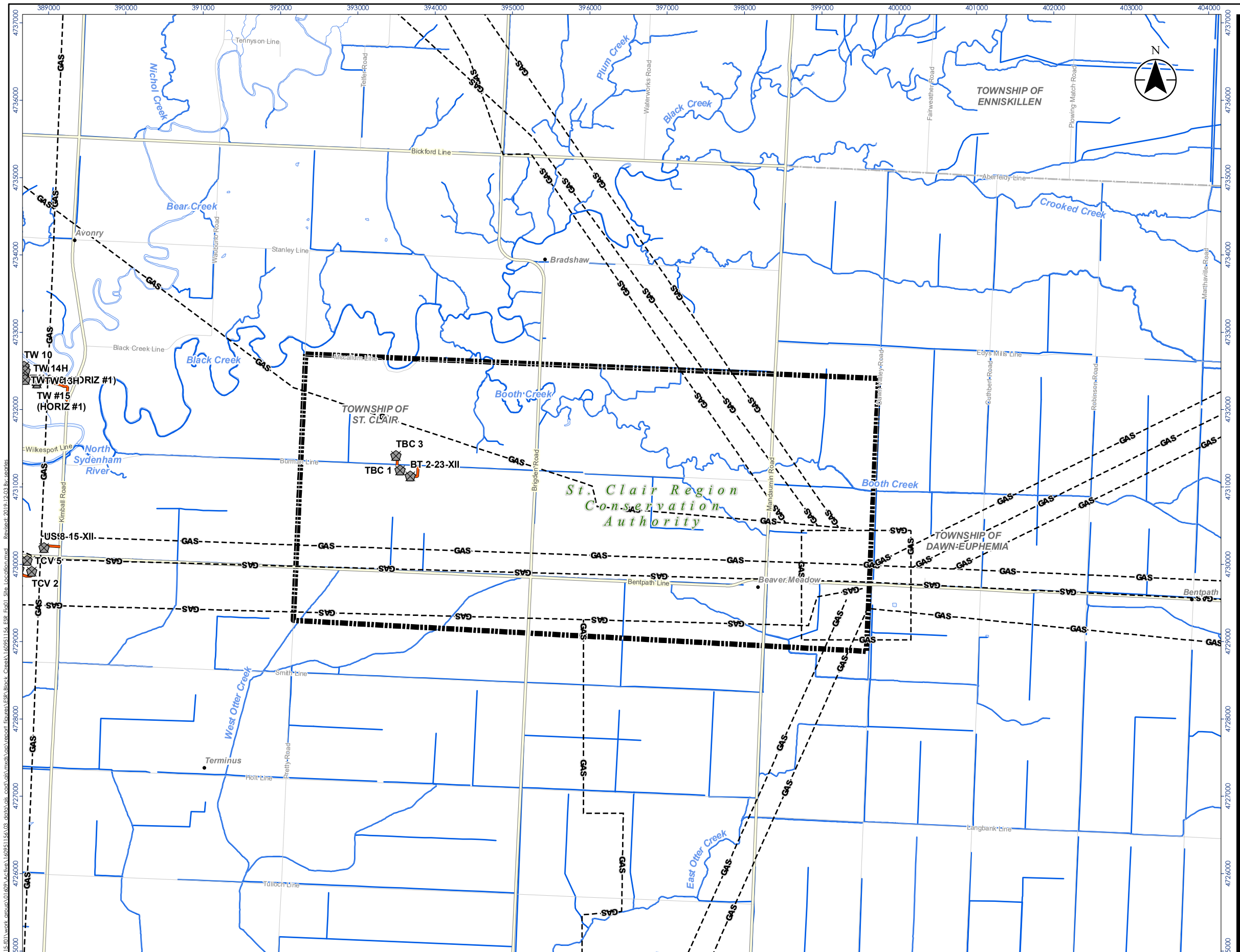
APPENDIX A

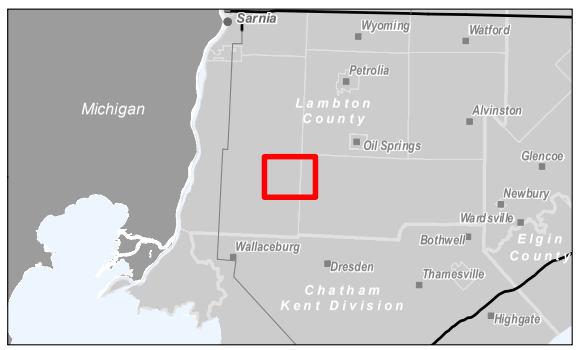
Environmental and Socio-Economic Features



Stantec

Legend
- Enbridge Well
- Access
- Study Area
- Constructed Drain
- Gas Pipeline
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Waterbody
- Lot
- Municipal Boundary, Lower

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.



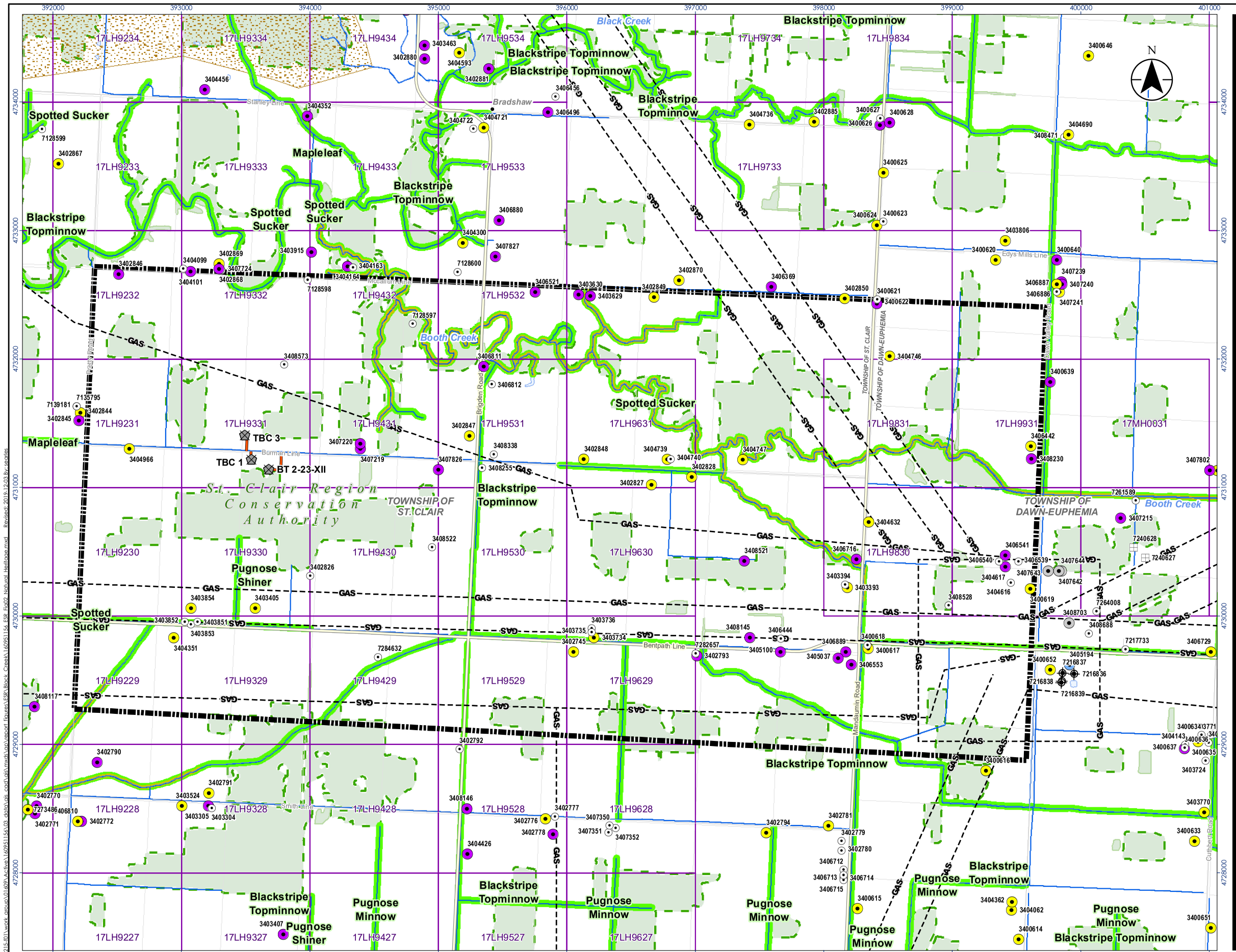
Project Location
County of Lambton

160951156 REV4
Prepared by SPE on 2019-12-03
Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
1

Title
Site Location - Black Creek



Stantec

Legend

- Enbridge Well
- Access
- Study Area
- Constructed Drain
- Thermal Regime, Warm
- Gas Pipeline
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Deer Wintering Area
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Lot
- Municipal Boundary, Lower
- 1 km UTM Grid

Wooded Area (ha)

- Wooded Area < 2 ha
- Wooded Area >2 ha

MECP Water Well (Well ID)

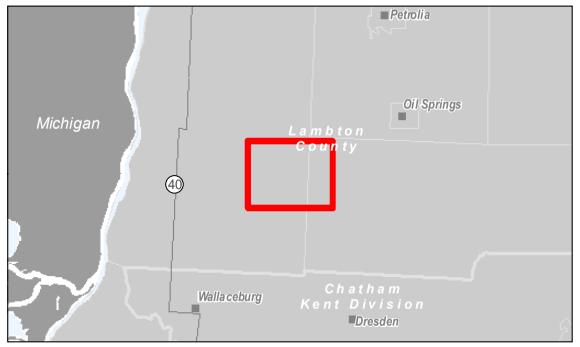
- Commerical
- Industrial
- Domestic
- Livestock
- Test Hole
- Monitoring and Test Hole
- Well use not identified

0 1 km

1:30,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. MECP Water well locations are approximate and have been positioned based on published UTM coordinates © Queen's Printer for Ontario, 2019.



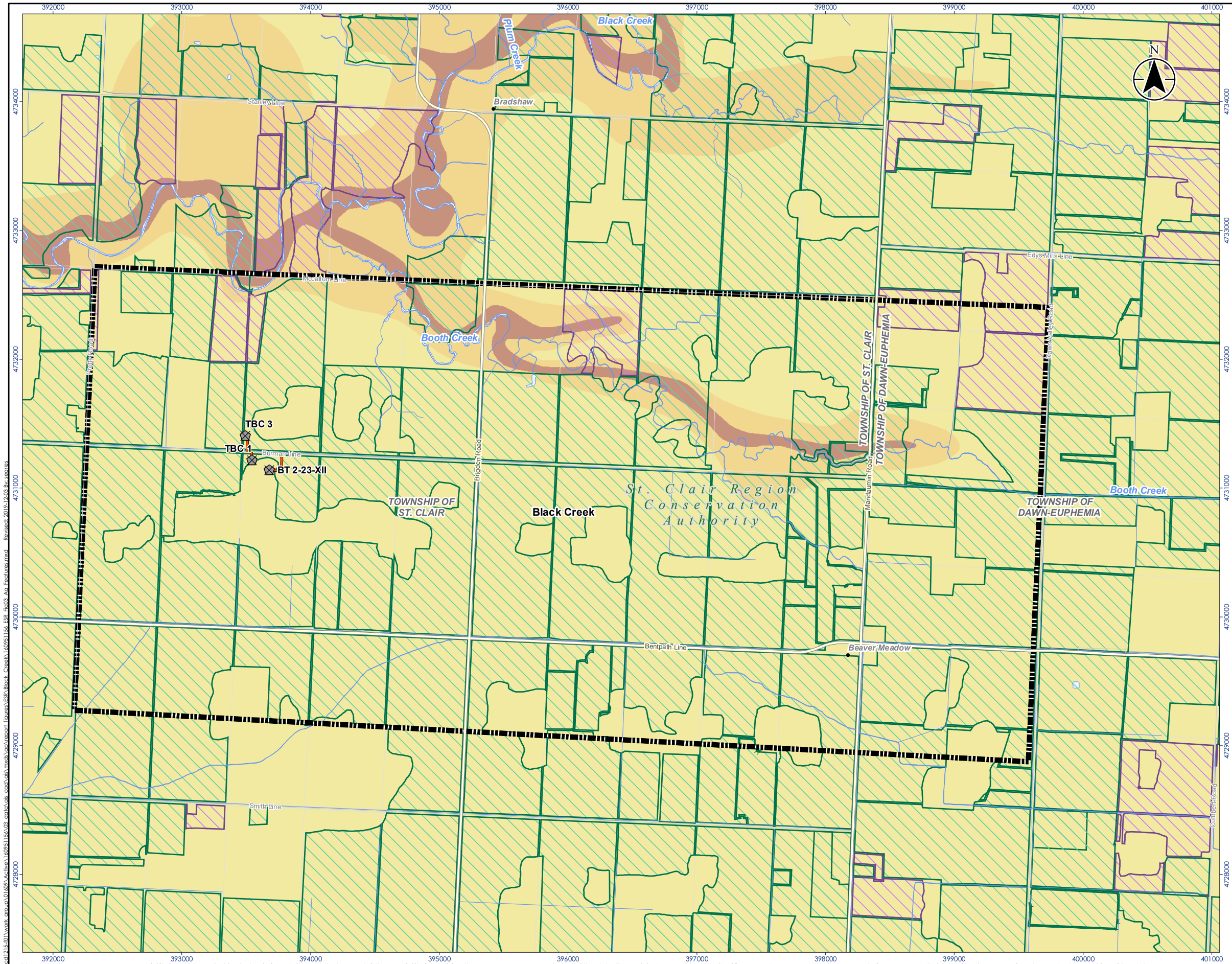
Project Location
County of Lambton

160951156 REV4
Prepared by SPE on 2019-12-03
Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
2

Title
Natural Heritage Features - Black Creek



Stantec

Legend

- Enbridge Well
- Access
- Study Area
- Constructed Drain
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Waterbody
- Lot
- Municipal Boundary, Lower
- Random Tile Drainage
- Systematic Tile Drainage

Soil Capability Classification of Agriculture

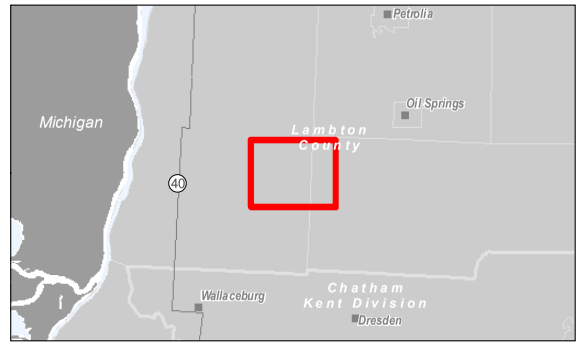
- 2: Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices
- 3: Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices
- 5: Soils in this class gave very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible

0 1 km

1:30,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.



Project Location
County of Lambton

160951156 REV4
Prepared by SPE on 2019-12-03
Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
3

Title
Agricultural Features - Black Creek

Stantec

Storage Enhancement Project: Coveny and Wilkesport Designated Storage Areas – Environmental Screening Report Update

FINAL REPORT

December 3, 2019

File: 160951156

Prepared for:

Enbridge Gas Inc.
101 Honda Boulevard
Markham, ON L6C 0M6

Prepared by:

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham, ON L3R 0B8

Revision	Description	Author		Quality Check		Independent Review	
0	Draft	2019-10-30	CFP		RW		MK
1	Final	2019-11-06	CFP		RW		

Sign-off Sheet

This document entitled Storage Enhancement Project: Coveny and Wilkesport Designated Storage Areas – Environmental Screening Report Update was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Enbridge Gas Inc. (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____
(signature)

Chris Foster-Pengelly, M.Sc., CAN-CISEC
Environmental Planner

Reviewed by _____
(signature)

Rob Rowland, M.Sc., P.Geo.
Associate, Environmental Services, Assessment and Permitting

Approved by _____
(signature)

Rooly Georgopoulos, B.Sc.
Senior Associate, Environmental Services

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Executive Summary

Enbridge Gas Inc. (“Enbridge”) is proposing to increase the maximum pressure gradient at their Wilkesport and Coveny Designated Storage Areas (DSA) in the Township of St. Clair, Ontario (“the Project”). The Project is necessary to meet growing market demand for incremental storage space. The Project includes laying steel plates to create temporary access roads and temporary work areas to two existing wellheads identified as TW1 and TW7. At surface, each wellhead within the Coveny and Wilkesport DSA will be upgraded. The wells are not being deepened or modified in the subsurface, and ground disturbance is not required.

Stantec has reviewed the Environmental Report previously completed for the Wilkesport and Coveny Designated Storage Areas, “Environmental Report: Tecumseh Storage Enhancement Project – Storage Infill Drilling,” (Stantec 2008). Desktop and field environmental and socio-economic reviews were completed to confirm details and data in the screening report and to determine where updates were required. Sections in this updated report were revised in accordance with the current guidelines set out in the Enbridge Reference Manual for the Environmental Screening Checklist, July 2012 (2012).

The Study Area includes the ‘south section’ Study Area from the Stantec, 2008 report, and encompasses lands extending from White Line in the north, Kimball Road in the east, Smith Line in the south, and Baby Road in the west.

Physical, natural, and socio-economic features were identified within the Study Area. A review of the potential effects of the project on these features is provided in the Environmental Screening Report (ESR). Based on these potential impacts, mitigation measures are recommended to minimize these effects.

It is Stantec’s opinion that the proposed Project will be constructed and operated in a manner that protects the environment and manages potential effects. The disturbance is limited in size and scope and is restricted to agricultural lands. Environmental effects (if any) are anticipated to be managed and protected through the implementation of the proposed mitigation measures outlined in this report.

Abbreviations

a.s.l	above sea level
CLI	Canada Land Inventory
DSA	Designated Storage Area
EASR	Environmental Activity Sector Registry
Enbridge	Enbridge Gas Inc.
ER	Environmental Report
ESR	Environmental Screening Report
MECP	Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
MTCS	Ministry of Tourism, Culture and Sport
NHIC	Natural Heritage Information Centre
OBBA	Ontario Breeding Bird Atlas
OEB	Ontario Energy Board
O. Reg.	Ontario Regulation
PTTW	Permit to Take Water
RoW	Right-of-Way

SAR	Species at Risk
SARA	*Species at Risk Act*
SCN	Soybean Cyst Nematode
SCRCA	Saint Clair Region Conservation Authority
Stantec	Stantec Consulting Ltd.
WSSD	Wet Soil Shutdown
WWR	Water Well Records

1.0 INTRODUCTION

1.1 DESCRIPTION AND PURPOSE OF THE PROJECT

Enbridge Gas Inc. (“Enbridge”) is proposing to increase the maximum pressure gradient at their Wilkesport and Coveny Designated Storage Areas (DSA) in the Township of St. Clair, Ontario (“the Project”). The Project is necessary to meet growing market demand for incremental storage space. The Project includes laying steel plates to create temporary access roads and temporary work areas to two existing wellheads identified as TW1 and TW7. At surface, each wellhead within the Coveny and Wilkesport DSA will be upgraded. The wells are not being deepened or modified in the subsurface, and ground disturbance is not required.

Stantec Consulting Ltd. (Stantec) was retained by Enbridge to review an Environmental Report (ER) previously completed for the area (“Environmental Report: Tecumseh Storage Enhancement Project – Storage Infill Drilling,’ (Stantec 2008). Stantec completed a desktop and field review and updated the report’s findings and recommended mitigation measures with current Enbridge practices.

1.2 DEFINITION OF THE STUDY AREA

The Study Area for the Project included the ‘south section’ Study Area from the 2008 Stantec report. The study area encompasses lands extending from White Line in the north, Kimball Road in the east, Smith Line in the south, and Baby Road in the west. The Study Area is shown on Figure 1 (Appendix A).

1.3 REPORT OBJECTIVES

Stantec reviewed the 2008 report and completed a field and desktop environmental and socio-economic review to determine where updates were required. The purpose of the Environmental Screening is to:

- Identify the environmental issues associated with the proposed wellhead upgrades, and temporary access road and temporary well pad enlargements at TW1 and TW7; and
- Determine the environmental mitigation and/or restorative techniques required to mitigate impacts caused by the Project.

The Environmental Screening for this project was prepared following generally accepted principles of Environmental Screening Principles for Distribution System Expansion Projects by Ontario Natural Gas Utilities, as outlined in the Ontario Energy Board’s “(“OEB”) E.B.O. 188 Report.

Environmental and socio-economic features were reviewed in accordance with the guidelines set out in the Enbridge Reference Manual for the Environmental Screening Checklist, July 2012 (2012).

Fieldwork in support of this report was conducted in October 2019. Field investigations included a Stage I and II Archaeological Assessment and a windshield survey of the proposed location for the temporary access road and well pad enlargements at TW1 and TW7 to identify vegetation communities and potential habitat for Species at Risk (SAR) at TW1 and TW7.

1.4 APPROVAL PROCESS AND REGULATORY REQUIREMENTS

This Project is being planned in accordance with OEB and other applicable regulations and requirements. St. Clair Township will be consulted to address any schedule concerns and road closures.

The OEB requires that the level of environmental planning, documentation, and reporting applied by the utilities for distribution system expansion projects be determined by the potential environmental impacts associated with each project.

The following permits and regulatory approvals may be required for the Project:

- St. Clair Region Conservation Authority (SCRCA) Permit, under Ontario Regulation (O. Reg.) 171/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Based on a review of publicly available data, the wellheads at TW1, TW3, TW7, TW10, TW14H, and TW16 are within areas regulated by the SCRCA. As ground disturbance is not required, a permit may not be required for the Project, however, this should be confirmed with the SCRCA.
- Ministry of the Environment, Conservation and Parks (MECP)
  - If the Project requires pumping/taking from 50,000 Litres (L) to 400,000 L/day of water a day from a lake, river, stream or groundwater source, an Ontario Environmental Activity Sector Registry (EASR) must be obtained.
  - If the Project requires pumping/taking more than 400,000 L of water a day from a lake, river, stream or groundwater source, a Permit to Take Water (PTTW) must be obtained.
- *Endangered Species Act*, 2007
  - May require approval and/or authorization under O. Reg. 242/08 from MECP for terrestrial SAR (e.g. Butler's Gartersnake and Eastern Foxsnake).
- Ministry of Tourism, Culture and Sport Compliance (MTCS) Letter.
- St. Clair Township
  - If the Project will impact traffic, a Traffic Control plan may be required to be submitted to the Township for approval.
- By-Law Number 44 of 20014 of the Corporation of the Township of St. Clair, being a by-law regulating and prohibiting within the Township of St. Clair noise or noises likely to disturb the inhabitants.

2.0 ENVIRONMENTAL SCREENING AND RECOMMENDED MITIGATION MEASURES

For each physical, natural, or socio-economical feature that was identified along the Project, the following information is provided:

- A summary of the feature, as described in Stantec (2008);
- If applicable, comments on how the feature has been modified, added, or removed from the Stantec (2008) report;
- If necessary, comments on how the Project is proposed to be modified to mitigate impacts on the features described; and
- If necessary, other measures to mitigate impacts on the described features.

The following physical, natural, or socio-economical features were not identified within or adjacent to the Study Area during this screening exercise are not discussed in this report:

- Significant Geological Features, including Scenic Vistas, Escarpments, Slopes;
- Scenic Vistas, Escarpments;
- Vulnerable Soils: Unstable Soils;
- Valleylands;
- Wildlife Management Areas;
- Areas of Natural and Scientific Interest;
- Special Policy Areas; and
- Waste Disposal Sites (Active or Closed).

2.1 PHYSICAL FEATURES

2.1.1 Geological Features and Mineral Resources

As described in Stantec (2008), The Study Area is underlain by bedrock from the Kettle Point Formation. Generally, the bedrock is covered by a mantle of unconsolidated material as deep as 30 m or more. Black fissile shale is intermixed with dark bituminous shale in the upper strata of bedrock. These shales extend to a depth of five metres (m) and are covered with a thick overburden of glacial drift.

2.1.1.1 Bedrock Outcroppings

Field investigations conducted in support of Stantec (2008) did not identify outcroppings of bedrock within the Study Area. A review of the updated MECP water well records (WWR) indicate that the general depth to bedrock is approximately 33 m to 44 m (MECP, 2019).

Mitigation Measures

As the general depth of bedrock is approximately 33 to 44 metres below grade, bedrock will not be encountered during construction of the Project.

2.1.2 Vulnerable Soils

As described in Stantec (2008), the Study Area is in the Lambton Clay Plain physiographic region, a sub-region of the St. Clair Clay Plains (Chapman and Putnam, 1984). The Lambton Clay Plain is characterized as a bevelled till plain and often a thin veneer of lacustrine clay overlies the till. Over extensive areas the clay plain has the faint knoll-and-sage relief, typical of ground moraines. The St. Clair Clay Plains are characterised by relatively level topography that varies between 175 and 213 metres above sea level (a.s.l.) (Chapman and Putnam, 1984). The Study Area is approximately 180 to 185 metres a.s.l., the only exceptions being the creeks, rivers and drains which flow through the Study Area. The land in the Study Area slopes slightly to the south and west.

As described in Stantec (2008), soil types within the Study Area, recorded by the Ontario Soil Survey, include Brookstone Clay, Caistor Clay, and Bottom Land.

2.1.2.1 Brookstone Clay

As described in Stantec (2008), Brookston Clay is the poorly drained member of the Huron Catena and occurs on nearly 60% of the lands within the Study Area and on 100% of lands within the Coveny Pool. This poorly drained soil has developed on level to slightly sloping terrain (OMAFRA, 1957).

Agricultural yields on Brookston Clay soils are hindered by drainage problems and, where artificial drainage has not been installed, crops are generally limited to hay, pasture, and some cereal grains. On lands which have been improved with artificial drainage systems the crop productivity is increased and typical crops include winter wheat, cereal grains, alfalfa, corn, soybeans, and sugar beets.

2.1.2.2 Caistor Clay

As described in Stantec (2008), in the Study Area, Caistor Clay soils are situated immediately adjacent to Bottom Land. Bottom Land is situated in the valleys of the North Sydenham River, and Bear Creek. Typically, Caistor Clay occurs on slightly undulating topography. This imperfectly drained soil belongs to the Grey-Brown Podzolic Great Soil Group and represents the transition area between the Brookston Clay and the Bottom Land (OMAFRA, 1957).

The soil is moderately acidic and is inherently low in organic content. Caistor Clay soils are best utilized for livestock farming, legume crops, and rotations that include some row crops.

2.1.2.3 Bottom Land

Bottom land is located immediately adjacent to the North Sydenham River, and Bear Creek, subsequently; these lands are subject to seasonal flooding. The soil materials which have been deposited on these lands are a result of recent flooding and consist of layers of silt, sand, and clay intermixed with organic content.

In a typical year, Bottom Land is moist all year. This excess moisture tends to exclude the use of Bottom Land for many farming practices. However, grass can grow in abundance on these lands which makes them quite valuable for use as pasture lands. If serious flooding does not occur over the course of a growing season good crop yields from Bottom Land are possible.

The Canada Land Inventory ("CLI") categories land into seven classes which reflect the soil's capability to produce field and forage crops. Lands classified as Class 1 are considered the most productive, while those classified as Class 7 are the least productive. Class 1 to 4 agricultural lands are generally considered arable lands with Class 1 and 2 considered prime for general field crop production. The classification system reflects limitations such as slope, shallow soils, climate, drainage, and fertility. Organic soils are not rated in the classification system.

Approximately 60% of the Study Area has been classified at CLI Class 2, which is associated with the Brookston Clay soil. Approximately 24% of the Study Area has been classified at CLI Class 3, which is associated with the Caistor Clay soil. Approximately 16% of the Study Area has been classified at CLI Class 5, which is associated with the Bottom Land soils. The access roads will be built on lands primarily classified as CLI Class 5, with soils adjacent to Baby Road classified as CLI Class 3. The agricultural features within the Study Area are illustrated in Appendix A, Figure 3.

2.1.2.4 Potential Impacts

During construction, soils are more prone to erode due to the loss of vegetative cover, intensity and duration of rainfall events, antecedent soil moisture, surface soil cover, slope, soil texture, soil structure, and organic matter levels.

Construction of the temporary access roads and temporary work areas around TW1 and TW7 has the potential to affect agricultural soils through compaction soil.

The Project is in an area with relatively flat topography. The level lands may result in surface ponding of precipitation. A slope is located east of the work area at TW1 and TW7. Potential impacts to physiographic features typically occur on slopes adjacent to watercourses. Impacts may include surface soil erosion, and in extreme cases, sedimentation in watercourses.

Mitigation Measures

As construction is limited to the construction of the two temporary access roads, temporary well pad enlargements at TW1 and TW7, and above grade construction within the existing well pad footprints and the other DSAs, potential impacts will be limited.

Leveling, smoothing of ruts or indentation marks may be required after removal of the temporary access roads and work space. If compaction of soils is identified, this may be relieved by farm implements.

The proposed access roads or enlargements of the well pads to TW1 and TW7 do not cross watercourses, including municipal drains.

To reduce construction impacts associated with wet climatic conditions, construction at TW1 and TW7 is recommended to occur during dry soil conditions. If construction cannot be completed during the dry summer or early autumn months when evapotranspiration is greatest strict adherence to Enbridge's Wet Soil Shutdown (WSSD) practice is recommended.

As the topography of the Study Area is virtually flat, and the work area at TW1 and TW7 will avoid the slope to the east of TW1 and TW7, no slope stabilization concerns are anticipated.

2.1.3 Agricultural Resources

2.1.3.1 Specialty Crop Lands and Sensitive Agricultural Operations

Agricultural lands are present within the Study Area, including at the temporary access road and well head locations. These lands are not considered to be specialty crop lands.

Soybean Cyst Nematode ("SCN")

As described in Stantec (2008), Construction equipment may have come into contact with soil contaminated with SCN. There will be potential for transporting SCN to non-infested fields if soil from a previous job site on construction equipment contains SCN. Once a field has been infested, there is significant potential for soybean crop yield reductions (Olechowski, 1990). SCN concerns are limited to agricultural fields that will be traversed by construction equipment. SCN is not a concern within the road allowance, or areas where the topsoil has been completely removed.

Mitigation Measures

As existing access roads and well pads will be used at each location except for TW1 and TW7, potential for contamination with SCN is limited to the proposed access roads and temporary well pad areas at TW1 and TW7.

In order to reduce the potential for the spread of SCN, the following mitigation measures are recommended at TW1 and TW7:

- Remove soil from equipment before arriving to site, which may involve thorough washing of equipment.
- Remove all soil from equipment before leaving the site.
- Any soil tracked onto the municipal road should be removed as soon as possible to reduce the potential for vehicles and equipment from SCN "clean" farms from driving through the soils.

If the property is previously known to be infested with SCN it should be recorded and communicated to the Contractor. The landowner should be advised of the infestation and provided with a copy of OMAFRA "Fact Sheet" - Order #90-119 (Olechowski, 1990).

If imported topsoil is required for site rehabilitation it should be analyzed for SCN. Imported suitable fill (not topsoil) or granular materials do not need to be tested for SCN.

With implementation of these recommendations, no significant adverse impacts upon crop yield resulting from SCN infestation are anticipated.

2.1.3.2 Tile Drainage

As described in Stantec (2008), most agricultural land in the Study Area has been improved with artificial drainage systems. Both systematic and random tile systems exist throughout the Study Area, however, random tile drainage systems are more common adjacent to the major watercourses. The field at TW1 and TW7 are located is not mapped as containing tile drainage. Appendix A, Figure 3 identifies the location and type of artificially drained lands within the Study Area.

Mitigation Measures

As ground disturbance is not required for the Project, impacts to tile drainage is not anticipated and therefore specific mitigation measures have not been created.

2.1.4 Water Wells and Hydrology

2.1.4.1 Water Wells

According to the MECP database, there are forty-two wells located within 200 m of the Study Area. The primary use of the majority of these wells is domestic (twenty-eight wells), while the primary use of the remaining wells are livestock (three), monitoring (two), public (three), not used (two), and unknown (four).

The MECP WWR indicate static water levels at depths ranging from 1.8 m to 11.3 mbg.

Mitigation Measures

The following mitigation measures are recommended to be employed during construction:

- Confirm location of water wells near storage area and new temporary access roads and well pad enlargements.
- Avoid works near active wells, if possible.
- Any landowner complaints regarding well interference during or after the construction period, should be investigated individually.

As the Project does not include ground disturbance including drilling or subsurface work, impacts to water wells is unlikely to occur.

2.1.4.2 Hydrology and Hydrogeology

As described in Stantec (2008), the topography of the Study Area is relatively flat resulting in slow moving streams that hinder external run-off. There are two (2) watercourses (North Sydenham River and Bear Creek) and constructed municipal drains that cross the Study Area. These watercourses are described in further detail in Section 2.2.3 of this report.

The North Sydenham river is located approximately 65 m from the edge of the disturbance where the temporary access roads and temporary well pad enlargements will be constructed.

The Study Area is located within the Lower Bear Creek and Lower North Sydenham subwatersheds (Thames-Sydenham and Region Source Protection Committee, 2015). The Sydenham River drains approximately 67% of the area to the St. Clair River, which discharges into Lake St. Clair.

The Study Area is not within a significant groundwater recharge or discharge area, highly vulnerable aquifer, or intake protection zone (Thames-Sydenham and Region Source Protection Committee, 2015).

Mitigation Measures

As the work area will be approximately 65 m from the nearest watercourse, mitigation measures during construction will be limited to standard erosion and sediment controls, including:

- Fuels, chemicals, and lubricants should be stored on level ground in properly contained/sealed storage areas.
- Monitor refueling activities at all times.
- Vehicles should never be left unattended while being refueled and refueling and maintenance of vehicles should occur at a minimum distance of 100 m from the edge of a waterbody.
- In the unlikely event of a spill, the MECP Spills Action Centre should be contacted and spills containment and clean-up procedures implemented immediately.

Dewatering of the work area after a precipitation event may be required. Dewatering 50,000 to 400,000 L/Day is not expected, but would require the Project to be registered under EASR with the MECP. If dewatering is required:

- Dewatering should be minimized to the extent possible in order to mitigate the effects on nearby watercourses.
- The dewatering discharge point should be a minimum of 30 meters from any watercourse.

2.2 NATURAL ENVIRONMENTAL FEATURES

2.2.1 Woodlots

The Study Area is within the Deciduous (Carolinian) Forest Region. As described in Stantec (2008), there are four woodlots greater than 2 hectares (ha) (Appendix A, Figure 2), which includes the riparian zone around Bear Creek at the north end of the Study Area. Most of the natural vegetation was cleared for agricultural purposes.

Mitigation Measures

Based on the information available at the time of preparing this report, it is understood that no tree removal will occur. To minimize impacts to the trees and shrubs adjacent to the temporary access roads and temporary well pad enlargements, the following mitigation measure are recommended, where required:

- Equipment and vehicles should not be stored or parked within the dripline of the trees and shrubs.
- Temporary fencing may be required outside the dripline of trees and shrubs.
- Overhanging branches that may be affected by equipment should be noted and protected.
- Use lightweight and wide-tracked equipment to minimize compaction if working near trees and shrubs.

2.2.2 Significant Wildlife Habit and Vulnerable, Threatened and Endangered Species

A search of publicly available wildlife records identified records of the following SAR with the potential to occur within one (1) km of the Study Area (Table 2-1).

A list of species at risk species designated under the Ontario *Endangered Species Act*, *2007* (ESA, 2007) and/or the federal *Species at Risk Act* (SARA) as endangered, threatened or special concern with potential to occur in or adjacent to the Site was developed by reviewing the following sources:

- Natural Heritage Information Centre (NHIC) database (NHIC, 2019)
- Aquatic Species at Risk Mapping (DFO, 2019)
- Ontario Breeding Bird Atlas (OBBA) (Cadman, 2007)
- eBird Canada (ebird, 2019)
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2015)
- Atlas of the Mammals of Ontario (Dobbyn, 1994)

Table 2-1: Summary of Species at Risk

Species	Status Ontario ESA, 2007	Status Federal *Species at Risk Act*, Schedule 1
Small-footed myotis (*Myotis leibii*)	Endangered	NA
Little brown myotis (*Myotis lucifungus*)	Endangered	Endangered
Northern myotis (*Myotis septentrionalis*)	Endangered	Endangered
Tri-colored bat (*Perimyotis subflavus*)	Endangered	Endangered
Eastern Spiny Softshell (*Apalone spinifera spinifera*)[5]	Endangered	Endangered
Butler's Gartersnake (*Thamnophis butleri*)[4]	Endangered	Endangered
Eastern Foxsnake (*Pantherophis gloydi*)[5]	Endangered	Endangered
Barn Owl (*Tyto alba*)[5]	Endangered	Endangered
Red-headed Woodpecker (*Melanerpes erythrocephalus*)[2]	Special Concern	Threatened
Acadian Flycatcher (*Empidonax virescens*)[2]	Endangered	Endangered
Bank Swallow (*Riparia riparia*)[2,3]	Threatened	Threatened
Barn Swallow (*Hirundo rustica*)[2,3]	Threatened	Threatened
Wood Thrush (*Hylocichla mustelina*)[2]	Special Concern	Threatened
Bobolink (*Dolichonyx oryzivorus*)[2,5]	Threatened	Threatened
Eastern Meadowlark (*Sturnella magna*)[2,3,5]	Threatened	Threatened
Prothonotary Warbler (*Protonotaria citrea*)[2]	Endangered	Endangered
Cerulean Warbler (*Setophaga cerulea*)[2]	Threatened	Endangered
Blue Ash (*Fraxinus quadrangulata*)[5]	Threatened	Threatened
Eastern Flowering Dogwood (*Cornus florida*)[5]	Endangered	Endangered
Kentucky Coffee-tree (*Gymnocladus dioicus*)[5]	Threatened	Threatened
Eastern Sand Darter (*Ammocrypta pellucida)*[6]	Endangered	Threatened
Pugnose Minnow (*Opsopoeodus emiliae*)[6]	Threatened	Threatened
Fawnsfoot (*Truncilla donaciformis*)[6]	Endangered	Endangered
Kidneyshell (*Ptychobranchus fasciolaris*)[6]	Endangered	Endangered
Lilliput (*Toxolasma parvum*)[6]	Threatened	Endangered
Round Pigtoe (*Pleurobema sintoxia)*[6]	Endangered	Endangered
Salamander Mussel (*Simpsonaias ambigua*)[5]	Endangered	Endangered
Threehorn wartyback (*Obliquaria reflexa*)[6]	Threatened	Threatened

Notes:
1 Atlas of Mammals of Ontario (Dobbyn, 1994)
2 Atlas of Breeding Birds of Ontario (Cadman, 2007) (10 x 10 km squares 17LH83)
3 eBird Point (observations from Wilkesport-Nicholl's Memorial Forest and Wetland Hotspot) (ebird, 2019)
4 Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019) (10 x 10 km squares 17LH83)
5 NHIC database (1x1km squares 17LH8728 to 17LH8733, 17LH8827 to 17LH8833, 17LH8927 to 17LH8933, and 17LH9028 to 17LH9033) (NHIC, 2019)
6 Aquatic Species at Risk Report (Fisheries and Oceans Canada, 2019)

Bat SAR were not identified in the SAR databases, however, given their distribution within Ontario (iNaturalist, 2019), they have been included as potentially present. Stantec (2008) included American Badger (*Taxidea taxus*), Gray Fox (*Urocyon cinereoargenteus*), Spotted Turtle (*Clemmys guttata*), and Blanding's Turtle (*Emydoidea blandingii*) as potentially present in the Study Area. Based on recent Project experience in the Project area, these species are considered unlikely to be present and have been removed from Table 2-1.

Based on the scope of work (disturbance limited to construction of temporary access roads and temporary well pad enlargements for TW1 and TW7), potential impacts to SAR are likely limited to reptile SAR, including Butler's Gartersnake and Eastern Foxsnake.

A Mitigation Plan has been prepared for submission to the MECP to confirm proposed mitigation measures, outlined below.

Mitigation Measures

If wildlife is encountered during construction, the following mitigation measures are recommended.

- Restrict vehicles, machinery and personnel to the road Right-of-Way (RoW) and approved work areas to limit construction disturbances to wildlife and wildlife habitat;
- Nuisance wildlife should be reported to the Ministry of Natural Resources and Forestry (MNRF) district ecologist;
- If larger wildlife (e.g., deer) are struck with vehicles or equipment, notify the MNRF;
- Food waste and other debris will be properly contained, and will be collected and removed from the site daily to an approved facility;
- Wildlife should not be fed or other interactions promoted with wildlife;
- The possession of firearms will be prohibited; and
- Pets will not be allowed on the Project site.
- Follow the proposed Mitigation Plan submitted to the MECP, detailed below.

For work proposed during the active season for snake species at risk (i.e., between March 15 and October 15, weather dependent), the following mitigation measures are recommended:

- All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. Continual awareness and avoidance of snakes crossing roadways will be encouraged through training programs for those individuals with access to the Project Location.
- Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit.
- All equipment and machinery that is left idle for over one hour, or overnight, on the property must be visually examined prior to (re)ignition to ensure snakes are not present within the machinery. This visual examination should include all lower components of the machinery, including operational extensions and running gear.
- If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used.

- All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project.
- In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per ***Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*** (MNR No date).
- In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately.

Additional mitigation measures recommended for TW1 and TW7:

- Prior to placement of steel plates, the entire work area will be walked and staked, with construction limits isolated with exclusion fencing (e.g., silt fencing). No fencing is proposed at other well locations.

- Fencing will be installed prior to placement of steel plates and will be monitored and maintained in-place until the end of construction activities.

- Fencing will be installed in accordance with MNR's *Species at Risk Branch – Best Practices Technical Note Reptile and Amphibian Exclusion Fencing Version 1.1* (MNR, July 2013) and though the use of a spotter:

  - The recommended height of fencing for Butler's Gartersnake is a minimum of 50 to 60 cm and 200 cm for Eastern Foxsnake, adjusted in consideration of topography. The fence should be buried 10 to 20 cm below grade with an additional 10 cm horizontal lip ('keyed in') on the species side.
  - Fencing reinforced with a woven nylon mesh is not an acceptable material as this can cause entanglement and mortality for snakes.
  - At access locations, it is recommended that the fence be designed to curve inward in order to direct animals from the area of exclusion.
  - Inspection of fences at regular intervals throughout the active season (weekly, and after any rainfall events). These inspections are important for areas of geotextile fencing as well as permeable fence types where fencing is subject to water flow events (inspect to remove debris build up). Damage that affects the integrity of the fence (e.g., tear, loose edges, collapses, etc.) should be fixed promptly.
  - To facilitate rapid evacuation of the work site in the case of an emergency, two openings in the fence around the wellsite will be included during fence installation. These openings will require the design of temporary gates that are closed at the end of each workday, secured such that snakes cannot access underneath.

- The construction contractor to monitor that no construction disturbance occurs beyond the staked/fenced limits.

- A daily survey of the isolated work area (i.e., prior to construction each day) will occur to confirm that no snakes have entered the area.

If construction is to occur outside of the active season for Eastern Foxsnake and Butler's Gartersnake (October 16-March 14), the following mitigation measures are recommended for all wells:

- All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. The likelihood of encountering a snake outside of the active season is low but may occur if weather conditions are optimal (i.e., sunny days with air temperatures >5°C).
- Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit.
- If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used.
- All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project.
- In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per ***Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*** (MNR No date).
- In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately.

Within the construction area, the primary nesting period is April 16 – August 11. If works occur during the primary nesting period, pre-construction surveys should be undertaken by a qualified biologist to identify the presence/absence of nesting birds. These surveys should take place in areas where vegetation clearing activities are to occur.

As in-water works will not be required for the Project, negative impacts to aquatic species or terrestrial riverine species are not anticipated.

2.2.3 Lakes, Rivers, Headwaters and Spring Sources

As described in Stantec (2008), there are two watercourses (North Sydenham River and Bear Creek) and several municipal drains within the Study Area.

Water quality may potentially be affected during construction of the proposed access roads as a result of accidental spills due to inappropriate handling or storage of fuel, dust suppressants, lubricants or other potential contaminants and from construction vehicles working in or adjacent to the Baby Road ditch.

North Sydenham River

The North Sydenham River is the largest watercourse in the Study Area. This river commences at the confluence of Bear Creek and Black Creek just to the east of the southern section of the Study Area. The North Sydenham River meanders southwest, flowing south of the Hamlet of Wilkesport, across the lower portion of the southern section of the Study Area. Generally, the North Sydenham River is a slow moving, meandering watercourse with gradual banks. Its' confluence with the Sydenham River occurs in the Town of Wallaceburg.

Bear Creek

The second largest watercourse in the Study Area is Bear Creek. Bear Creek meanders through the north portion of the south section of the Study Area and flows into the North Sydenham River just east of the southern section of the Study Area.

Municipal Drains

Several municipal drains occur in the Study Area, the primary purpose of these drains is to assist in the drainage of agricultural fields. With some exceptions, these drains are located adjacent to the County and Township roads in the Study Area.

During significant rainfall events, smaller watercourses in the Study Area swell to bank full width very rapidly due to the extensive tile drainage system prevalent in the Study Area. Since most of the smaller watercourses are relatively short in length, these large volumes of runoff are transported very rapidly into the larger watercourses in the Study Area such as Bear Creek and the North Sydenham River.

Mitigation Measures

The proposed access from Baby Road does not cross a mapped municipal drain (Land Information Ontario, 2019). If a new permanent access across the Baby Road ditch is required, consultation should be undertaken with the SCRCA to confirm permitting requirements.

The following mitigation measures are recommended for work near watercourses and drains in the Study Area:

- Activities, including equipment maintenance and refueling, should be greater than 100 m from the watercourse at all times.

- On-site fuel tanks and generators should be situated in a designated area. Refueling activities should always be monitored.
- Vehicles should not be left unattended while being refueled.
- Containers, hoses and nozzles should be free of leaks.
- Fuel nozzles should be equipped with functional automatic shut-offs.
- Fuel remaining in hoses should be returned to the fuel storage facility.
- Appropriate spill management equipment must be readily available and maintained within the refueling area.

Spills that are determined to have an impact upon the environment must be reported to the MECP Spills Action Centre at 1-800-268-6060.

2.2.4 Wetlands

There are no Provincially Significant Wetlands or Locally Significant Wetlands within the Study Area (Appendix A, Figure 2). A review of google earth imagery shows an unclassified wetland southeast of the intersection of Kimball Road and Burman Line, within the Study Area.

Mitigation Measures

As there are no wetlands within the proposed access roads, impacts to these feature are not anticipated, therefore specific mitigation measures have not been recommended.

2.3 SOCIO-ECONOMIC FEATURES

2.3.1 Designated Environmental Sensitive Areas

The Corridor around the North Sydenham River has been designated as a Primary Corridor (Group “C” Feature) in the County of Lambton official plan. As described in Stantec, 2008, the Township of St. Clair (2005) has designated the area directly surrounding the North Sydenham River, and Bear Creek as a Hazard and Environmental Protection area. Additionally, the area immediately southeast of Wilkesport (the Nicholls Memorial Forest) is designated within the County of Lambton official plan as a Natural Heritage ‘Group B Features’.

The County of Lambton has mapped a buffer around the North Sydenham River, including the proposed location of the access roads as a ‘Primary Corridor (Group “C” Feature)’. The Lambton County official plan (2019), defines Primary Corridor (Group “C” Feature), as:

- lands adjacent to other Group B features
- primary corridors, including core areas

- linkage features
- highly vulnerable aquifers
- significant groundwater recharge areas
- other surface water features
- woodlots other than significant woodlands
- other significant natural areas, including shrublands, meadows and prairies

The Lambton Official Plan described constraints within a Group "C" feature as, "local official plans will address general controls on development with the aim of improving the overall health of the natural heritage system including the improvement of linkages within corridors".

Mitigation Measures

Consultation with the County of Lambton and the Township of St. Clair should be undertaken to confirm development restraints or permitting requirements for construction of the access roads within the primary corridor area.

2.3.2 Recreation Areas and Outdoor Education Areas

As described in Section 2.3.1 above, Nicholls Memorial Forest is located within the Study Area, but outside of the area proposed access roads.

Mitigation Measures

Impacts to these features are not anticipated, therefore specific mitigation measures have not been recommended.

2.3.3 Heritage Resources

A Stage 1-2 Archaeological Assessment has been completed for this Project. The Stage 1-2 archaeological assessment was carried out in accordance with the provisions of the *Ontario Heritage Act* (Government of Ontario 1990) and the OEB established guidelines for the expansion of natural gas service in its *EBO 188 Report on Natural Gas Distribution System Expansion* (OEB 2016).

The report will be sent to the MTCS for their review and is included as Appendix B in this ESR.

2.3.4 Transportation Corridors and Easements

The St. Clair Township Official Plan (2019) identifies Wilkesport Line as a 'Collector Road', defined in the Official Plan as "Collector Roads are intended to connect local roads to arterial roads, and to provide access to abutting properties. These roads carry low to moderate traffic volumes".

Mitigation Measures

As construction traffic is expected to be minimal during construction of the access roads, and limited to periodic inspections, no specific mitigation measures have been developed. It is recommended that Enbridge consult with the Municipality to determine if road access/occupancy permits or traffic control plans are required.

2.3.5 Utility Corridors and Facilities

The Baby Road RoW may contain some public utilities (i.e., water, sewer, hydro, telephone).

Mitigation Measures

Construction of the access roads may impact utilities installed within the existing RoWs. Utilities should be identified to determine if they may be interfered with by the Project. Refer to Section 4.3 of the Planning, Design and Records Manual (Enbridge 2009) for requirements for paralleling and crossing underground structures.

2.3.6 Social Impacts

2.3.6.1 Sensitive Receptors

The community of Wilkesport is within the Study Area, and there are several homes adjacent to the proposed locations for the access roads. During construction, residents may experience a temporary disruption in the use and enjoyment of their property. This disruption may result from noise, dust, or additional traffic volume.

The most common sources of noise during construction are associated with the movement of heavy machinery and work equipment. The Township of St. Clair By-Law Number 44 of 2014 states that:

> *"No person shall, either by shouting, voice or by mechanical or other means, cause or permit a noise within the municipality calculated or likely to disturb the inhabitants of the municipality having regard to the time, place and the intensity and frequency of the said noise."*

Given the mitigation measures described below, it is not anticipated that there will be noise related restrictions to construction activity.

The noise associated with the operation of the Project once construction of the access roads is completed is expected to be negligible with infrequent, limited duration noise from maintenance vehicles, and repair activities.

A common nuisance from any construction project is fugitive dust generation as a result of movement of excavation of soils and movement of heavy machinery.

The delivery of construction materials, equipment, and daily movement of construction workers in and out of the area are expected to cause slight increases in traffic in the Study Area. Daily traffic interruptions during the construction phase are expected to be primarily due to any required lane closures to accommodate working space.

Mitigation Measures

Construction activities should be undertaken with respect to local by-laws regarding working hours. Access will need to be maintained to all residential and industrial buildings adjacent to the Project. Consultation should be undertaken with local businesses to determine if alternate access and/or appropriate signage is required.

Enbridge should address concerns expressed by residents, businesses, and institutions in an expeditious and courteous manner. Prior to construction, Enbridge should provide residents near the work area with a construction communication procedure and every reasonable effort should be to address concerns and maintain good landowner relations.

To minimize inconveniences brought on by excessive noise, all engines associated with construction heavy equipment should be equipped with low-noise mufflers and Noise abatement equipment and be in good working order. Construction crew members should not make any unnecessary noise, to comply with Township of St. Clair By-Law Number 44 of 2014.

Nuisance dust can be minimized by proper maintenance of road surfaces. Traveled surfaces should be kept moist during excessively dry and/or windy conditions by frequently applying a low energy water spray. Road surfaces should be cleared of construction debris and mud.

Implementation of a Traffic Management Plan and following standard traffic safety guidelines as agreed to with the Township of St. Clair and Lambton County can minimize occasional disruptions.

Public safety is a primary focus of Enbridge. Safety issues, both perceived and real, can be mitigated by implementing proven safety measures during construction, ensuring that the Project is constructed and operated in accordance with all applicable codes and regulations.

2.3.6.2 Ornamental Vegetation

Ornamental Vegetation and hedegrows are present throughout the Study Area, however, these features were not identified at location of the proposed access roads.

Mitigation Measures

As impacts to ornamental vegetation and hedgerows are not anticipated, no specific mitigation has been prepared.

2.4 SUMMARY OF ISSUES

Table 2-2 below presents a summary of the environmental issues identified in this report and the proposed mitigation measures.

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
Flat topography	• Surface ponding of precipitation within work area.	• Erosion of topsoil stockpiles.	• The Study Area should be periodically monitored during and after significant rainfalls. If significant water erosion is evident, mitigation measures such as silt fencing and diversion berms could be put in place.
Vulnerable Soils	• Vehicles driving over soils.	• Loss of soils and or soil productivity.	• Access to well heads to use existing access roads or temporary access roads to be constructed. • Construction of the temporary access roads and well pad enlargements at TW1 and TW7 is recommended to occur during dry soil conditions. If construction cannot be completed during the dry summer or early autumn months when evapotranspiration is greatest strict adherence to the WSSD practice is recommended. • Leveling, smoothing of ruts or indentation marks may be required after removal of the temporary access roads and work space. If compaction of soils is identified, this may be relieved by farm implements.

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
Agricultural Operations	• Work within active agricultural operations.	• Loss of access to fields, potential for damage to tile drainage, effects of dust on adjacent tree farms, contamination of agricultural field(s) with SCN.	• A form of access will be maintained for the adjacent agricultural operations at important times. • Construction timing should be discussed with landowners of agricultural operations that may be impacted by construction. • In order to reduce the potential for the spread of SCN, the following mitigation measures are recommended at TW1 and TW7: – Remove soil from equipment before arriving to site, which may involve thorough washing of equipment before arriving to the site. – Remove all soil from equipment before leaving the site. – Any soil tracked onto the municipal road should be removed as soon as possible to reduce the potential for vehicles and equipment from SCN “clean” farms from driving through the soils. • Nuisance dust can be minimized by proper maintenance of road surfaces. Traveled surfaces should be kept moist during excessively dry and/or windy conditions by frequently applying a low energy water spray.

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
Groundwater	• Accidental release of fuels, chemicals, and lubricants from work area into aquifer.	• Contamination of ground water.	• Fuels, chemicals, and lubricants should be stored on level ground in properly contained/sealed storage areas. • Refuelling activities should be monitored at all times; vehicles should never be left unattended while being refuelled and refuelling and maintenance of vehicles should occur at a minimum distance of 100 m from the edge of a waterbody. • In the unlikely event of a spill, the MECP Spills Action Centre should be contacted and spills containment and clean-up procedures implemented immediately.
Woodlots, greater than 2 ha	• Vegetation within or adjacent to Work Area.	• Removal of vegetation.	• Equipment and vehicles should not be stored or parked within the dripline of the trees and shrubs. • Temporary fencing may be required outside the drip line of trees and shrubs. • Overhanging branches that may be affected by equipment should be noted and protected. • Use lightweight and wide-tracked equipment to minimize compaction.
Wildlife Habitat and Species at Risk	• Wildlife entering or crossing through the work area.	• Disturbance or injury to wildlife through construction activities.	• Restrict vehicles, machinery and personnel to the road RoW and approved work areas to limit construction disturbances to wildlife and wildlife habitat. • Nuisance wildlife should be reported to the MNRF district ecologist. • If larger wildlife (e.g., deer) are struck with vehicles or equipment, notify the MNRF. • Food waste and other debris will be properly contained, and will be collected and removed from the site daily to an approved facility. • Wildlife should not be fed or other interactions promoted with wildlife.

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			• The possession of firearms will be prohibited. • Pets will not be allowed on the Project site. • Follow Mitigation Plan (detailed below) and any additional measures required by MECP. • All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. Continual awareness and avoidance of snakes crossing roadways will be encouraged through training programs for those individuals with access to the Project Location. • Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit. • All equipment and machinery that is left idle for over one hour, or overnight, on the property must be visually examined prior to (re)ignition to ensure snakes are not present within the machinery. This visual examination should include all lower components of the machinery, including operational extensions and running gear. This is required during the active season (i.e., March 15 – October 15) only. • If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used. • All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project. • In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per ***Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders*** (MNR No date). • In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately. Additional mitigation measures recommended for TW1 and TW7: • Prior to placement of steel plates, the entire work area will be walked and staked, with construction limits isolated with exclusion fencing (e.g., silt fencing). No fencing is proposed at other well locations. • Fencing will be installed prior to placement of steel plates and will be monitored and maintained in-place until the end of construction activities. • Fencing will be installed in accordance with MNRF's Species at Risk Branch – Best Practices Technical Note Reptile and Amphibian Exclusion Fencing Version 1.1 (MNR, July 2013) and though the use of a spotter. • The recommended height of fencing for Butler's Gartersnake is a minimum of 50 to 60 cm and 200 cm for Eastern Foxsnake, adjusted in consideration of topography. The fence should be

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			buried 10 to 20 cm below grade with an additional 10 cm horizontal lip ('keyed in') on the species side. • Fencing reinforced with a woven nylon mesh is not an acceptable material as this can cause entanglement and mortality for snakes. • At access locations, it is recommended that the fence be designed to curve inward in order to direct animals from the area of exclusion. • Inspection of fences at regular intervals throughout the active season (weekly, and after any rainfall events). These inspections are important for areas of geotextile fencing as well as permeable fence types where fencing is subject to water flow events (inspect to remove debris build up). Damage that affects the integrity of the fence (e.g., tear, loose edges, collapses, etc.) should be fixed promptly. • To facilitate rapid evacuation of the work site in the case of an emergency, two openings in the fence around the wellsite will be included during fence installation. These openings will require the design of temporary gates that are closed at the end of each workday, secured such that snakes cannot access underneath. • The construction contractor to monitor that no construction disturbance occurs beyond the staked/fenced limits. • A daily survey of the isolated work area (i.e., prior to construction each day) will occur to confirm that no snakes have entered the area.
Watercourses	• Construction near watercourses.	• Disturbance to watercourses.	• Control construction activities to prevent entry of petroleum products or other deleterious

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			substances into watercourses. Any spills or leaks should be promptly remediated by the Contractor. • Activities, including equipment maintenance and refueling, should be greater than 100 m from waterbodies. • On-site fuel tanks and generators should be situated in a designated area. Refueling activities should always be monitored. • Vehicles should not be left unattended while being refueled. • Containers, hoses and nozzles should be free of leaks. • Fuel nozzles should be equipped with functional automatic shut-offs. • Fuel remaining in hoses should be returned to the fuel storage facility. • Appropriate spill management equipment must be readily available and maintained within the refueling area.
Transportation Corridors	• Shared use of municipal and provincial roads by construction and local traffic.	• Disturbance to local traffic.	• The Project must be conducted in accordance with the local municipal requirements. • It is recommended that Enbridge consult with the Municipality to determine if road access/ occupancy permits or traffic control plans are required.
Utility Corridors	• Driving overtop of public utilities.	• Damage to public utilities and construction equipment and personnel.	• Utilities should be identified to determine if they may be interfered with by the Project.
Sensitive Receptors	• Construction near homes and businesses.	• Increased noise and vibration.	• Access will need to be maintained to all residential and industrial buildings adjacent to the Project. • To minimize inconveniences brought on by excessive noise, all engines associated with construction heavy equipment should be equipped with low-noise mufflers and Noise

Table 2-2: Summary of Issues Identified and Proposed Mitigation Measures

Issue	Description of Interaction	Description of Potential Effects	Mitigation Measure
			abatement equipment and be in good working order. Construction crew members should not make any unnecessary noise, to comply with Township of St. Clair By-Law Number 44 of 2014 • Traveled surfaces should be kept moist during excessively dry and/or windy conditions by frequently applying a low energy water spray. • Road surfaces should be cleared of construction debris and mud. • All engines associated with construction heavy equipment should be equipped with low-noise mufflers and Noise abatement equipment and be in good working order.

3.0 CONCLUSION

It is Stantec's opinion that the proposed Project can be constructed and operated in a manner that protects the environment and manages potential effects. Any disturbance is limited to construction of temporary access roads and temporary well pad enlargements, through existing agricultural fields, to TW1 and TW7. Potential negative environmental effects are anticipated to be managed and protected through the implementation of the proposed mitigation measures outlined in this report.

4.0 REFERENCES

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APPENDIX A

Environmental and Socio-Economic Features

APPENDIX B

Stage 1-2 Archaeological Assessment

Stantec Consulting Ltd.
1-70 Southgate Drive, Guelph ON N1G 4P5

December 3, 2019
File: 160951156

Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West
14th Floor
Toronto, ON M4V 1P5
Via email: SAROntario@ontario.ca

To whom it may concern,

Reference: Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening

INTRODUCTION

Enbridge Gas Inc. ("Enbridge") is proposing to increase the maximum pressure gradient at three of their Designated Storage Areas (DSAs) in the Township of St. Clair, Ontario (the "Project"). The Project is necessary to meet growing market demand for incremental storage space. An overview of the three DSAs (Black Creek, Wilkesport, and Coveny) and associated wellheads are shown on **Figure 1** (**Attachment A**). The Project Location (i.e., area of impact) will not include ground disturbance or new developments. Impacts will be restricted to additional heavy equipment traffic.

The Black Creek Well Project involves upgrades to each wellhead (**Figure 2**, **Attachment A**). The wells are not being deepened or modified in the subsurface, and ground disturbance is not required. Existing access roads will used to access each wellhead and work will be completed within existing graveled well pads. The work is anticipated to commence in the spring of 2020.

The Wilkesport and Coveny Well Projects involve upgrades to each wellhead (**Figures 3 and 4**, **Attachment A**). Work within the Wilkesport DSA also involves laying steel plates to create temporary access roads and temporary work areas to two existing wellheads identified as TW1 and TW7. The remaining wells within the Coveny and Wilkesport DSAs (**Figures 3 and 4, Attachment A**) have existing access roads which will be used. The wells are not being deepened or modified in the subsurface and ground disturbance is not required. The work is anticipated to commence in the spring of 2020.

Stantec Consulting Ltd. (Stantec), on behalf of Enbridge, has completed a natural heritage background review of the proposed Project Locations, which included a review of Land Information Ontario (LIO) mapping, Natural Heritage Information Centre (NHIC) database, Fisheries and Oceans Canada database, Conservation Authorities regulated area mapping and various wildlife atlases. The following letter provides project details, the results of the background records review, and a proposed mitigation strategy to address potential impacts to species protected under the *Endangered Species Act* (2007).

SPECIES AT RISK SCREENING

Results of the background records review for species protected under the ESA, existing conditions based on recent aerial photography, an assessment of habitat suitability, and proposed regulatory next steps for each of the five dig locations is summarized in **Table 1**.

Table 1: Potential Species at Risk and Habitat Suitability for each of the Proposed 2019 Integrity Digs

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Small-footed Myotis (*Myotis leibii*)	END	OMA	Small-footed Myotis hibernates in the fall in caves and abandoned mines after mating occurs near these communal sites. During summer months, this bat typically roosts in crevices and cracks associated with rocky site (e.g. rip rap, rock piles, bluffs, bedrock outcrops) but also have also been found in old buildings (e.g., barns, and houses) (Humphrey, 2017).	No buildings or rocky outcrops proposed for removal within Project Location.	N/A
Little Brown Myotis (*Myotis lucigungus*)	END	OMA	A widespread species, the Little Brown Myotis is commonly found in warm sites such as buildings, attics, roof crevices, under bridges or in cavities of canopy trees in the forest (COSEWIC, 2013).	No trees or buildings proposed for removal within Project Location.	N/A

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Northern Myotis (*Myotis septentrionalis*)	END	OMA	The Northern Myotis prefers upland forests, typically foraging for aerial insects in the forest understory. Maternity roosts are typically located under the bark of large trees and are rarely found in human-made structures. Hibernating colonies typically reside in cave crevices (COSEWIC, 2013).	No trees or buildings proposed for removal within Project Location.	N/A
Tri-coloured Bat (*Perimyotis subflavus*)	END	OMA	The Tri-coloured Bat prefers partly open habitat such as fields with large trees or woodland edges while avoiding both denser and more open areas. In the summer, Tri-coloured Bats roost in trees or dead clusters of leaves on trees. In the winter, they often hibernate in the deepest part of the caves where temperature is the least variable and the humidity is high. Maternity colonies are usually found either in tree cavities or man-made structures, but in at least parts of their range they have also been recorded in large clumps of arboreal lichen (COSEWIC, 2013).	No trees or buildings proposed for removal within Project Location.	N/A
Eastern Spiny Softshell (*Apalone spinifera spinifera*)	END	NHIC	Spiny softshells require sandy beaches and riverbanks for nesting, shallow soft-bottomed water bodies to function as nurseries and refugia, basking areas and deep pools for	No in water works proposed.	N/A

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
			thermoregulation, and riffle areas for foraging, habitat features may occur over a large area, as long as the intervening habitat doesn't prevent the turtles from travelling between them (COSEWIC 2002).		
Butler's Gartersnake (*Thamnophis butleri*)	END	ORAA	This species is typically found in open areas such as grasslands, old fields, tall-grass prairie habitats, urban, industrial, and disturbed sites, typically in proximity to wet areas such as seasonal marshes, swales, and small waterbodies (ECCC 2018). Butler's Gartersnakes hibernate from mid-September until early April, typically near wetland or open water within crayfish or small mammal burrows, drains, log piles, and other underground sites (ECCC 2018).	Forested, grassy and/or riparian habitats found in proximity to each of the three sites.	**Yes** – see mitigation plan below
Eastern Foxsnake (*Pantherophis gloydi*)	END	NHIC	Eastern Foxsnakes of the Carolinian population primarily use un-forested areas, such as old fields, prairies, marshes and dune shorelines. Farm field hedgerows and riparian zones along drainage canals are also used regularly, particularly in areas of intensive agriculture. Brush piles, table rocks, tree stumps, root systems of downed trees, driftwood are also often used for shelter and basking sites (COSEWIC, 2008).	Forested, grassy and/or riparian habitats, as well as ditches, found in proximity to each of the three sites.	**Yes** – see mitigation plan below

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Northern Bobwhite (*Colinus virginianus*)	END	NHIC	The Northern Bobwhite is a very rare and declining grassland species. The best habitat in southern Ontario includes the grasslands and savannahs of Walpole Island, however, there is potential habitat along riparian zones along the Thames River and Kettle Creek (Cadman *et al.,* 2007).	Grassland habitat absent from Project Location.	N/A
Chimney Swift (*Chaetura pelagica*)	THR	OBBA	Chimney Swift use chimneys for roosting and breeding, as well as walls, rafters, or gables of buildings and, less frequently, natural structures such as hollow trees, tree cavities and cracks in cliffs (Cadman et al., 2007).	Trees and chimneys absent from Project Location.	N/A
Barn Owl (*Tyto alba*)	END	NHIC	The Barn Owl favours pastures, hayfields, marshes and other grassy habitats that support mice and vole populations. It has nested in barns, church steeples, silos, cavities in large trees and artificial nest boxes (Cadman et al., 2007).	Suitable nesting structures absent from Project Location.	N/A

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Acadian Flycatcher (*Empidonax virescens*)	END	OBBA	Its preferred breeding habitat generally consists of large mature forests and deeply wooded ravines (Friesen and Stabb, 2001). A minimum of thirty hectares of suitable habitat are required. Acadian Flycatchers generally prefer large tracts of undisturbed forest and in Ontario, the species often breeds in black ash swamps (Whitehead and Taylor, 2002).	Mature forests absent from Project Location.	N/A
Bank Swallow (Riparia riparia*)*	THR	OBBA	The Bank Swallow excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits. Single nests may occur, although colonies are typical and range from two to several thousand. Adjacent grasslands and watercourses are used for foraging habitat (Cadman et al., 2007).	Banks absent from Project Location.	N/A

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Barn Swallow (*Hirundo rustica*)	THR	OBBA	As their name suggests, Barn Swallows nest on walls or ledges of barns as well as on other human-made structures such as bridges, culverts or other buildings (Cadman et al., 2007). Where suitable nesting structures occur, Barn Swallow often form small colonies, sometimes mixed with Cliff Swallows. Barns Swallows feed on aerial insects while foraging in open habitat (COSEWIC, 2011).	Suitable structures absent.	N/A
Bobolink (*Dolichonyx oryzivorus*)	THR	OBBA, NHIC	The Bobolink is generally referred to as a "grassland species". It nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Preferred ground cover species include grasses such as Timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC 2010).	Grassland absent from Project Location.	N/A

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Eastern Meadowlark (*Sturnella magna*)	THR	OBBA, NHIC	Meadowlarks are ground nesting birds (Harrison, 1975), which are often associated with human-modified habitats where they sing from prominent perches such as roadside wires, trees, and fenceposts. As a grassland species the Eastern Meadowlark typically occurs in meadows, hayfields and pastures. However, it will utilize a wider range of habitat than most grassland species, including mown lawn (e.g. golf course, parks), wooded city ravines, young conifer plantations and orchards (Peck and James 1983).	Grassland absent from Project Location.	N/A
Prothonotary Warbler (*Protonotaria citrea*)	END	OBBA	This warbler is a habitat specialist, nesting exclusively in tree cavities, usually overhanging open water, found in deciduous swamps and floodplains (Cadman et al., 2007).	Swamps absent from Project Location.	N/A
Cerulean Warbler (*Setophaga cerulea*)	THR	OBBA	Cerulean Warbler breeds mainly in mature deciduous or swamp forest. The species generally prefers tracts over 100 ha in size but it has been found to breed in woodlots as small as 10 ha (Hamel, 2000). In Ontario, the species is generally associated with large oak or bitternut hickory trees (Cadman et al., 2007).	Mature forests absent from Project Location.	N/A

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Blue Ash (*Fraxinus quadrangulata*)	THR	NHIC	Occurs as a scattered tree, mixed with white ash, black ash, chinquapin oak, black walnut and other southern broadleaf trees; found on floodplains, well-drained sand and on limestone outcrops. The most drought-resistant of the native ashes. (Farrar 1995).	Floodplains absent from Project Location.	N/A
Eastern Flowering Dogwood (*Cornus florida*)	END	NHIC	Eastern flowering dogwood is an understory plant of dry to fresh deciduous and mixed forests, which frequently grows on the tops of slopes or other dry microsites, and occasionally in moister areas where no flooding occurs; preferred soils range from sand to sandy loam and clay loam (COSEWIC, 2007),	Forests absent from Project Location.	N/A
Kentucky Coffee-tree (*Gymnocladus dioicus*)	THR	NHIC	The Kentucky Coffee-tree occurs naturally only in southwestern Ontario; it is found in deep rich soils, often with other broadleaf trees (Farrar, 1995). This species prefers full sun in woodlands and at marsh edges, but may occur in a variety of habitats in full sun (ROM, 2008).	Tree removal not proposed.	N/A
Eastern Sand Darter (*Ammocrypta pellucida)*	END	DFO	Found exclusively in sandy areas of streams, rivers and lakes where it feeds and reproduces (COSEWIC, 2009; Holm et al, 2010).	No in-water works proposed.	N/A

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Pugnose Minnow (*Opsopoeodus emiliae*)	THR	DFO	Prefers warm, turbid waterbodies exhibiting low flows over soft substrates, with or without vegetation (COSEWIC, 2012; Holm et al, 2010).	No in-water works proposed.	N/A
Pugnose Shiner (*Notropis anogenus*)	THR	DFO	Inhabits highly vegetated waterbodies with little to no flow over soft substrates (COSEWIC, 2013).	No in-water works proposed.	N/A
Fawnsfoot (*Truncilla donaciformis*)	END	DFO	Found in large rivers with low to moderate flows in soft substrates such as silt and sand (COSEWIC, 2008).	No in-water works proposed.	N/A
Kidneyshell (*Ptychobranchus fasciolaris*)	END	DFO	Inhabits large streams and small rivers with moderate flows in substrates consisting of gravel and sand (Metcalfe-Smith et al, 2005).	No in-water works proposed.	N/A
Lilliput (*Toxolasma parvum*)	THR	DFO	Found in a wide variety of habitats including large rivers and wetlands with low current soft substrates including mud, sand, and silt (COSEWIC, 2013; Metcalfe-Smith et al, 2005).	No in-water works proposed.	N/A
Round Pigtoe (*Pleurobema sintoxia)*	END	DFO	The Round Pigtoe may be found in small, medium-sized and large rivers with moderate flows on mixed substrates of gravel, cobble, boulder, sand and mud and varying depths (COSEWIC, 2004).	No in-water works proposed.	N/A

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

Species	COSSARO Status	Source	Species Habitat Description	Habitat Suitability of Project Locations	Proposed Mitigation
Salamander Mussel (*Simpsonaias ambigua*)	END	DFO	Inhabits shallow areas with swift currents where it is burrowed in sand or silt below cobble and boulder. Found in areas suitable to the larval host Mudpuppy (*Necturus maculosus*) (COSEWIC, 2001).	No in-water works proposed.	N/A
Threehorn wartyback (*Obliquaria reflexa*)	THR	DFO	Typically found in large rivers with moderate current and stable substrates of gravel, sand and mud (COSEWIC, 2013).	No in-water works proposed.	N/A

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

MITIGATION PLAN

Based on the results of the species at risk screening detailed above in **Table 1**, two (2) species have the potential to occur within the Project Location, Butler's Gartersnake and Eastern Foxsnake. Disturbance or destruction of habitat of the two species are not anticipated as the Project Location is comprised of highly disturbed lands (agriculture, existing wells and access roads). However, interactions between equipment (including vehicles) and individuals of the species is possible, if construction occurs during the active season for these species (i.e., March 15 – October 15). Snakes often bask on roadways or may crawl into idle equipment for cover and warmth. Temporary access of steel plates for TW1 and TW7 may also provide cover objects which could be used by either species. As ground disturbance is not proposed, risks are low while snakes are hibernating (i.e., October 16 – March 14).

Mitigation measures are provided below for protection of individuals of the species. As work at the various wellheads may occur at different times of year, two sets of mitigation are provided; mitigation for the active season and mitigation for the inactive season.

WORK TO OCCUR WITHIN ACTIVE SEASON (MARCH 15 – OCTOBER 15)

Wells with Existing Access Roads in Agricultural Fields

As the proposed work for the Black Creek and Coveny Well Projects and majority of Wilkesport Well Project does not involve ground disturbance or the use of mats and is comprised entirely of equipment traffic on an existing gravel access road, risk of snake interactions is anticipated to be low. For work proposed between March 15 and October 15 (weather dependent), the following mitigation measures are recommended:

- All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. Continual awareness and avoidance of snakes crossing roadways will be encouraged through training programs for those individuals with access to the Project Location.
- Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit.
- All equipment and machinery that is left idle for over one hour, or overnight, on the property must be visually examined prior to (re)ignition to ensure snakes are not present within the machinery. This visual examination should include all lower components of the machinery, including operational extensions and running gear.
- If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used.
- All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project.
- In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per **Attachment B**.
- In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate

temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately (**Attachment C**).

Wells Without Existing Access Roads Located Outside of Agricultural Fields

The proposed work for wells TW1 and TW7 (Wilkesport Well Project) involves the use of temporary steel mats, which poses an additional risk to snakes, should they use the mats as shelter. As such, in addition to the mitigation above, we recommend the use of exclusionary fencing to exclude snakes from the access route. For construction of TW1 and TW7 during the active season, the following mitigation measures are recommended:

- Implement all mitigation measures for wells with existing access above.
- Prior to placement of steel plates, the entire work area will be walked and staked, with construction limits isolated with exclusion fencing (e.g., silt fencing).
- Fencing will be installed prior to placement of steel plates and will be monitored and maintained in-place until the end of construction activities.
- Fencing will be installed in accordance with MNR's 'Species at Risk Branch – Best Practices Technical Note Reptile and Amphibian Exclusion Fencing Version 1.1 (MNR, July 2013), **Appendix E**) and though the use of a spotter:
  - The recommended height of fencing for Butler's Gartersnake is a minimum of 50 to 60 cm and 200 cm for Eastern Foxsnake, adjusted in consideration of topography. The fence should be buried 10 to 20 cm below grade with an additional 10 cm horizontal lip ('keyed in') on the species side.
  - Fencing reinforced with a woven nylon mesh is not an acceptable material as this can cause entanglement and mortality for snakes.
  - At access locations, it is recommended that the fence be designed to curve inward in order to direct animals from the area of exclusion.
  - Inspection of fences at regular intervals throughout the active season (weekly, and after any rainfall events). These inspections are important for areas of geotextile fencing as well as permeable fence types where fencing is subject to water flow events (inspect to remove debris build up). Damage that affects the integrity of the fence (e.g., tear, loose edges, collapses, etc.) should be fixed promptly.
  - To facilitate rapid evacuation of the work site in the case of an emergency, two openings in the fence around the wellsite will be included during fence installation. These openings will require the design of temporary gates that are closed at the end of each workday, secured such that snakes cannot access underneath.
- The construction contractor to monitor that no construction disturbance occurs beyond the staked/fenced limits.
- A daily survey of the isolated work area (i.e., prior to construction each day) will occur to confirm that no snakes have entered the area.

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

WORK TO OCCUR OUTSIDE OF ACTIVE SEASON (OCTOBER 16 – MARCH 14)

If construction is to occur outside of the active season for Eastern Foxsnake and Butler's Gartersnake (October 16 – March 14), the following mitigation measures are recommended for the Black Creek, Coveny and Wilkesport Well Projects. The use of steel mats is not anticipated to provide an additional risk outside the active season, so the same mitigation is proposed for all wells.

- All persons entering the site should be provided training about Butler's Gartersnakes and Eastern Foxsnakes. The likelihood of encountering a snake outside of the active season is low but may occur if weather conditions are optimal (i.e., sunny days with air temperatures >5°C).
- Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be installed to communicate the 30 km/hr limit.
- If erosion control blankets are required, only wildlife friendly products (i.e., no mesh as wildlife can become entangled) should be used.
- All observations of Butler's Gartersnakes or Eastern Foxsnakes on the site should be recorded and submitted to MECP upon completion of the Project.
- In the event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. Alternately, the snake should be relocated by a qualified biologist as per **Attachment B**.
- In the unlikely event of an injured or deceased Butler's Gartersnakes or Eastern Foxsnakes being found, the specimen must be placed in a non-airtight container maintained at an appropriate temperature, and both the MECP and a certified wildlife rehabilitation facility will be contacted immediately (**Attachment C**).

CLOSING

In closing, the Black Creek, Coveny and Wilkesport Well Projects have the potential to impact Eastern Foxsnake and Butler's Gartersnake, both of which are protected under the *Endangered Species Act*. The area of construction associated with each project is comprised of existing agricultural fields or disturbed areas and therefore disturbance or destruction of habitat is not anticipated. With the implementation of mitigation measures above, it is anticipated harm or harassment of individuals of the species can also be avoided.

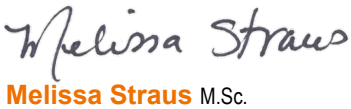
We are seeking MECP's confirmation of this conclusion.

Reference: **Enbridge Gas Inc. Tecumseh Storage Operation Pressure Increase at Black Creek, Coveny, and Wilkesport Storage Pools – Species at Risk Screening**

If you have any questions or concerns, please contact the undersigned and we would be happy to discuss.

Yours truly,

Stantec Consulting Ltd.



Melissa Straus M.Sc.
Terrestrial Ecologist
Phone: 519 780 8103
Fax: 519 836 2493
Melissa.Straus@stantec.com

Attachments: Attachment A: Figures
Attachment B: Ontario Species at Risk Handling Manual
Attachment C: Wildlife Rehabilitators
Attachment D: Reptile and Amphibian Exclusion Fencing

c. Kathy McConnell, Enbridge Gas Inc.
Sarah Kingdon-Benson, Enbridge Gas Inc.
Rooly Georgopoulos, Stantec Consulting Ltd.

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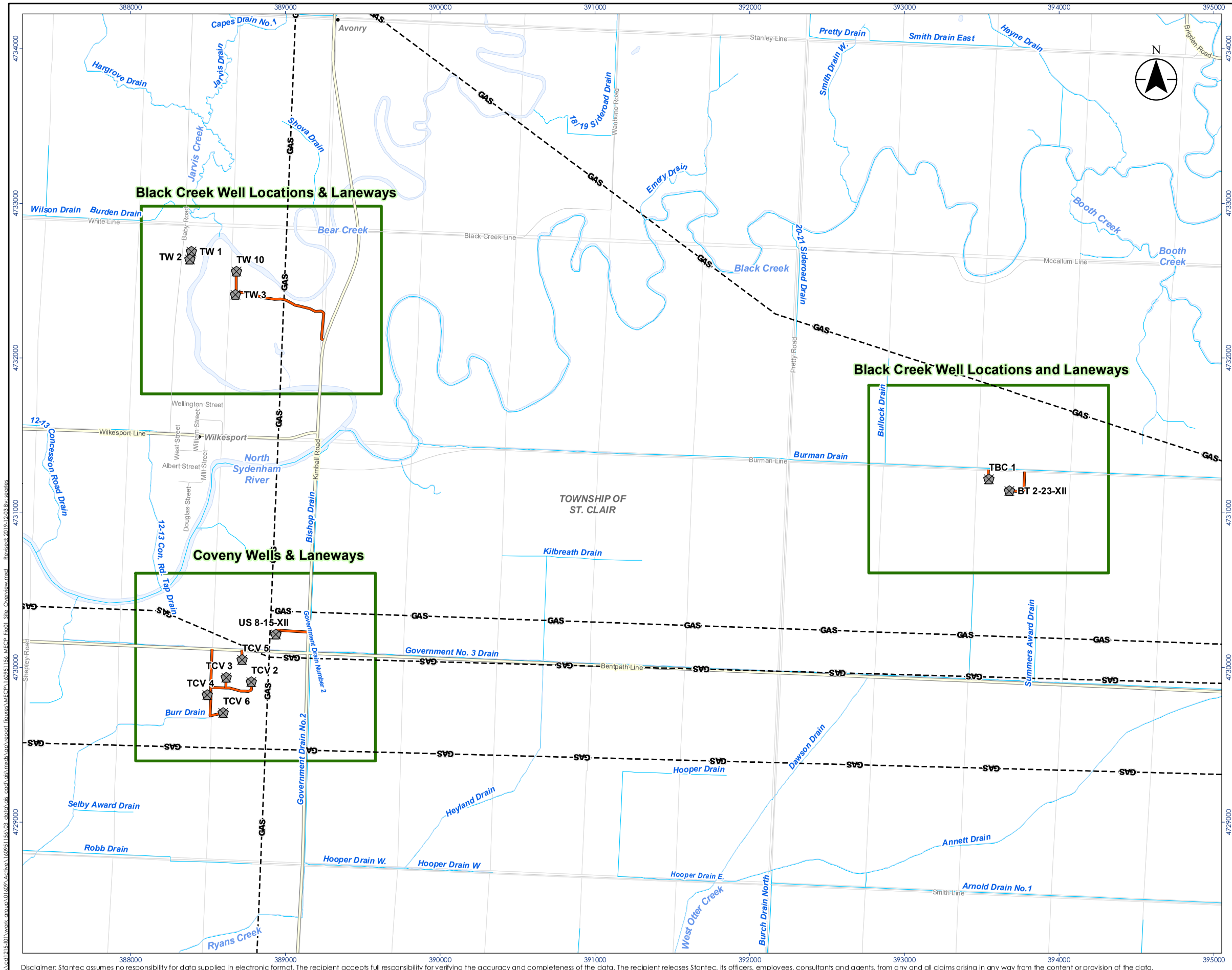
Attachment A

Figures



Stantec

Legend

- Enbridge Well
- Access
- Constructed Drain
- Gas Pipeline
- Watercourse (Permanent)
- Waterbody
- Lot
- Municipal Boundary, Lower
- Map Tile Index

0 1 km

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Notes

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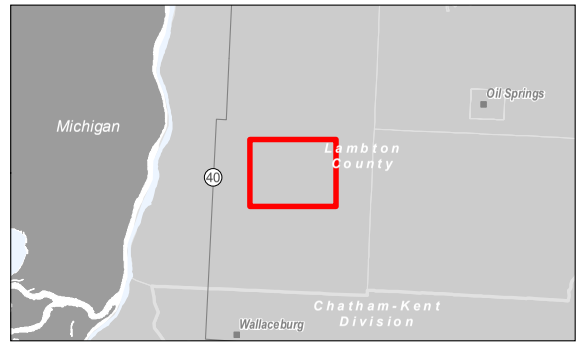

Project Location
County of Lambton

160951156 REV4
Prepared by SPE on 2019-12-03
Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
1

Title
Site Overview

Stantec

Legend

- Enbridge Well
- Access
- Proposed temporary access road and temporary well pad enlargement for TW 1 and TW 7
- Constructed Drain
- GAS - Gas Pipeline
- Watercourse (Permanent)
- Waterbody
- Lot
- Municipal Boundary, Lower

0 50 100 150 200 250 Meters

1:5,000 (At original document size of 11x17)

Notes

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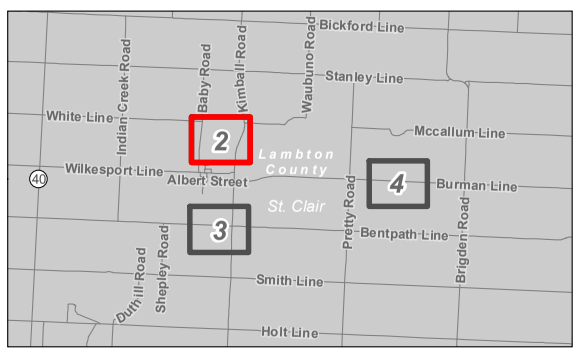

Project Location
County of Lambton

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Prepared by SPE on 2019-12-03
Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
2

Title
Site Details -
Black Creek Well Locations & Laneways

Stantec

Legend
- Enbridge Well
- Access
- Constructed Drain
- Gas Pipeline
- Watercourse (Permanent)
- Waterbody
- Lot
- Municipal Boundary, Lower

0 50 100 150 200 250 Meters

1:5,000 (At original document size of 11x17)

Notes
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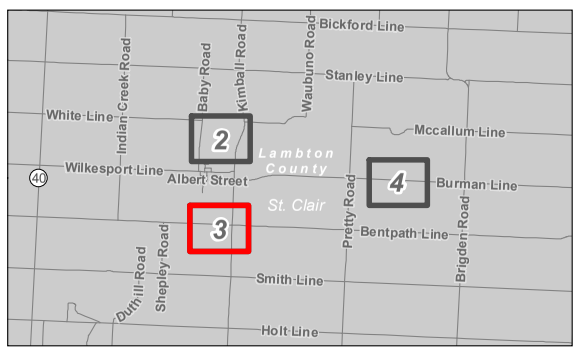

Project Location
County of Lambton

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Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
3

Title
Site Details - Coveny Wells & Laneways

Stantec

Legend

- Enbridge Well
- Access
- Constructed Drain
- Gas Pipeline
- Lot
- Municipal Boundary, Lower

0 50 100 150 200 250 Meters

1:5,000 (At original document size of 11x17)

Notes

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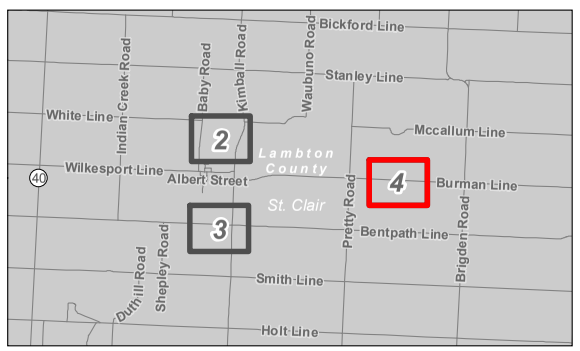

Project Location
County of Lambton

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Technical Review by BCC on 2019-10-31

Client/Project
ENBRIDGE GAS INC.

Figure No.
4

Title
Site Details -
Black Creek Well Locations and Laneways

Attachment B

Ontario Species at Risk Handling Manual

Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders

Table of Contents

Introduction

Ontario's *Endangered Species Act, 2007* (ESA) protects endangered and threatened species and their habitats.

Ontario is home to over 30,000 species, about 200 of which are considered at risk. Roughly 40 per cent of the species at risk in Canada are found in Ontario.

Activities that would harm individual species at risk or their habitats are prohibited by the ESA, unless they are authorized under the act. Authorizations include permits, stewardship agreements and exemption agreements.

This manual is designed to provide guidance to those whose authorization under the ESA may require the capture, relocation, handling, and/or transport of species at risk.

Enclosed is both a DVD presentation and CD of this manual which are also available from your Ministry of Natural Resources (MNR) District Office.

For additional information and assistance with species identification, please consult MNR *Ontario Species at Risk Quick Reference Guide*, or email: esa.permits.agreements@ontario.ca.

Visit our wesite **ontario.ca/speciesatrisk** for more general information about all Ontario's species at risk.

1. Safe Handling of Turtles

1.1 Materials

a) The following materials are required for the handling, capture, temporary safe keeping and transport of turtles:

» Large plastic bin and lid with air holes, a large bucket or a cloth/burlap bag. Ensure both sides of the container/bag and the lid are well marked with “live animal”. See section 1.5 to determine when it is appropriate to use a specific type of container.

» Thick work gloves

» Thermometer

» SAR Notification/Contact Schedule

» SAR Encounter Reporting Form

» Broom or broom handle with small paint brush roller attached to end.

b) Equipment must be maintained on each job site.

1.2 Safety considerations

a) Generally, there is little risk associated with handling turtles. However, all turtles can scratch and bite, and work gloves should be worn to help avoid minor injuries.

b) Snapping, Spiny Softshell and Eastern Musk Turtles cannot completely retract into their shell and are more likely to bite in defence. These species should be handled more cautiously and as follows:

I. **Always keep your hands as close to the back of the turtle’s shell as possible, and always behind the midpoint of the shell**. These species have a considerable reach above their shells. Snapping Turtles can reach the midpoint of the shell, and in some cases Spiny Softshell Turtles and Eastern Musk Turtles can almost reach the back of their shell.

II. Always maintain a safe distance between the front of the turtle and other people.

c) Snapping and Spiny Softshell Turtles have a powerful and painful bite that is likely to bruise and may break the skin. However, it will almost never break bone. The damage inflicted by a Snapping Turtle bite is greatly exaggerated (such as being able to bite a boat oar or golf club in half). Forcing a Snapping Turtle to bite hard implements may result in an injury to the turtle. Wearing gloves will significantly reduce the risk of injury from these turtles.

d) If bitten by a turtle, remain calm and allow the turtle to relax and let go on its own. Pulling away from the turtle may cause further injury to you or the turtle.

e) Always wash your hands after handling a turtle. Turtles (and many other animals, including humans) carry potentially harmful bacteria in their gut. Although it is possible to contract salmonella from handling turtles, there are few reported cases of contracting these bacteria from wild turtles. Cases of salmonella poisoning from turtles are almost always limited to pet turtles, since these captive turtles are forced to live in the same small space that they defecate in.

1.3 Capture and handling of turtles

Safely handle, move or capture a turtle by following these steps:

a) Always handle turtles carefully and slowly, yet firmly. Rough handling may cause injury or stress to the turtle and/or the developing eggs and may cause the turtle to be more defensive (increased biting and scratching).

b) With the exception of very small individuals, always handle turtles with both hands. Turtles are good at freeing themselves with a bit of wiggling, kicking, clawing and biting, and a good grip is essential to ensure no harm comes to you or the turtle.

c) Never pick up a turtle by the tail. This can dislocate bones throughout the tail and is extremely painful for the turtle. For larger, heavier turtles this may result in dislocation of bones in the spinal cord as well.

d) Wear gloves when handling turtles to minimize risk from scratches and bites. If gloves are not available, handle turtles with clean hands that are free of insect repellent, antibacterial hand sanitizer, sunscreen, etc.

e) **Painted, Map, Wood, Blanding's and Spotted Turtles:** Pick up these species using both of your hands, one on each side of the shell, between the front and back legs.

f) **Snapping Turtle:** Always wear gloves when handling a Snapping Turtle and always keep your hands behind the midpoint of the top or sides of the turtle's shell. To pick up a Snapping Turtle:

I. Hold it by the back of the shell, placing your thumbs on the top of the shell and your fingers in the hind leg pockets (the space between the upper shell and the hind legs). Your hands will be at approximately 5 and 7 o'clock.

II. Or use one hand to hold the base of the tail near the shell and slide your second hand under the turtle to support its weight. Lift the turtle using the hand underneath the turtle. Never pick up a turtle by the tail.

Turtles

III. Or you can move it by guiding it into a pail or garbage can with a broom.

IV. It is important to get a good, strong hold on the turtle's shell as the force that is exerted by the turtle snapping may result in an unexpected release. A good grip will ensure that both the turtle and the handler remain safe and uninjured.

g) **Eastern Musk Turtle:** Pick up Eastern Musk Turtles by the back of the shell. This turtle species can be held with one hand, as long as you ensure that you have a good grip.

h) **Spiny Softshell:** Always wear gloves when handling a Spiny Softshell, and always keep your hands well behind the midpoint of the top or sides of the turtle's shell. To pick up a Spiny Softshell turtle:

I. Use both hands, one on each side of the shell, as close as possible to the back legs.

II. Or place one hand under the turtle between its back legs (in the middle to balance its weight) and the other hand, also from behind, on the top of the turtle's shell (close to the back).

i) Turtles can be difficult to capture. If a turtle escapes or heads for cover, let it disperse on its own, ensuring it is safe from harm before allowing activities to continue. If continuing activities poses a threat to the turtle, postpone activities for up to 24 hours to allow the turtle to disperse. If it is not possible to leave the area for 24 hours, have a Qualified Member relocate the individual. Do not disturb any natural cover under which the turtle has retreated. If necessary, contact MNR for further direction using the SAR Notification/ Contact Schedule.

1.4 Moving turtles out of harm's way (distances under 50 metres)

a) If it is necessary to move a turtle more than 50 metres, refer to section 1.6 on turtle relocation.

b) Turtles should only be moved when they are in imminent, unavoidable danger.

c) If possible, allow the turtle to move on its own by walking toward the turtle in the direction that you want it to move. This will not work for Snapping Turtles, as they often turn to face a potential threat head-on rather than running away. If the turtle does not move on its own, you may have to pick it up and move it (see section 1.3).

d) When moving a turtle a short distance, such as across a road, move the turtle in the direction that it was heading, regardless of what the habitat looks like. These animals often make intentional movements to specific areas, and if you put them back where they started they may simply turn around and start their journey again. If it is not clear which direction the turtle was headed, move the turtle to the closest suitable habitat that will not be disturbed. In this case, suitable habitat includes a water body or the vegetation/forest at the edge of the road allowance, disturbed area or clearing.

e) If possible, release the turtle near a retreat site (somewhere the animal can seek shelter from the elements and avoid predators, such as water or dense vegetation) to allow it to take cover. Do not release it in the open where it could be exposed to inclement weather, extreme sunlight or predators.

1.5 Temporary safe keeping and transportation of turtles

a) You are responsible for this animal. Remember, once you have put it in a container, it depends on you to keep it safe and at the right temperature.

b) Always create air holes in the lid of a container prior to placing an animal in the container.

c) If the turtle will be in captivity for **less than one hour**, place the turtle in a cloth or burlap bag, a large bucket or a large plastic bin with a lid that has adequate air holes. Cloth or mesh bags should not be used for snapping turtles as they can become tangled and strangle themselves. Always use large plastic bins or large buckets for snapping turtles.

d) If the turtle will be in captivity for **more than one hour**, avoid the use of cloth or burlap bags. For adults, use a large plastic bin or bucket with a lid that has adequate air holes and a small amount of water (no more than an inch deep). Ensure that the turtle is not fully submerged, as it will drown if it cannot breathe. For hatchlings and juveniles, use an appropriately sized container with a lid that has air holes and line the bottom of the container with wet towels or paper towels. Never transport small juveniles or hatchlings in water.

e) It is extremely important to monitor the air temperature regularly in the container to ensure it **never exceeds 30°C or drops below 5°C**. Never leave the container in direct sunlight or in a closed vehicle parked in the sun, as this will cause the turtle to overheat and could be fatal.

f) Never put more than one turtle in a container or bag at a time, especially in the case of Snapping Turtles. This will help to minimize stress and prevent injury to the turtles.

g) Once the turtle is in the container or bag, ensure that the lid is secure or that the bag is tied tightly.

h) **Never leave the container or bag unattended** in an unsecured location (e.g., side of road).

i) If using a bag, ensure that it is in a secure location where it cannot fall if the turtle moves the bag. The movement of a turtle within a bag can easily cause the bag to fall off of a table.

j) Do not offer the turtle any food. Turtles do not have to eat as often as mammals, and it is no problem for a turtle in temporary captivity to go a few days without food.

k) Turtles should be checked periodically (every hour should suffice). Hatchlings are especially susceptible to dehydration and must be carefully monitored during transport.

1.6 Relocation of turtles

a) A turtle should only be relocated if the destruction of its habitat is unavoidable or if it is not possible to release it at the capture location.

b) Transport and release the turtle within one hour of capture in order to minimize stress on the animal.

c) Turtles should not be relocated during their over-wintering season. This varies depending on the species and location, but is generally from October to May. If you are unsure whether you should relocate the turtle or take it to a wildlife custodian, contact MNR for further direction using the SAR Notification/ Contact Schedule.

d) If it is not possible to relocate the turtle due to the time of year (October to May) or other conditions, transport the turtle to a wildlife custodian per the SAR Notification/Contact Schedule.

e) **Turtles should never be moved more than 250 metres** from the location where they were found. Only move a turtle as far as necessary to avoid potential harm to the turtle, and avoid moving turtles more than 125 metres unless absolutely necessary. If it is not possible to relocate the turtle within 250 metres of the capture location, contact MNR for further direction using the SAR Notification/Contact Schedule.

f) If hatchlings are found and must be relocated, move them to the nearest permanent body of water. Never place hatchlings directly into water. Release the turtle at the shoreline of the appropriate habitat (see below). The turtle may or may not choose to enter the water; do not force it.

g) Whenever possible, release the turtle in the same water body where it was found and in the same type of natural habitat as the capture site. To determine if the habitat is of the same type, consider the water depth, water current, substrate type (mud, rock, etc.) and vegetation type (cattails vs. lily pads vs. aquatic vegetation).

h) If possible, release the turtle near a retreat site (somewhere the animal can seek shelter from the elements and avoid predators, such as water or dense vegetation) to allow it to take cover. Do not release it in the open where it could be exposed to inclement weather, extreme sunlight or predators.

i) To release the turtle, gently pick up the turtle (per section 1.3) from the container and set it down in the new location. To release a Snapping Turtle or Spiny Softshell Turtle, you may wish to tip the container on its side and allow the turtle to move out on its own. Allow the turtle to disperse on its own at this new location.

1.7 Injured turtles

a) Use the methods outlined in section 1.3 to handle injured turtles whenever possible. If those methods are not applicable due to the turtle's injuries, use a shovel or other flat object to pick up the turtle. Ensure that any injured areas are supported.

b) Place the turtle in a large plastic bin or large bucket with a lid that has air holes. Darkness helps to reduce stress to the turtle. Do not place anything else in the container with the turtle, including water or other turtles.

c) Thoroughly wash your hands after handling injured turtles.

d) Immediately transport the turtle to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase its chances of survival.

2. Safe Handling of Snakes

2.1 Materials

a) The following personal protective equipment should be worn when working with Massasauga rattlesnakes:

» High-ankle hiking or rubber boots

» Thick pants (jeans) or baggy pants

» Leather work gloves

b) The following materials are required for the handling, capture, temporary safe keeping and transport of snakes:

» Pail, large garbage can or bucket (1 metre deep) with air holes in the lid. Ensure both the side of the container and the lid are well marked “live animal” or “caution rattlesnake”.

» A snake bag (for non-venomous species only). A snake bag must be cloth. (A pillowcase works well.) Plastic and non-breathable materials are not appropriate. Ensure the bag is well marked “live animal”.

» Broom or broom handle with small paint brush roller holder attached to end. Never use “snake pinchers”.

» Thermometer

» SAR Notification/Contact Schedule

» SAR Encounter Reporting Form

c) Equipment must be maintained on each job site.

2.2 Safety considerations

a) **The Massasauga is the only venomous snake in Ontario.**

The venom is an adaptation for hunting and is used to kill prey (primarily small rodents).

As a defence mechanism, Massasaugas may also bite when threatened, at which time they may or may not release venom. Camouflage, rattling and retreating are their primary defensive strategies, and they generally bite as a last resort.

Their maximum striking distance is about half of their body length. Generally, your safety zone is yourheight plus 50 centimetres away from the snake. (This accounts for the snake’s striking distance to you if you fall.)

A Massasauga bite is generally not deadly. Only two people have ever died from a Massasauga bite in Ontario. Neither person received medical attention, and both cases were almost 50 years ago.

If you are bitten by a Massasauga, remain calm and seek medical attention immediately. Do not apply a tourniquet or try to suck out the venom. Never try to capture the snake to take it to the hospital; if you were bitten by a venomous snake in Ontario, we know it was a Massasauga. Have someone else drive you safely.

b) **Never under any circumstances pick up a Massasauga rattlesnake**. Massasaugas occur in very specific regions of the province, and if you are well outside of those regions it should be safe to handle any native snake you find. If you are working within a region where Massasaugas may occur, never pick up a snake unless you are absolutely certain that it is not a Massasauga.

c) All other Ontario snakes are non-venomous and harmless. Despite being harmless, many of Ontario’s snakes will put on defensive displays to intimidate potential predators. These include:

I. Rearing up, hissing and striking.

II. Eastern Hog-nosed Snakes will flatten out their necks like cobras, hiss loudly and pretend to strike (although their mouths remain closed).

III. Eastern Foxsnakes, Milksnakes, Gray Ratsnakes and Eastern Hog-nosed Snakes sometimes vibrate their tails to imitate a rattlesnake. If their tails come into contact with rocks, dry leaves, or some other medium, they can produce a buzzing sound like that of a rattlesnake. Combined with their blotchy pattern, this mimicry is often very effective at fooling humans.

d) Holding the snake properly (see section 2.4) will significantly reduce stress to the snake and the likelihood that it will try to bite in self-defence.

2.3 Capture and handling of the Massasauga rattlesnake

Safely move a Massasauga by following these steps:

a) Put on personal protective equipment (per section 2.1).

b) Clear the area of unnecessary bystanders to lessen the stress on the animal.

c) Determine your plan for capture to anticipate where the snake may move or retreat as well as any potential hazards you may encounter.

d) If capturing injured snakes, avoid touching or manipulating injured areas.

e) Tip the 1-metre-deep pail on its side.

f) Use the broom to position the snake near the pail.

g) Gently and slowly guide the snake into the pail, being careful not to push the snake too hard or lift if off the ground. Never pin a Massasauga or use tools that constrict or pinch the snake. Quick, abrupt movements are threatening to the snake and may also cause it to make quick movements in an attempt to escape.

h) Be patient and gentle with the snake. Gravid (pregnant) females are carrying live young, and rough handling may cause damage to the developing snakes.

i) Once the snake is in the pail, slowly tip the pail upright and secure the lid.

j) Snakes can be difficult to capture. If a snake escapes or heads for cover, let it disperse on its own, ensuring it is safe from harm before allowing activities to continue. If allowing activities to continue is not safe for the snake, postpone activities for up

to 24 hours to allow the snake to disperse. If it is not possible to leave the area for 24 hours, have a Qualified Member relocate the individual. Do not disturb any natural cover under which the snake has retreated. If necessary, contact MNR for further direction using the SAR Notification/Contact Schedule.

2.4 Capture and handling of non-venomous snakes

a) If you are uncomfortable handling large, non-venomous snakes with your hands, you can use the above method for capturing venomous snakes (section 2.3). However, it is much easier to capture most non-venomous snakes using your hands. Some of the smaller species, such as the Butler's Gartersnake, are almost impossible to capture with a stick and a pail.

b) If you elect to use thick gloves, be very careful not to squeeze the snake too hard, as you can crush internal organs and kill it. Do not use gloves to capture small snakes, as the risk of accidentally crushing them is too high.

c) Clear the area of unnecessary bystanders to lessen the stress on the animal.

d) Determine your plan for capture to anticipate where the snake may move or retreat and to anticipate any potential hazards you may encounter.

e) Never grab the snake behind the head or grip the snake tightly in order to restrain it. This may injure or scare the snake, cause it to struggle and encourage it to bite in self-defence.

f) Always support the snake's body with both hands and never pick up a snake only by the tail. Holding a snake only by the tail can result in dislocated bones or other serious injury to the snake.

g) To capture a large snake (more than 30 centimetres in length):

I. Gently grab it by the back of the body to prevent it from getting away.

II. Holding the snake by the back end while it is still on the ground, slide your other hand underneath the snake to support its weight and lift it up. Do not lift if off the ground by the tail.

III. As soon as the snake is off the ground, continue to support its weight by keeping both hands under the snake, with one hand about a third of the way back and one hand about two thirds of the way back along the snake's body.

IV. As the snake tries to move forward, reposition the hand from the back of the snake to the front of the snake, and continue to rotate your hands between the front and back of the snake to allow it to continue to crawl through your hands. Calm and slow movements will help the snake relax and make it move more slowly.

V. Often a snake will stop moving once it no longer feels threatened. If the snake continues to move rapidly after a minute or so, you can try holding the back end of the snake more firmly to prevent it from continuing to move forward. Continue to support the unrestricted front half of the snake with your other hand.

h) To capture a small snake (less than 30 centimetres in length):

I. Grasp the snake gently but firmly with one or both hands. It may be necessary to gently restrain it against the ground with your hands initially to prevent it from escaping. Never use a stick, snake hook or any other object to pin a snake.

II. Hold the back end of the snake in one hand and support the front of the snake with your fingers or your second hand. Allowing the snake's front end to remain free helps the snake remain calm.

III. For very small snakes, hold the snake in the palm of your hand using your thumb or fingers to gently apply only enough pressure to prevent the snake from wiggling free.

i) Snakes can be difficult to capture. If a snake escapes or heads for cover, let it disperse on its own, ensuring it is safe from harm before allowing activities to continue. If continuing activities poses a threat to the snake, postpone activities for up to 24 hours to allow the snake to disperse. If it is not possible to leave the area for 24 hours, have a Qualified Member relocate the individual. Do not disturb any natural cover under which the snake has retreated. If necessary, contact MNR for further direction using the SAR Notification/ Contact Schedule.

2.5 Moving a snake out of harm's way (distances under 50 metres)

a) If it is necessary to move a snake more than 50 metres, refer to section 2.7 on snake relocation.

b) Snakes should only be moved when they are in imminent, unavoidable danger.

c) If possible, allow the snake to move on its own by walking toward the snake in the direction that you want it to move. If the snake does not move on its own, you will have to pick it up and move it (see section 2.4). Unlike most snake species, Massasaugas may not

move away when you walk toward them. Rather, they often adopt a defensive position (coiled), hold their ground and rattle (asking you to go the other way). To encourage a Massasauga to move away on its own, give it lots of space and observe it from a distance (ideally so the snake cannot see you).

d) When moving a snake out of harm's way, such as across a road, move the snake in the direction that it was heading, regardless of what the habitat looks like. These animals often make intentional movements to specific areas, and if you put them back where they started they will simply turn around and start their journey again. If it is not clear which direction the snake was headed, move it to the closest habitat that will not be disturbed. In this case, suitable habitat includes a rock pile or other cover that the snake can retreat under, or the vegetation at the edge of the road allowance, disturbed area or clearing.

e) If possible, release the snake near a retreat site (somewhere the animal can seek shelter from the elements and avoid predators: loose rocks, logs, rock crevices or dense vegetation) to allow it to take cover upon release. Do not release the snake in the open where it could be exposed to inclement weather, extreme sunlight or predators.

2.6 Temporary safe keeping and transportation of snakes

a) You are responsible for this animal. Remember, once you have put it in a container, it depends on you to keep it safe and at the right temperature.

b) Always use a pail, large garbage can or bucket (at least 1 metre deep) with adequate air holes in the lid for Massasaugas. Ensure the lid is properly secured, and always create the air holes before putting the snake in the container.

c) If using a snake bag:

I. **Make sure it is properly closed**. To close the snake bag, gather the material at the opening together in one hand and run your other hand down the bag to ensure that the snake is in the bottom. Twist the neck of the bag and tie it into a tight knot. Never rely on a drawstring, as snakes can wiggle out of tight holes. When tying a snake bag, make sure the snake remains in the bottom of the bag so it does not get tangled in the part you are tying.

II. **Make sure it is in a secure location** where it cannot fall if the snake moves the bag. The movement of a snake within a bag can easily cause the bag to fall off of a table.

III. If transporting the snake or holding it for a longer time (over an hour), the closed snake bag should be placed in a well-ventilated hard container (such as plastic tub) for added protection.

d) It is extremely important to monitor the air temperature regularly in the container or around the snake bag to ensure it **never exceeds 30°C or drops below 5°C**. Never leave the container or snake bag in direct sunlight or in a closed vehicle parked in the sun, as this will cause the snake to overheat and could be fatal.

e) **Never leave the container or snake bag unattended** in an unsecured location (e.g., side of road).

f) Do not offer the snake any food. Snakes do not have to eat as often as mammals, and it is no problem for a snake in temporary captivity to go a few days without food.

2.7 Relocation of snakes

a) A snake should only be relocated if the destruction of its habitat is unavoidable or if it is not possible to release it at the capture location.

b) Snakes should not be relocated during their over-wintering season. This varies depending on the species and location, but is generally from October to May. If you are unsure whether you should relocate the snake or take it to a wildlife custodian, contact MNR for further direction using the SAR Notification/Contact Schedule.

c) If it is not possible to relocate the snake due to the time of year (October to May) or other conditions, transport the snake to a wildlife custodian per the SAR Notification/Contact Schedule.

d) Transport and release the snake within one hour of capture in order to minimize stress on the animal.

e) **Snakes should never be moved more than 250 metres** from the location where they were found. Only move a snake as far as necessary to avoid potential harm to the snake, and avoid moving snakes more than 125 metres unless absolutely necessary. If it is not possible to relocate the snake within 250 metres of the capture location, contact MNR for further direction using the SAR Notification/Contact Schedule.

f) Release the snake in the same type of natural habitat as the capture site. If this is not possible, contact MNR for further direction using the SAR Notification/Contact Schedule.

g) If possible, release the snake near a retreat site (somewhere the animal can seek shelter from the elements and avoid predators: loose rocks, logs, rock crevices or dense vegetation) to allow it to take cover upon release. Do not release the snake in the open where it could be exposed to inclement weather, extreme sunlight or predators.

h) To release the snake from a pail, gently tip the pail onto its side, remove the lid, back away from the pail and allow the snake to leave on its own. If necessary, use the broom to gently guide the snake out of the pail or gently tip the pail on an angle to slide the snake out of the pail.

i) To release a non-venomous snake from a bag, untie the bag, gently tip the bag by holding one of the bottom corners (make sure you are not holding the snake) and gently slide the snake onto the ground.

2.8 Injured snakes

a) If dealing with an injured Massasauga, ensure compliance with all instructions and safety considerations provided in sections 2.1-2.3.

b) If the methods of handling snakes that are outlined in section 2.3 or 2.4 are not applicable due to the snake's injuries, use a shovel or other flat object to pick up the snake. Ensure that any injured areas are supported.

c) Place the snake in a large plastic bin or bucket with a lid that has air holes (the darkness helps to reduce stress to the snake). You can place newspaper in the container to provide cover for the snake and help to reduce its stress. Do not place anything else in the container with the snake or offer it any food.

d) Thoroughly wash your hands after handling injured snakes.

e) Immediately transport the snake to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase its chances of survival.

Snakes

3. Safe Handling Of The Five-lined Skink

3.1 Materials

a) The following materials are required for the handling, capture, temporary safe keeping and transport of Five-lined Skinks:

» Small plastic container with a lid that has air holes. Ensure the container and the lid are well marked “live animal”.

» Thermometer

» SAR Notification/Contact Schedule

» SAR Encounter Reporting Form

b) Equipment must be maintained on each job site.

3.2 Capture and handling of Five-lined Skinks

a) There is no risk associated with handling Five-lined Skinks. They may bite, but this will not cause any substantial injury – they have small mouths and tiny teeth.

b) Safely handle, move or capture a Five-lined Skink by following these steps:

I. Always handle Five-lined Skinks gently and slowly. Rough handling may cause injury or stress to the animal. Skinks can drop their tail as an anti-predator defence and may do so if they feel threatened, even if they are not being held by the tail.

II. **Never grab or pick up a Five-lined Skink by the tail**. This may cause the skink to drop its tail (even if you are being gentle) and can be detrimental to the survival of the animal.

III. Do not pick up Five-lined Skinks by the body; exerting too much pressure by accident can result in internal injury.

IV. Capture a skink by cupping your hands over the skink while it is on the ground. (You have to be quick!)

V. Carefully close your hand(s) around the skink to pick it up. Note that they can fit through small holes between your fingers.

c) Always wash your hands after handling any wildlife.

3.3 Moving a Five-lined Skink out of harm’s way (distances under 25 metres)

a) If it is necessary to move a skink more than 25 metres, refer to section 3.5 on Five-lined Skink relocation.

b) Five-lined Skinks should only be moved when they are in imminent, unavoidable danger.

c) If possible, allow the skink to move on its own by walking toward the skink in the direction that you want it to move. Skinks are fast and tend to hide whenever possible. If the skink continues to seek shelter within the area where work is taking place, it will have to be picked up and moved (see section 3.5).

d) When moving a skink out of harm’s way, such as across a road, move the skink in the direction that it was heading, regardless of what the habitat looks like. These animals often make intentional movements to specific areas, and if you put them back where they started they will simply turn around and start their journey again. If it is not clear which direction the skink was headed, move the skink to the closest suitable habitat that will not be disturbed. In this case, suitable habitat includes rocks or other cover objects that the skink can retreat under.

e) If possible, release the Five-lined Skink near a retreat site, which is somewhere the animal can seek shelter from the elements and avoid predators (vegetation, rocks, logs or leaf litter). Do not release it in the open where it could be exposed to inclement weather, extreme sunlight or predators.

3.4 Temporary safe keeping and transportation of Five-lined Skinks

a) You are responsible for this animal. Remember, once you have put it in a container, it depends on you to keep it safe, moist and at the right temperature.

b) Keep Five-lined Skinks in a small container with a lid that has air holes. Always create the air holes before putting the skink in the container.

c) Skinks can move very quickly and may try to escape before the lid is on the container. Be careful that the skink does not get crushed when you place the lid on the container.

d) It is extremely important to monitor the air temperature regularly in the container to ensure it **never exceeds 30°C or drops below 5°C**. Never leave the container in direct sunlight or in a closed vehicle parked in the sun, as this will cause the animal to overheat and could be fatal.

f) **Never leave the container unattended** in an unsecured location (e.g., side of road).

3.5 Relocation of Five-lined Skinks

a) A Five-lined Skink should only be relocated if the destruction of its habitat is unavoidable or if it is not possible to release it at the capture location.

b) Transport and release the skink within one hour of capture in order to minimize stress on the animal.

c) Five-lined Skinks should not be relocated during their over-wintering season, which is generally from October to May. If you are unsure whether you should relocate the skink or take it to a wildlife custodian, contact MNR for further direction using the SAR Notification/Contact Schedule.

d) If it is not possible to relocate the skink due to the time of year (October to May) or other conditions, transport it to a wildlife custodian per the SAR Notification/Contact Schedule.

e) Five-lined Skinks should never be moved more than 100 metres from the location where they were found. Only move a skink as far as necessary to avoid potential harm to the skink, and avoid moving skinks more than 50 metres unless absolutely necessary. If it is not possible to relocate the animal within 100 metres of the capture location, contact MNR for further direction using the SAR Notification/Contact Schedule.

f) Always release Five-lined Skinks in the same type of natural habitat as the capture site.

g) If possible, release Five-lined Skinks near a retreat site, which is somewhere the animal can seek shelter from the elements and avoid predators (vegetation, rocks, logs or leaf litter). Do not release them in the open where they could be exposed to inclement weather, extreme sunlight or predators.

h) To release Five-lined Skinks, remove the lid and gently tip the container onto its side and allow the animal to leave on its own. If necessary, gently tip the container on an angle to slide the animal out.

3.6 Injured Five-lined Skinks

a) Use the methods outlined in section 3.2 to handle injured skinks whenever possible. If those methods are not applicable due to the skink's injuries, use a shovel or other thin, flat object to pick up the skink. Ensure that any injured areas are supported.

b) Place the Five-lined Skink in a small container with a lid that has air holes. Always create the air holes before putting the skink in the container.

c) Newspaper or paper towels may be added to the container to give the skink something to hide in. Do not place water, other skinks, food or anything else in the container with the skink.

d) Thoroughly wash your hands after handling injured skinks.

e) Immediately transport the skink to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase its chances of survival.

Five-lined Skink

4. Safe Handling of Amphibians

Important Note: Many amphibian species absorb oxygen through their skin as well as breathing with lungs; some species rely completely on their skin for respiration. If their skin dries out, they can suffocate. Therefore, careful handling of amphibians (especially salamanders) includes ensuring that their skin is kept moist.

4.1 Materials

a) The following materials are required for the handling, capture, temporary safe keeping and transport of amphibians:

- A pail, bucket or large plastic bin with a lid that has air holes (for frogs). Ensure both the side of the container and the lid are well marked “live animal”.
- Plastic kitchen-style container lined with paper towel (needs to be wet when used) with a lid that has air holes (for salamanders and toads). Ensure both the side of the container and the lid are well marked “live animal”.
- Thermometer
- SAR Notification/Contact Schedule
- SAR Encounter Reporting Form
- Net (optional)

b) Equipment must be acquired and maintained on each job site.

4.2 Capture and handling of salamanders, toads and frogs

Note: Eastern Newts have toxins in their skin and some salamanders may release a white, mildly toxic substance from their skin and tail. If ingested, these toxins may cause mild nausea. There is no risk associated with handling Ontario’s amphibians, provided you wash your hands afterwards. Toads will not give you warts.

Safely handle, move or capture a salamander, toad or frog by following these steps:

a) Always make sure your hands are clean and free of insect repellent, antibacterial hand sanitizer, sunscreen, etc. Amphibians have very wet, porous skin through which they absorb oxygen and other compounds. Harmful chemicals (such as bug repellent) are quickly absorbed through an amphibian’s skin and can cause serious damage to the animal.

b) If possible, wet your hands before picking up salamanders in order to avoid drying out their skin. Some species rely completely on their skin for respiration. If their skin dries out, they can suffocate and die. You can also ensure dampness is maintained by picking up some wet soil with the salamander.

c) Keep handling times to a minimum as oil produced by human skin can easily clog amphibian pores, causing suffocation in some species.

d) Always handle amphibians gently and slowly. Rough handling may cause injury or stress to the animal. Salamanders can drop their tail as an anti-predator defence, and may do so if they feel threatened (even if you are not holding them by the tail).

e) Never grab or pick up a salamander by the tail. This may cause the salamander to drop its tail (even if you are being gentle) and can be detrimental to the survival of the animal.

f) Capture a **frog or toad** using a net or pick it up with your hands by:

I. Cupping your hands over the frog or toad while it is on the ground. (You have to be quick!)

II. Closing your hand(s) to create a “cage” around the animal and picking it up. Note that they are slippery and can fit through small holes between your fingers.

III. If it is necessary to identify the species after picking it up, carefully allow it to partially crawl out of your hand between your thumb and forefinger and then gently tighten your grip around its back legs (near its waist), holding onto both back legs. Support its front legs with your other hand.

g) Pick up a **salamander or newt** by scooping it up in one or two hands and then closing your hands to create a “cage”. Note that these animals are slippery and can fit through small holes between your fingers.

h) Use a net, container or your hands to catch frog tadpoles or salamander larvae. A net is easiest.

4.3 Moving amphibians out of harm's way (distance under 25 metres)

a) If it is necessary to move an amphibian more than 25 metres, refer to section 4.5 on amphibian relocation.

b) Amphibians should only be moved when they are in imminent, unavoidable danger.

c) Salamanders do not move large distances and will tend to hide whenever possible. If there is the need to move a salamander, you will have to pick it up and move it (refer to section 4.2).

d) If possible, allow a frog and a toad to move on its own by walking toward it in the direction that you want it to move. If the frog or toad does not move on its own, you will have to pick it up and move it (see section 4.2).

e) When moving an amphibian out of harm's way, such as across a road, move it in the direction that it was heading, regardless of what the habitat looks like. These animals often make intentional movements to specific areas and if you put them back where they started they will simply turn around and start their journey again. If it is not clear which direction the animal was headed, move it to the closest suitable habitat that will not be disturbed. Suitable habitat includes: any shoreline habitat in the case of frogs; leaf litter, rocks or logs in a vegetated/forested area that the animal can hide under in the case of salamanders; any cover, such as rocks or vegetation, in the case of toads.

4.4 Temporary safe keeping and transportation of amphibians

a) You are responsible for this animal. Remember, once you have put it in a container, it depends on you to keep it safe, moist and at the right temperature.

b) Make sure that all containers that will be housing amphibians are thoroughly washed and rinsed and do not contain any soap or chemical residue.

c) Keep **frogs** in a pail, bucket or large plastic bin with a lid that has adequate air holes. Always create the air holes before putting the animal in the container. Fill the container with less than one inch of water. Frogs should never be fully submerged, or they will drown.

d) Keep **toads** in a pail, bucket, large plastic bin or plastic kitchen-style container with a lid that has adequate air holes. Always create the air holes before putting the animal in the container. Line the bottom of the container with wet paper towels.

e) Keep **salamanders** in a plastic kitchen-style container with a lid that has adequate air holes. Line the bottom of the container with wet paper towels.

f) Keep **newts and mudpuppies** in a pail, bucket, large plastic bin or plastic kitchen-style container with a lid, and fill the container with water. Replace water twice daily to ensure proper aeration, as these animals breathe through gills (like fish).

g) It is extremely important to monitor the air temperature regularly in the container to ensure it **never exceeds 25°C or drops below 5°C**. Never leave the container in direct sunlight or in a closed vehicle parked in the sun, as this will cause the animal to overheat and could be fatal.

h) **Never leave the container unattended** in an unsecured location (e.g., side of road).

4.5 Relocation of amphibians

a) Amphibians should only be relocated if the destruction of their habitat is unavoidable, or if it is not possible to release the animal at the capture location.

b) Transport and release it within one hour of capture in order to minimize stress on the animal.

c) Amphibians should not be relocated during their over-wintering season. This varies depending on the species and location, but is generally from October to May. If you are unsure whether you should relocate the animal or take it to a wildlife custodian, contact MNR for further direction using the SAR Notification/ Contact Schedule.

d) If it is not possible to relocate the animal due to the time of year (October to May) or other conditions, transport it to a wildlife custodian per the SAR Notification/Contact Schedule.

e) **Amphibians should never be moved more than 100 metres** from the location where they were found. Only move the amphibian as far as necessary to avoid potential harm to the amphibian, and avoid moving amphibians more than 50 metres unless absolutely necessary. If it is not possible to relocate the animal within 100 metres of the capture location, contact MNR for further direction using the SAR Notification/Contact Schedule.

f) Release amphibians as close as possible to the capture site.

g) Always release frogs and larvae in the same water body where they were found, or in the same type of natural habitat as the capture site.

h) Release salamanders and toads in the same type of natural habitat as the capture site.

i) If possible, release frogs, toads and salamanders near a retreat site, which is somewhere the animal can seek shelter from the elements and avoid predators (vegetation, rocks, logs or leaf litter in the case of salamanders; water or vegetation in the case of frogs). Do not release them in the open where they could be exposed to inclement weather, extreme sunlight or predators.

j) To release frogs, toads and salamanders, remove the lid and gently tip the container onto its side and allow the animal to leave on its own. If necessary, gently tip the container on an angle to slide the animal out of the container.

4.6 Injured amphibians

a) Use the methods outlined in section 4.2 to handle injured amphibians whenever possible. If those methods are not applicable due to the animal's injuries, use a shovel or other thin, flat object to pick up the animal. Ensure that any injured areas are supported.

b) Place the amphibian in a small container with a lid that has air holes and line the bottom of the container with wet paper towels. Always create the air holes before putting the animal in the container.

c) Newspaper or paper towels may be added to the container to give the amphibian something to hide in. Do not place water, other animals, food or anything else in the container with the individual.

d) Thoroughly wash your hands after handling injured amphibians.

e) Immediately transport the injured animal to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase its chances of survival.

Amphibians

5. Safe Handling of Birds

The protocol for handling birds is based on the size of the birds you may encounter.

Small Birds: e.g., Loggerhead Shrike, Prothonotary Warbler, Whip-poor-will

Large Birds: e.g., King Rail, Least Bittern, Peregrine Falcon

5.1 Materials

a) The following materials are required for the handling, capture, temporary safe keeping and transport of birds:

- Sturdy cardboard box or large plastic bin and lid with air holes. Ensure both sides of the box/container and the lid are well marked with “live animal”.
- Sheet or blanket large enough to cover a large bird
- Thick work gloves
- Safety glasses
- Thermometer
- Digital camera (optional)
- MNR Notification/Contact Schedule
- SAR Encounter Reporting Form

b) Equipment must be acquired and maintained on each job site.

5.2 Safety considerations

a) Generally, there is little risk associated with handling birds. However, some species can scratch or bite, and work gloves should be worn to help avoid minor injuries. Safety glasses are recommended for larger birds, especially the Least Bittern.

b) Always wash your hands after handling a bird. In addition, cloths, blankets and containers used to hold or transport birds should be washed with soap and water after each use. Discard a cardboard box after using it to hold or transport a bird.

5.3 Capture and handling of birds

a) The first consideration is to determine if the bird needs handling. It may be that the bird is healthy and can fly away. To find out, approach the bird slowly and wave your arms to make it fly or move away. Ensure that the direction in which the bird will fly is clear and free of obstruction. If this occurs (i.e., bird flies away), there is no need to proceed further with trying to catch it. If it doesn’t fly and instead crouches down or wobbles, indicating that it can’t fly, then it may be injured or a young bird not yet capable of flight.

c) Determine if it is a small or large bird from the list above. If possible, take a picture of the bird so that it can be identified without having to reopen the container.

Birds

d) **Small birds:** Use your bare or gloved hands, or the cloth or blanket, if that is more appropriate. Place your hands or the cloth/blanket over the bird around its body and over its wings to keep it from escaping. Gently pick it up and place it in the cardboard box or the large plastic bin. If it attempts to escape, work it towards a corner and attempt capture again.

e) **Large birds:** Use gloves and safety goggles for protection. Take the cloth or blanket and throw it over the bird to keep it from escaping. Use both hands to clasp the body of the bird through the cloth and gently restrain it. Pick up the bird, including the cloth, and place it all in the cardboard box/plastic bin. Free the bird from the cloth, remove the cloth, and then place the cover on the box.

If the bird jabs or bites at you during capture, use your gloved hand to fend off the attacks. Ensure it does not get close to your eyes if you are not wearing glasses.

f) Always handle birds carefully and gently, yet firmly. Birds may at any time struggle in an attempt to escape.

g) Never pick up a bird by the legs alone. Always support the body by grasping it around the wings.

5.4 Moving and releasing young birds or recovered birds

a) If the bird is a young bird incapable of long flight, it may be that its parents are nearby. Check around the site where the bird was found for the parents. If you locate parents, the young bird should be moved to a nearby tree, bush or ledge where the parents can attend to it and feed it. The location should be close to the parents and removed from danger. Watch the bird for 15 minutes and see if a parent attends to it.

b) In other cases, the captured bird may recover in the container and begin struggling to escape. In this case, you may wish to try releasing it in a natural habitat near where it was found. Place it in a location where it has shelter from the elements and can avoid predators. Allow it to move into cover. Do not release it in the open where it could be exposed to inclement weather, extreme sunlight or predators.

5.5 Temporary safe keeping and transportation of birds

a) You are responsible for this bird. Remember, once you have put it in a container, it depends on you to keep it safe and at the right temperature.

b) Always create air holes in the sides or lid of the box or container prior to placing the bird in it.

c) Place the box in a sheltered environment, preferably in the dark or semi-dark. This will quiet the bird down and let it rest.

d) Contact one of the MNR staff indicated on the SAR Notification/Contact Schedule. Ask for instructions on how to care for the bird. Send a picture of the bird if necessary.

e) It is extremely important to monitor the air temperature regularly in the container to ensure it **never exceeds 30°C or drops below 15°C**. Never leave the container in direct sunlight or in a closed vehicle parked in the sun, as this could cause the bird to overheat and could be fatal.

f) Never put more than one bird in a container at a time, especially raptors (Peregrine Falcon).

g) Once the bird is in the container, ensure that the lid is secure.

h) **Never leave the container unattended** in an unsecured location (e.g., side of road) or on the edge of a car seat.

i) Do not offer the bird any food or water unless instructed to do so following consultation with MNR staff on the SAR Notification/Contact Schedule.

j) Birds should be checked periodically (every hour should suffice). Young birds are especially susceptible to dehydration and must be carefully monitored during transport.

5.6 Evaluation and disposition of captured birds

a) Contact the MNR staff person listed on the SAR Notification/Contact Schedule immediately. Inform him or her of the capture and holding of the bird and ask for advice on the next steps.

b) It may be useful to take a picture of the bird for identification purposes. Send the photo to the MNR staff person or another person as requested.

c) You may be asked by the staff person to take the bird to a wildlife custodian.

5.7 Injured birds

a) If the bird is injured, immediately request and follow instructions given by the MNR staff person listed on the SAR Notification/Contact Schedule.

b) If so instructed, immediately transport the bird to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase the chances of the bird's survival.

6. Reporting Species at Risk Encounters

a) Contact MNR to report the occurrence (including dead animals) within the period of time set out in the permit or agreement, or within 24 hours if not stipulated. Report injured animals to MNR immediately.

b) Complete and submit the SAR Encounter Reporting Form, which includes the following information:

I. Name of Qualified Member

II. Contact number of Qualified Member

III. Date and time of the encounter

IV. Detailed location of the encounter (with lat-long or UTM coordinates, if possible). To obtain coordinates without a GPS, zoom into the area using Google Maps, right click on the location and select “what’s here?” from the right-click menu. The coordinates (in decimal degrees) will be provided to you in the Google Maps search bar.

V. Species encountered, with photo documentation, when possible. For assistance with species identification, see MNR’s *Ontario Species at Risk Quick Reference Guide*. Detailed species accounts can be found at **www.ontarionature.org/atlas** or the “Species Guides” at **www.torontozoo.com/AdoptAPond**.

VI. Action taken

Risk Encounters

7. Handling and Transporting Dead Animals

Dead species at risk that are encountered should be reported to the MNR as soon as possible. It is possible that the Ministry will request that the individual be stored and/or transported to the MNR.

Many researchers are currently studying the genetics of wild populations in Ontario, and genetic materials extracted from dead animals can make a valuable contribution to this research.

Examining a dead animal may provide important information about the cause of death or threats affecting the population.

If the MNR asks to see the species at risk and it is not possible to transport it on the same day it was found, the specimen should be stored in a freezer.

7.1 Materials

a) The following materials must be used for the handling and transport of dead species at risk:

I. A plastic resealable bag or plastic kitchen-style container with a tight lid with label “dead SAR for transport to MNR”

II. Permanent, water-resistant marker for labelling the bag or container with additional information, such as the date and location

III. Latex gloves or thick work gloves that can be washed

IV. Cooler with cold ice packs, if possible

V. SAR Notification/Contact Schedule

VI. SAR Encounter Reporting Form

7.2 Safety Considerations

Always wear gloves or wash your hands after handling any dead animal. Turtles (and many other animals) carry potentially harmful bacteria in their gut. Handling dead, rotting animals may also expose you to bacteria that can make you sick.

Handle a dead Massasauga with extreme caution

I. The snake’s venom is still a serious biohazard even after the snake is dead.

II. Never handle a dead Massasauga with your hands. Use a broom or sticks to place it into a container with a secure lid (not a bag).

III. Although unlikely, nerves can trigger the Massasauga’s bite reflex even after the snake is dead.

IV. In some situations, it can be very difficult to confirm that a snake is dead. For example, extreme shock can make a snake appear dead for several minutes until it slowly regains its senses. Unless you can confirm that the Massasauga is dead, always treat it as though it is alive and never place any part of your body within its potential strike range (approximately half of the snake’s body length).

Dead Animals

7.3 Handling a dead animal

a) Always make sure that an animal is actually dead before handling or capturing it. In some situations, live animals can easily be mistaken for being dead:

I. Extreme shock can make a reptile or amphibian motionless and appear dead for several minutes until it slowly regains its senses.

II. Air temperature controls the metabolism, and therefore the activity level, of reptiles and amphibians. If an over-wintering snake or turtle is encountered, it will only be 4 or 5°C and may be so inactive that it will appear dead. Very cold animals in the spring or fall may also be very inactive and appear dead until closely examined.

III. Eastern Hog-nosed Snakes sometimes play dead as a defensive strategy to deter predators. This display includes rolling onto their back with their mouth gaping open and tongue hanging out, regurgitating food or defecating and emitting a foul smell. It is very difficult to determine if this species is actually dead without manipulating the snake and carefully inspecting it. If you flip the snake onto its belly, it will often roll back over and continue to play dead.

7.4 Temporary storage of dead animals

a) Place the dead animal in a plastic resealable bag or container with a tight lid that will not leak. Always use a thick container with a secure lid for Massasauga rattlesnakes.

b) Do not place anything else in the container with the animal.

c) Label the container with “dead SAR for transport to MNR” as well as the date, location and name of the observer.

d) Place the bag or container in a freezer as soon as possible. If a freezer is not immediately available, place it in a cool place, preferably a cooler with ice packs.

e) If the animal cannot be delivered to MNR on the same day that it was found, place it in a freezer until it can be delivered to MNR.

8 Appendices

Appendix I - Definitions

Species at Risk (SAR) Notification/Contact Schedule:
A contact list provided by the Ministry of Natural Resources District Office to be used when immediate guidance is required concerning species at risk (SAR) encounters. This list will include Ministry of Natural Resources staff as well as local veterinarians and wildlife custodians.

Species at Risk (SAR) Encounter Reporting Form:
A reporting form provided by Ministry of Natural Resources that must be completed any time that a species at risk (SAR) is encountered.

Qualified Member:
An individual who has received training by, in consultation with, or in a manner approved by Ministry of Natural Resources to capture, handle, move and relocate species at risk (SAR).

Appendix II - References

Ontario Ministry of Natural Resources, Parry Sound and Sudbury District. *Draft Turtle and Snake Capture and Relocation Protocol For Hwy 69/400 ESA Authorization Requirements.* Revised January 19, 2011.

Parks Canada. *The Eastern Massasauga Rattlesnake Stewardship Guide: A Resource and Field Guide for Living with Rattlesnakes in Ontario*, Parks Canada, pp 84.

Karch, Mandy. 2008. *Standard Turtle Handling Practices and Protocols*. Prepared for the Ontario Ministry of Natural Resources and the Ontario Multi-species Turtles At Risk Recovery Team. 2008.

Unless otherwise noted, all photographs are credited to Jason Mortlock.

Appendix III - Equipment and Materials Checklist

The following materials must be acquired and maintained on each job site, and are required for the handling, capture, temporary safe keeping and transport of species at risk:

All Species (including for dead animals)

- ❑ Thermometer
- ❑ Plastic resealable bag or plastic kitchen-style container with a tight lid with label “dead SAR for transport to MNR”
- ❑ Permanent, water-resistant marker for labelling bag or container with additional information, such as the date and location
- ❑ Latex gloves or thick work gloves that can be washed
- ❑ SAR Notification/Contact Schedule (from MNR District Office – see Appendix IV)
- ❑ SAR Encounter Reporting Form (See Appendix V)

Additional Materials for Turtles

- ❑ Large plastic bin or bucket and lid with air holes, with both sides of the container and lid marked “live animal”
- ❑ Cloth/burlap bag with both sides marked “live animal”
- ❑ Broom or broom handle with small paint brush roller attached to end

Additional Materials for Snakes

- ❑ Pail, large garbage can or bucket with air holes in the lid, with side of the container and lid marked “live animal”
- ❑ A cloth snake bag (e.g., pillowcase) for non-venomous species only, marked “live animal”

For Massasaugas:

- ❑ Pail, large garbage can or bucket (1 metre deep) with air holes in the lid, with side of the container and lid marked “caution rattlesnake”
- ❑ Broom or broom handle with small paint brush roller holder attached to end

Additional Protective Gear to be Worn When Working in or near Massasauga Habitat

- ❑ High-ankle hiking or rubber boots
- ❑ Thick pants (jeans) or baggy pants
- ❑ Leather work gloves

Additional Material for Skinks

- ❑ Plastic kitchen-style container and lid with air holes, marked “live animal”

Additional Materials for Amphibians (Salamanders, Newts, Mudpuppies, Frogs, Toads)

- ❑ Pail, bucket or large plastic bin with a lid that has air holes (for frogs), both side of container and lid marked “live animal”
- ❑ Plastic kitchen-style container and lid with air holes, marked “live animal”
- ❑ Paper towels (to be moistened and put in plastic kitchen-style container)
- ❑ Net (optional)

Additional Materials for Birds

- ❑ Sturdy cardboard box or large plastic bin and lid with air holes, with both sides of box/container and lid marked “live animal”
- ❑ Sheet or blanket large enough to cover a large bird
- ❑ Safety glasses
- ❑ Digital camera (optional)

Appendix IV - SAR Notification/Contact Schedule

Appendices

Appendix V - SAR Encounter Reporting Form

Attachment C

Wildlife Rehabilitators

Wildlife Rehabilitators

The following wildlife rehabilitators are authorized by the Ministry of Natural Resources and Forestry to care for wildlife in distress until they can be released back into the wild. The following contacts were chosen due to their proximity to the Sarnia area and the type of wildlife they can accommodate. Facilities indicating HER include were selected as they can assist herpetofauna, which includes turtles, frogs, toads, snakes, and salamanders.

Authorization Holder	Facility	Phone	Location	Specie
Jenkins, Peggy	N/A	519-466-6636	Oil Springs	RVS, HER, SMM, LCA, SCA, SAM
Salt, Brian	Salt Haven	519-264-2440	Mt. Brydges	RVS, BIR, RAP, HER, SMM, SCA, UNG, SAM

https://www.ontario.ca/page/find-wildlife-rehabilitator

Attachment D

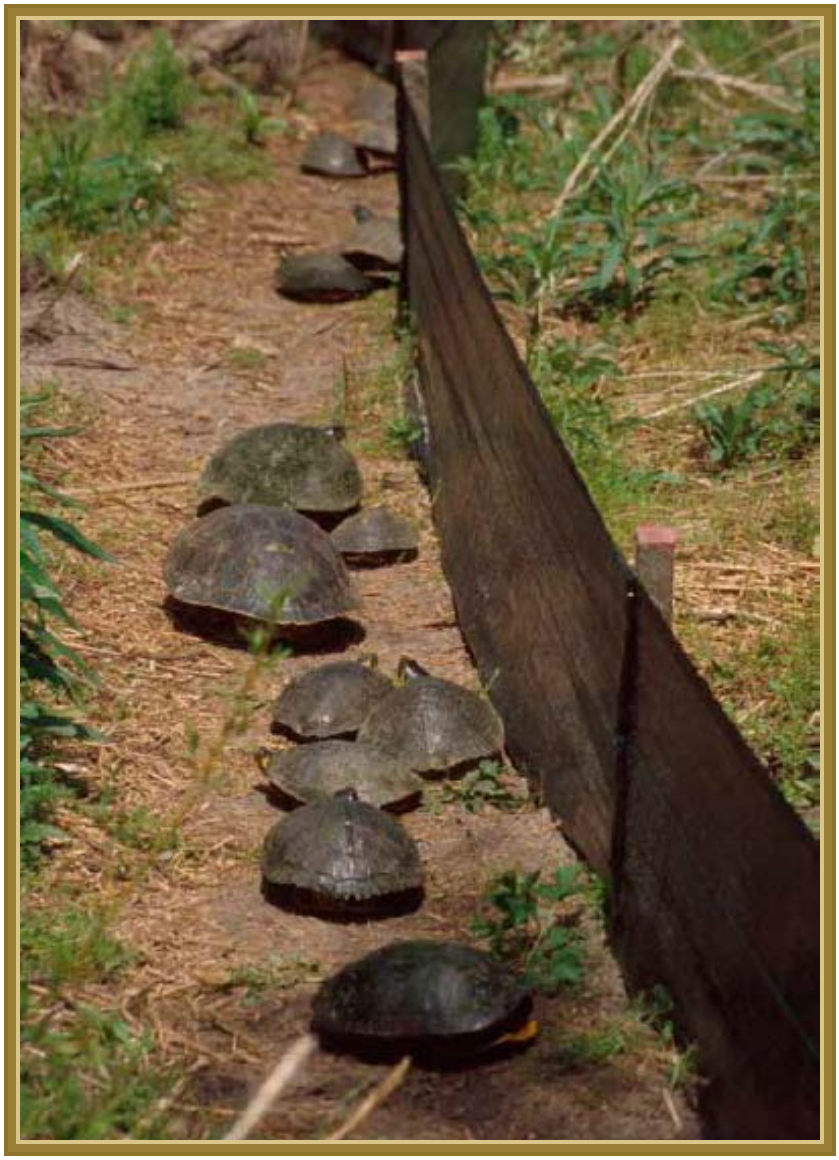
Reptile and Amphibian Exclusion Fencing

SPECIES AT RISK BRANCH
BEST PRACTICES TECHNICAL NOTE

REPTILE AND AMPHIBIAN EXCLUSION FENCING

Version 1.1

July 2013



July 2013

Ontario Ministry of Natural Resources
Species at Risk Branch

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

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

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

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

Document History

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

REPTILE AND AMPHIBIAN EXCLUSION FENCING - BEST PRACTICES -

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

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

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

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

EFFECTIVE FENCE CHARACTERISTICS

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

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

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

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

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

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

DURATION OF ACTIVITIES & DEGREE OF ANTICIPATED DISTURBANCE

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

GEOTEXTILE FENCES

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

Light-duty Geotextile Fencing:

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

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

To use light-duty geotextile fencing:

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

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

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

Heavy-duty Geotextile Fencing:

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

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

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

Heavy-duty geotextile fencing:

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

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

HARDWARE CLOTH FENCES

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

To use hardware cloth fencing:

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

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

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

WOOD LATH SNOW FENCING

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

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

To use wood lath snow fencing:

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

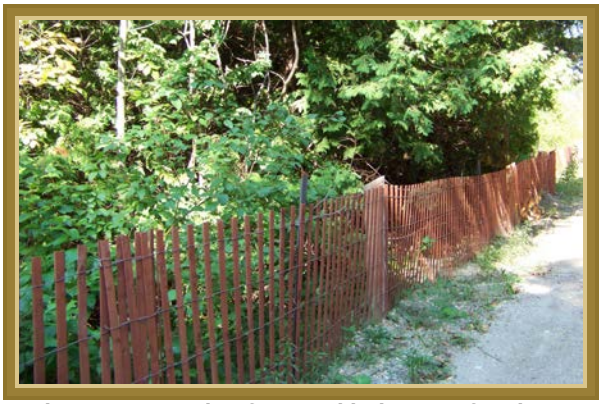

Plate 5. Example of a wood lath snow fencing used to exclude turtles (photo credit: Karine Beriault).

EXCLUSION FENCING FOR GRAY RATSNAKE AND EASTERN FOXSNAKE

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

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

CONCRETE, SHEET METAL & VINYL WALLS

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

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

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

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

HABITAT CONNECTIVITY

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

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

there are no gaps where animals can squeeze through.

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

GENERAL BEST PRACTICES:

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

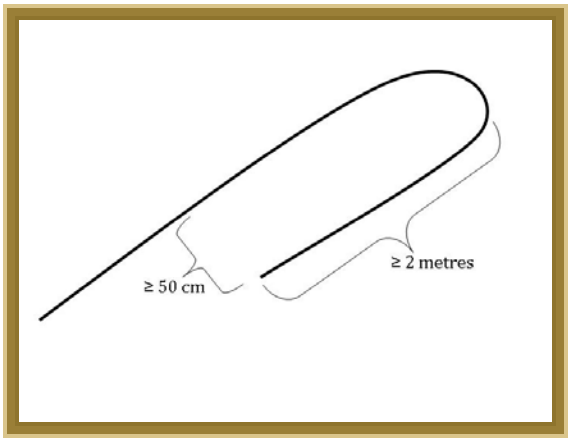

Figure 1. Diagram of the ends of the fence designed to curve inward in order to direct animals away from the area of exclusion.

WATER MOVEMENT & DRAINAGE

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

TOPOGRAPHY:

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

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

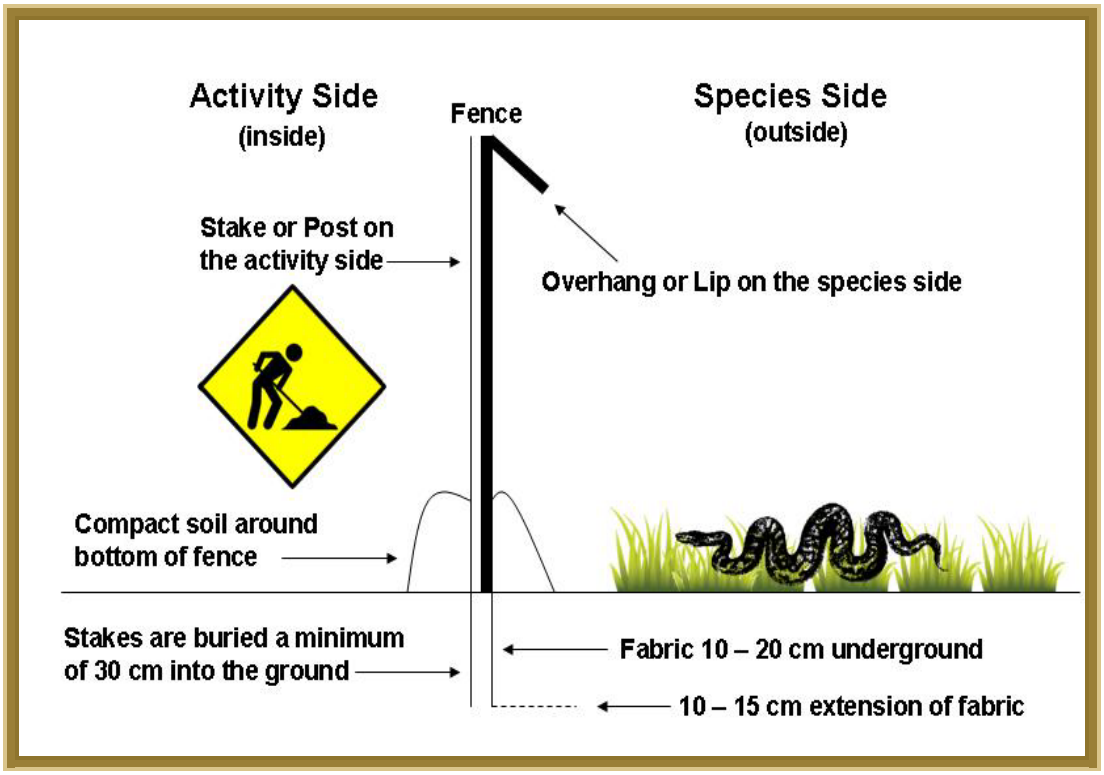

Figure 1. A side view of a basic exclusion fence including an overhang or flexible lip to deter animals from climbing or jumping over the fence. Placement of the stake on the Activity Side or on the inside of excluded area is also illustrated. This is particularly important for snake species which may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

RESOURCES:

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

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

For additional information:

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

ARCHAEOLOGICAL ASSESSMENT

1. A Stage 1 and 2 Archaeological Assessment ("AA") for the construction of temporary access roads and enlargement of well pads for TW1 and TW7 by Enbridge Gas was completed by Stantec. The AA is included as Attachment 1 to this Exhibit.

2. The Stage 1 and 2 AA was finalized on October 29, 2019 and was submitted to the Ministry of Tourism, Culture and Sport ("MTCS"). The Stage 1 and 2 AA was accepted into the Ontario Public Register of Archaeological Reports on November 5, 2019. An acceptance letter was provided by the MTCS, and a copy is included as Attachment 2 to this Exhibit.

3. The Stage 1 AA determined that the study areas exhibited potential for the identification and recovery of archaeological resources. As such, it was recommended that a Stage 2 AA be carried out in areas to be impacted by construction activities.

4. The Stage 2 AA identified no archaeological resources within the study areas and therefore, recommended that no further archaeological assessment of the study area was required.

Stage 1-2 Archaeological Assessment: Delta Pressure Project

Part of Lot 14, Concession 13,
Geographic Township of Sombra,
now Township of St. Clair,
Lambton County, Ontario

October 29, 2019

Prepared for:

Enbridge Gas Inc.
101 Honda Boulevard,
Markham, Ontario L6C 0M6

Prepared by:

Stantec Consulting Ltd.
600-171 Queens Avenue,
London, Ontario N6A 5J7

Licensee: Parker Dickson, MA
Licence Number: P256
Project Information Form #: P256-0593-2019
Project Number: 160951156

ORIGINAL REPORT

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Enbridge Gas Inc. (Enbridge) to complete a Stage 1-2 archaeological assessment for the Delta Pressure Project (the Project). The proposed Project includes upgrading the wellheads and installation of temporary access to the existing vertical wells (TW1 and TW7) associated with Enbridge's existing Wilkesport Designated Storage Area. The study area for the Project comprises approximately 0.19 hectares located on part of Lot 14, Concession 13, Geographic Township of Sombra, now Township of St. Clair, Lambton County, Ontario. The archaeological assessment is being completed during the preliminary planning phase of the Project. The Stage 1-2 archaeological assessment was carried out in accordance with the provisions of the *Ontario Heritage Act* (Government of Ontario 1990a) and the Ontario Energy Board's (OEB) established guidelines for the expansion of natural gas service in its *EBO 188 Report on Natural Gas Distribution System Expansion* (OEB 2016).

The Stage 1-2 archaeological assessment for the study area was conducted under Project Information Form number P256-0593-2019 issued to Parker Dickson, MA, by the Ministry of Tourism, Culture and Sport (MTCS). The study area is approximately 0.19 hectares and comprises ploughed agricultural field and two existing Enbridge wells. The Stage 1 archaeological assessment determined that the study area retained potential for the for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment was required. The Stage 2 archaeological assessment was completed on October 7, 2019.

No archaeological resources were identified during the Stage 1-2 archaeological assessment of the study area. Thus, in accordance with Section 2.2 and Section 7.8.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **no further archaeological work is required for the study area**.

The MTCS is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Project Personnel

Licensed Archaeologist:	Parker Dickson, MA (P256)
Project Manager:	Rooly Georgopoulos, B.Sc.
Licensed Field Director:	Darren Kipping (R422)
Field Technician:	Dylan Grant-Wilson
GIS Specialist:	Sean Earles, M.Sc.
Report Writer:	Parker Dickson, MA (P256)
Quality Review:	Jeffrey Muir, BA, CAHP (R304)
Independent Review:	Tracie Carmichael, BA, B.Ed. (R140)

Acknowledgements

Enbridge Gas Inc.:	Sarah Kingdon-Benson – Senior Environmental Analyst Kathy McConnell – Technical Manager Storage & Reservoir
Ministry of Tourism, Culture and Sport:	Robert von Bitter – Archaeological Sites Database Coordinator

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by Enbridge Gas Inc. (Enbridge) to complete a Stage 1-2 archaeological assessment for the Delta Pressure Project (the Project). The proposed Project includes upgrading the wellheads and installation of temporary access to the existing vertical wells (TW1 and TW7) associated with Enbridge's existing Wilkesport Designated Storage Area. The study area for the Project comprises approximately 0.19 hectares located on part of Lot 14, Concession 13, Geographic Township of Sombra, now Township of St. Clair, Lambton County, Ontario (Figure 1).

The archaeological assessment is being completed during the preliminary planning phase of the Project. Construction activities for the Project comprise the placement of a new temporary access road network which will provide access to TW1 and TW7. It also includes the enlargement of the existing well pads at TW1 and TW7 in order to allow for the placement of equipment. The Stage 1-2 archaeological assessment was carried out in accordance with the provisions of the *Ontario Heritage Act* (Government of Ontario 1990a) and the Ontario Energy Board's (OEB) established guidelines for the expansion of natural gas service in its *EBO 188 Report on Natural Gas Distribution System Expansion* (OEB 2016)

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 Archaeological Overview/Background Study are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork, and current land conditions;
- To evaluate the study area's archaeological potential which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives, Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historic, and environmental literature pertaining to the study area;
- A review of the land use history, including historical atlases; and
- An examination of the *Ontario Archaeological Sites Database* to determine the presence of known archaeological sites in and around the study area.

In compliance with the provincial standards and guidelines set out in the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 2 Property Assessment are as follows:

- To document archaeological resources within the study area;
- To determine whether the study area contains archaeological resources requiring further assessment; and

- To recommend appropriate Stage 3 assessment strategies for archaeological sites identified.

Permission to enter the study area to conduct the archaeological assessment was provided by Enbridge in consultation with individual landowner consent, as required.

1.2 HISTORICAL CONTEXT

The study area for the Project comprises approximately 0.19 hectares located on part of Lot 14, Concession 13, Geographic Township of Sombra, now Township of St. Clair, Lambton County, Ontario.

1.2.1 Post-contact Indigenous Resources

"Contact" is typically used as a chronological benchmark in discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

At the turn of the 16th century, the region of the study area is documented to have been occupied by the Western Basin Tradition archaeological culture (see Section 1.3.2). Following the turn of the 17th century, the region of the study area is understood to have been within the territory of the historic Fire Nation, an Algonquian group occupying the western end of Lake Erie. It is argued, however, that the Attiwandaron (Neutral) expanded extensively westward, displacing the Fire Nation and occupying the region of the current Municipality of Chatham-Kent (Lennox and Fitzgerald 1990:418-419). It is debated whether the Fire Nation was descendent from the archaeologically described Western Basin Tradition or if they migrated into the western part of Lake Erie, displacing a previous Indigenous culture (Murphy and Ferris 1990:193-194). Historians understand that the displaced Fire Nation moved across the St. Clair and Detroit Rivers into what is now lower Michigan and their populations are synonymous with the later historic Kickapoo, Miami, Potawatomi, Fox, and Sauk (Heidenreich 1990: Figure 15.1). Bkejwanong (Walpole Island) First Nation tradition states that Nations of the Three Fires (a political confederacy constituted of the Pottawatomi, the Ojibwa, and Ottawa) have occupied the delta of the St. Clair River and the surrounding region continually for thousands of years (Walpole Island First Nation [WIFN] n.d.). In 1649, the Seneca with the Mohawk led a campaign into southern Ontario and dispersed the resident Nations and the Seneca used the lower Great Lakes basin as a prolific hinterland for beaver hunting (Heidenreich 1978; Trigger 1978:345).

By 1690, Ojibwa speaking people had begun to displace the Seneca from southern Ontario. The economy, since the turn of the 18th century, focused on fishing and the fur trade, supplemented by agriculture and hunting (Konrad 1981; Rogers 1978). The study area falls within the traditional territory of the WIFN and the Aamjiwnaang (Sarnia) First Nation (AFN), the Wiiwkwedong and Aazhoodena (Kettle Point and Stony Point) First Nation (Lytwyn 2009), and the Deshkaan Ziibing Anishnaabeg (Chippewas of the Thames First Nation) (COTTFN). Some populations of Wyandot (a Nation of historically amalgamated Tionontate and Huron-Wendat populations) also had moved to the region of Lake St. Clair at the turn of the 18th century and resided with Three Fires Nations (Tooker 1978:398).

The expansion of the fur trade led to increased interaction between European and Indigenous people, and ultimately intermarriage between European men and Indigenous women. During the 18th century the progeny of these marriages began to no longer identify with either their paternal or maternal cultures, but instead as Métis. The ethnogenesis of the Métis progressed with the establishment of distinct Métis communities along the major waterways in the Great Lakes of Ontario. Métis communities were primarily focused around the upper Great Lakes and along Georgian Bay, however, Métis people have historically lived throughout Ontario (Métis Nation of Ontario 2019; Stone and Chaput 1978:607-608).

Together with the Pottawatomi, the Ojibway and Ottawa constituted a political confederacy known as the Three Fires. By 1730, it is reported that a community of approximately 300 people were living at the north end of Lake St. Clair (Rogers 1978:762). D'Anville's 1755 map (Konrad 1981: Plate 1) indicates the Mississauga (an Ojibway Nation) on the east bank of the St. Clair River. By 1760, the Chippewa community was established on the Thames River, southwest of present-day London, Ontario (COTTFN n.d.). By approximately 1790, the region of the study area was occupied by populations of Three Fires Nations as well as Wyandot. By 1796, the Three Fires community of Chenail Ecarté was established (Feest and Feest 1978:777-779).

Under British administration in the 19th century, the various Indigenous groups were divided into separate bands. The Anishinaabe included the western Algonquian peoples, among them the Chippewa and the Odawa. Until the 18th century, the central Algonquian-speaking peoples, including the Potawatomi, were located in the Michigan Peninsula (Blackbird 1887). In the middle of 18th century, the Chippewa were located on the south shores of Lake Huron, the east shores of Georgian Bay, and on the west end of Lake Ontario. Indigenous peoples and their communities continue to play a large role in the occupation of the study area and its environs.

Following the American Revolutionary War, Britain focused on the settlement of European immigrants into what became the province of Upper Canada in 1791. To enable widespread settlement, the British government negotiated a series of treaties with the First Nations peoples. Figure 2 provides a map of southwestern Ontario illustrating early treaties and purchases (Government of Canada n.d.), including a rectangular tract of land within which the study area is situated. On September 29, 1795, McKee obtained a preliminary agreement from several Ojibwa Chiefs to set apart land at Chenail Ecarté for the purpose of establishing a Reserve for those who lost their lands and homes during the last stages of the American Revolution War (Willig 2008). A preliminary agreement was signed by which the Crown offered to pay £1,200 for these lands (Willig 2008). On September 7, 1796, the Chenail Ecarté Treaty was signed by the Ojibwa and Odawa chiefs (Lytwyn 2009). Today, this treaty is more commonly identified as Treaty Number 7, identified by the letter "J" on Figure 3. This treaty comprises "…a tract of land near the River called Chenail Ecarte…[to include] the Township of Sombra in Lambton County and the Gore of Chatham Township in Kent County" (Morris 1943:21).

The nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon Indigenous territory. However, despite this shift, "written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to…systems of ideology and

thought" (Ferris 2009:114). As a result, Indigenous peoples have left behind archaeological resources throughout the region which show continuity with past peoples, even if they have not been explicitly recorded in Euro-Canadian documentation.

1.2.2 Euro-Canadian Resources

In 1791, the Provinces of Upper Canada and Lower Canada were created from the former Province of Quebec by an act of British Parliament. At this time, Colonel John Graves Simcoe was appointed as the Lieutenant Governor of Upper Canada and was tasked with governing the new province, directing its settlement and establishing a constitutional government modelled after that of Britain (Petrhyshyn 1985). In 1792, Simcoe divided Upper Canada into 19 counties consisting of previously settled lands, new lands opened for settlement, and lands not yet acquired by the Crown. These new counties stretched from Essex in the west to Glengarry in the east.

In discussing the late 19th century historical mapping it must be remembered that historical county atlases were produced primarily to identify factories, offices, residences, and landholdings of subscribers and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, all structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984). Review of historic mapping also has inherent accuracy difficulties due to potential error in geo-referencing. Geo-referencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in "fixed" locations over time (e.g., road intersections, road alignments, watercourses, etc.), errors and difficulties of scale, and the relative idealism of the historic cartography, historic maps may not translate accurately into real space points. This may provide obvious inconsistencies during the historic map review.

1.2.2.1 Lambton County

Lambton County was originally part of the District of Hesse, which in 1792 was renamed the Western District. The Western District consisted of Kent (which included Lambton) and Essex Counties, and was named after John George Lambton, first Earl of Durham. Lambton was the author of the Durham Report, which investigated the issues that led to the Upper Canada Rebellion of 1837. The townships in Lambton were not completely surveyed until 1835. After the *Municipal Act* of 1849, which provided a means of government for towns and counties, several counties amalgamated and separated over the next few years with the former Kent County. Lambton County finally became an independent county in 1853 (Elford 1982).

Euro-Canadian settlement of Lambton County began as early as 1796 as French settlers began living along the banks of the St. Clair River. Large-scale European settlement, however, did not begin until the 1830s. The majority of the surveyed lots in the townships of Lambton County were assigned to children of United Empire Loyalists, who sold their rights to early settlers. Early settlers were primarily tenant farmers from Britain as well as artisans and retired military men. The population of Lambton County swelled in the 1850s with the establishment of the Great Western Railway and the Great Trunk Railway. This growth remained steady until 1891, when the population peaked at 58,810 European settlers (Elford 1982).

1.2.2.2 Sombra Township

Originally named Shawnese Township, the Township of Sombra was surveyed in 1820 by Deputy Surveyor T. Smith (Dalgety 1984). It was the first block of land purchased by the Crown in Lambton County and was named Sombra (the Spanish word for shade) as it was heavily wooded. Survey records were examined for evidence of Aboriginal and early Euro-Canadian settlements in Sombra Township (Government of Ontario n.d.). An early survey plan of the township, drawn in 1820, depicts a sparsely populated block of land, with numerous areas identified as swamp and marsh land. The few land grant recipients noted on the survey are concentrated along major waterways, including the St. Clair River, Bear Creek (now Sydenham River), and Otter Creek. The 1820 survey of Sombra Township, confirmed by an examination of the accompanying field notes, notes an Indigenous presence in the township. In the southern portion of the township, along the banks of Bear Creek (now Sydenham River), there are two "Sugar Camps" and an "Indian Corn Field" illustrated. A third "Sugar Camp" is illustrated in the northwestern portion of the township. Figure 4 illustrates a portion of the 1820 survey map of Sombra Township near the study area; no Indigenous notations are depicted in the vicinity of the study area.

The Township of Sombra was poorly drained during early settlement by Euro-Canadian immigrants. In fact, Belden & Co. (1880:17) note that "…much of the area of the township is and for many years must continue to be a comparative swamp, though much is being done, and with effect too, to redeem the hitherto useless lands and increase the value of those already occupied by a system of drain which has already begun to bear good fruit, and will someday transform the whole of Sombra into a continuous expanse of valuable and fertile lands." The extent of modern-day municipal drains throughout Sombra Township attests to the concerted efforts of reclaiming land.

A portion of the Sombra Township map from the 1880 historical atlas of Lambton County (Belden & Co. 1880) is illustrated in Figure 5. Similar to the 1820 survey, settlement of the township in the late 19th century was initially dependent more on rivers than constructed roads as evidenced by landowner clustering along the St. Clair and Sydenham Rivers. The first post office in Sombra Township opened in 1851 in Sombra Village and later, in 1852, a post office was opened in Wilkesport (Dalgety 1984). A large number of lots on the 1880 map do not depict a landowner name or evidence of structures; however, this is due to the fact that only the names of subscribers to the *Dominion Atlas of Canada* were shown. For the portion of Lot 14, Concession 13 containing the study area, no landowners or structures are illustrated on the 1880 map of Sombra Township. As a result of municipal restructuring in 2001, the townships of Sombra and neighbouring Moore were amalgamated and re-identified as the Township of St. Clair.

The majority of the region surrounding the study area has been subject to European-style agricultural practices for over 100 years, having been settled by Euro-Canadian farmers by the late 19th century. Much of the region today continues to be used for agricultural purposes.

1.3 ARCHAEOLOGICAL CONTEXT

1.3.1 The Natural Environment

The study area is situated within the St. Clair Clay Plain physiographic region. This region is described as:

> *Adjoining Lake St. Clair in Essex and Kent County Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles. The region is one of little relief, lying between 575 and 700 feet a.s.l., except for the moraine at Ridgetown and Blenheim which rises 50 to 500 feet higher….Glacial Lake Whittlesey, which deeply covered all of these lands, and Lake Warren which subsequently covered nearly the whole area, failed to leave deep stratified beds of sediment on the underlying clay till except around Chatham, between Blenheim and the Rondeau marshes, and in a few other smaller areas. Most of Lambton and Essex Counties, therefore, are essentially till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action.*
>
> (Chapman and Putnam 1986:147)

The *Soil Survey of Lambton County* indicates that the only soil type mapped in the study area is the imperfectly drained Caistor clay (Matthews *et al*. 1957). Agricultural fields in this area commonly have tile drainage to increase the agricultural productivity. Although not ideal, these soil characteristics would have been suitable for Indigenous agricultural practices.

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southwestern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. The closest source of extant potable water is a branch of the North Sydenham River, located approximately 70 metres east of the study area.

1.3.2 Pre-contact Indigenous Resources

This portion of southwestern Ontario has been occupied by Indigenous peoples since the retreat of the Wisconsin glacier approximately 11,000 years ago. Much of what is understood about the lifeways of Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based in observed changes in formal lithic tools, and separated into the Early Paleo-Indian, Late Paleo-Indian, Early Archaic, Middle Archaic, and Late Archaic periods. Following the advent of ceramic technology in the Aboriginal archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. The

current understanding of Indigenous archaeological culture is summarized in Table 1 below, based on Ellis and Ferris (1990). The provided time periods are based on the "Common Era" calendar notation system, i.e., Before Common Era (BCE) and Common Era (CE).

Table 1: Generalized Cultural Chronology of the Study Area

Period	Characteristics	Time	Comments
Early Paleo-Indian	Fluted Projectiles	9,000 – 8,400 BCE	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8,400 – 8,000 BCE	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8,000 – 6,000 BCE	slow population growth
Middle Archaic	Brewerton-like Points	6,000 – 2,500 BCE.	environment similar to present
Late Archaic	Narrow Point	2,000 – 1,800 BCE	increasing site size
	Broad Point	1,800 – 1,500 BCE	large chipped lithic tools
	Small Point	1,500 – 1,100 BCE	introduction of bow hunting
Terminal Archaic	Hind Points	1,100 – 950 BCE	emergence of true cemeteries
Early Woodland	Meadowood Points	950 – 400 BCE	introduction of pottery
Middle Woodland	Couture Corded Pottery	400 BCE – 500 CE	increased sedentism
	Riviere au Vase Phase	500 – 800 CE	seasonal hunting and gathering
Late Woodland	Younge Phase	800 – 1200 CE	incipient agriculture
	Springwells Phase	1200 – 1400 CE	agricultural villages
	Wolf Phase	1400 – 1550 CE	earth worked villages, warfare
Contact Indigenous	Various Algonkian and Iroquoian Groups	1600 – 1875 CE	early written records and treaties
Historic	French/Euro-Canadian	1749 CE – present	European settlement

Local environmental conditions were significantly different from what they are today. Ontario's first peoples would have crossed the landscape in small groups in search of food, particularly migratory game species. In this area, caribou may have been a Paleo-Indian diet staple, supplemented by wild plants, small game, birds, and fish. Given the low density of populations on the landscape at this time and their mobile nature, Paleo-Indian sites are small and ephemeral. Such sites are sometimes identified by the presence of fluted points and are frequently located adjacent to the shorelines of large glacial lakes (Ellis and Deller 1990).

Archaeological records indicate subsistence changes around 8000 BCE at the start of the Archaic Period in southwestern Ontario. Since the large mammal species that formed the basis of the Paleo-Indian diet became extinct or moved north with the warming of the climate, Archaic populations had a more varied diet, exploiting a range of plants and bird, mammal, and fish species. Reliance on specific food resources like fish, deer, and several nut species became more noticeable through the Archaic Period and the presence of warmer, more hospitable environs led to expansion of group and family sizes. In the archaeological record, this is evident in the presence of larger sites. The coniferous forests of earlier times were replaced by stands of mixed coniferous and deciduous trees by about 4000 BCE. The transition to more productive environmental circumstances led to a rise in population density. As a result,

Archaic sites become more abundant over time. Artifacts typical of these occupations include a variety of stemmed and notched projectile points; chipped stone scrapers; ground stone tools (e.g., celts, adzes) and ornaments (e.g., bannerstones, gorgets); bifaces or tool blanks; animal bone; and chert waste flakes, a byproduct of the tool making process (Ellis *et al*. 1990).

Significant changes in cultural and environmental patterns occurred in the Early and Middle Woodland periods (*circa* 950 BCE to 800 CE). Occupations became increasingly more permanent in this period, culminating in major semi-permanent villages by roughly 1,000 years ago. Archaeologically, the most significant changes by Woodland peoples were the appearance of artifacts manufactured from modeled clay and the emergence of more sedentary villages. The earliest pottery was crudely made by the coiling method and early house structures were simple oval enclosures. The Early and Middle Woodland periods are also characterized by extensive trade in raw materials, objects and finished tools, with sites in Ontario containing trade items with origins in the Mississippi and Ohio River valleys (Spence *et al*. 1990).

By the Late Woodland period there was a distinctive cultural occupation in southwestern Ontario, including Essex, Kent, and Lambton counties. The primary Late Woodland occupants of this area were populations described by archaeologists as Western Basin Tradition. Murphy and Ferris (1990:189) indicate that these people had ties with populations in southeastern Michigan and northwestern Ohio and represent an *in situ* cultural development from the earlier Middle Woodland groups. The Western Basin Tradition seems to have been centred in the territory comprising the eastern drainage basin of Lake Erie, Lake St. Clair, and the southern end of Lake Huron. The Western Basin Tradition is divided up into four phases based on differences in settlement and subsistence strategies and pottery attributes.

1.3.3 Registered Archaeological Sites and Surveys

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MTCS who maintain the *Ontario Archaeological Sites Database*. The study area under review is located within Borden Block AeHo.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990b). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or

an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that there are seven registered archaeological sites within one kilometre of the study area (Government of Ontario 2019a). None of the seven registered archaeological sites are within 50 metres of the study area. Table 2 summarizes the registered archaeological sites within one kilometre.

Table 2: Registered Archaeological Sites within One Kilometre

Borden #	Site Name	Site Type	Cultural Affiliation
AeHo-23	Albert Perkins	Scatter	Multicomponent – Indigenous and Euro-Canadian
AeHo-31	Black Creek Line	Camp	Indigenous
AeHo-32	Kimball Road	Camp	Indigenous
AeHo-33	Kimball Road 2	Camp	Indigenous
AeHo-34	Robert Grant	Scatter	Multicomponent – Indigenous and Euro-Canadian
AeHo-35	Wilkesport	Unknown	Multicomponent – Indigenous and Euro-Canadian
AeHo-147	Zhashgaa Wiiskbing	Camp	Indigenous

Based on a query of the *Ontario Public Record of Archaeological Reports*, there are no previous archaeological assessments which document archaeological work within 50 metres of the study area (Government of Ontario 2019b).

1.3.4 Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by MTCS (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography and the general topographic variability of the area. Extensive land disturbance can eradicate archaeological potential (Government of Ontario 2011).

Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect sites locations and types to varying degrees. The MTCS categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;

- Secondary water sources: intermittent streams and creeks, springs, marshes, and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

The closest source of extant potable water is a branch of the North Sydenham River, located approximately 70 metres east of the study area. Additional ancient and/or relic tributaries of other primary and secondary water sources may have existed but are not identifiable today and are not indicated on historic mapping. Soil texture can be an important determinant of past settlement, usually in combination with other factors such as topography. As indicated previously, soil within the study area comprises the imperfectly drained Caistor clay that, while not ideal, would be suitable for Indigenous agriculture. An examination of the *Ontario Archaeological Sites Database* has shown that there are seven registered archaeological sites, each with an Indigenous archaeological component, within one kilometre of the study area (Government of Ontario 2019a).

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* (Government of Ontario 1990a) or property that local histories or informants have identified with possible historical events. The *Illustrated Historical Atlas of the Lambton County, Ontario* (Belden & Co. 1880) demonstrates that the region of the study area had been occupied by Euro-Canadian settlers by the late 19th century. Moreover, three of the seven registered archaeological sites within one kilometre of the study area include 19th century Euro-Canadian components. Much of the established road system and agricultural settlement from the 19th century is still visible today.

When the above listed criteria are applied, the study area retains potential for the identification of pre-contact Indigenous, post-contact Indigenous, and Euro-Canadian archaeological resources. Thus, in accordance with Section 1.3.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), a Stage 2 archaeological assessment is required.

1.3.5 Existing Conditions

The Stage 1-2 archaeological assessment for the study area was conducted under Project Information Form (PIF) number P256-0593-2019 issued to Parker Dickson, MA, by the MTCS. The study area comprises approximately 0.19 hectares, located on part of Lot 14, Concession 13, Geographic Township of Sombra, now Township of St. Clair, Lambton County, Ontario. The study area comprises ploughed agricultural field and two existing Enbridge wells.

2.0 FIELD METHODS

The Stage 1-2 archaeological assessment of the study area was conducted on October 7, 2019 under PIF # P256-0558-2018 issued to Parker Dickson, MA of Stantec by the MTCS. The study area comprises approximately 0.19 hectares and consists of ploughed agricultural field and two existing Enbridge wells. Prior to the start of the Stage 2 archaeological assessment, Enbridge provided preliminary mapping of the proposed impacts which defined the assessment area (i.e., study area). This mapping was then geo-referenced by Stantec's Geographical Information Services (GIS) team and a digital file (i.e., a shape file) was created of the Project's anticipated study area. The digital file was uploaded to handheld Global Positioning Service (GPS) devices for use in the field.

During the Stage 2 survey, the weather was overcast and cool. Overall, assessment conditions were excellent and at no time was the archaeological assessment conducted when the field, weather, or lighting conditions were detrimental to the identification and recovery of archaeological resources. Photographic documentation in Section 8.1 of this report confirms that field conditions met the requirements for a Stage 2 archaeological assessment, as per the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Section 7.8.6 Standard 1a; Government of Ontario 2011). An overview of the Stage 2 assessment methodology, as well as photograph locations and directions, is depicted on Figure 6 in Section 9.0 of this report.

Approximately 93% of the study area comprises well-weathered and ploughed agricultural field. This portion of the study area was subject to pedestrian survey at a five metre interval in accordance with Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Photos 1 to 3 illustrate the field conditions and the pedestrian survey of the study area. No further archaeological methods were employed as no artifacts were identified during the pedestrian survey.

The remaining portion of the study area, approximately 7%, comprises modern disturbance from the existing Enbridge gas wells. This portion of the study area was not surveyed. While this portion was not surveyed, it was photo documented (Photo 4). In accordance with Section 7.8.6 Standard 1b of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), photo documentation in Section 8.1 confirms that physical features affected the ability to survey portions of the study area.

3.0 RECORD OF FINDS

The Stage 1-2 archaeological assessment was conducted employing the methods described in Section 2.0. An inventory of the documentary record generated by fieldwork is provided in Table 3 below.

Table 3: Inventory of Documentary Record

Document Type	Current Location of Document Type	Additional Comments
2 pages of field notes	Stantec office, London, Ontario	In original field book and photocopied in project file
1 map provided by Enbridge	Stantec office, London, Ontario	Hard and digital copies in project file
13 digital photographs	Stantec office, London, Ontario	Stored digitally in project file

No archaeological resources were identified during the Stage 2 archaeological assessment of the study area, and so no material culture was collected. As a result, no artifact storage arrangements were required.

4.0 ANALYSIS AND CONCLUSIONS

The Stage 1 archaeological assessment determined that the study area retained potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment was required. The Stage 2 archaeological assessment was completed on October 7, 2019. No archaeological resources were identified during the Stage 2 survey.

5.0 RECOMMENDATIONS

No archaeological resources were identified during the Stage 1-2 archaeological assessment of the study area. Thus, in accordance with Section 2.2 and Section 7.8.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **no further archaeological work is required for the study area**.

The MTCS is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports.*

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. O.18 (Government of Ontario 1990a). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990a) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the *Ontario Public Register of Archaeological Reports* referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990a).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990a). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990a).

The *Funeral, Burial and Cremation Services Act,* 2002, S.O. 2002, c. 33 (Government of Ontario 2002), requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Government and Consumer Services is also immediately notified.

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8.0 IMAGES

8.1 PHOTOGRAPHS

Photo 1: Pedestrian survey of the study area, facing southeast

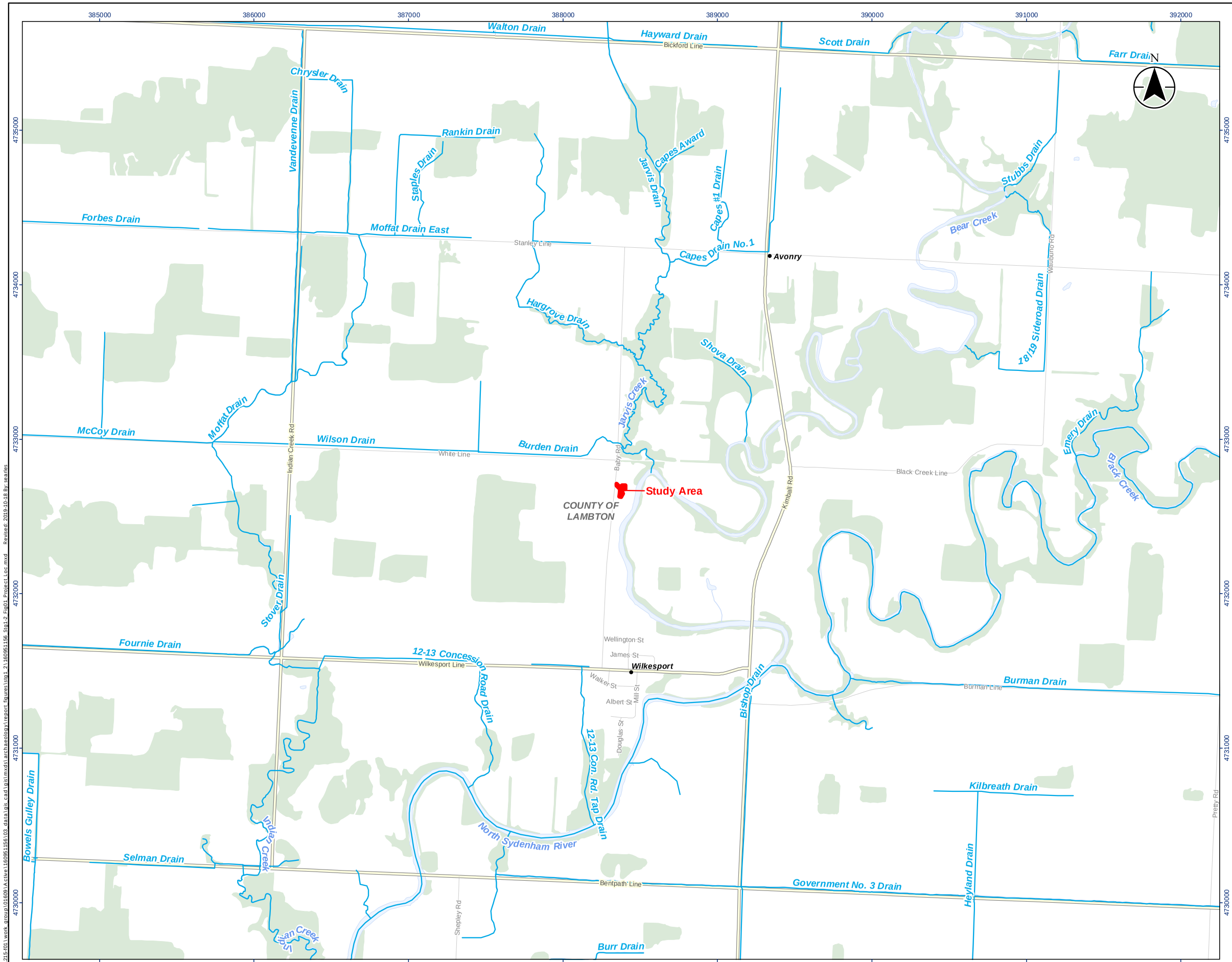
Photo 2: Pedestrian survey of the study area, facing east

Photo 3: Ground conditions during pedestrian survey, facing north

Photo 4: Existing Enbridge well within study area, facing southwest

9.0 MAPS

General maps of the study area will follow on succeeding pages.



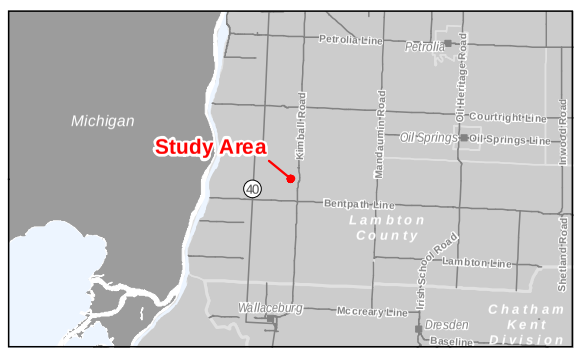
Stantec

Legend

- Study Area
- Constructed Drain
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary - Lower Tier
- Waterbody
- Wooded Area

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2019.



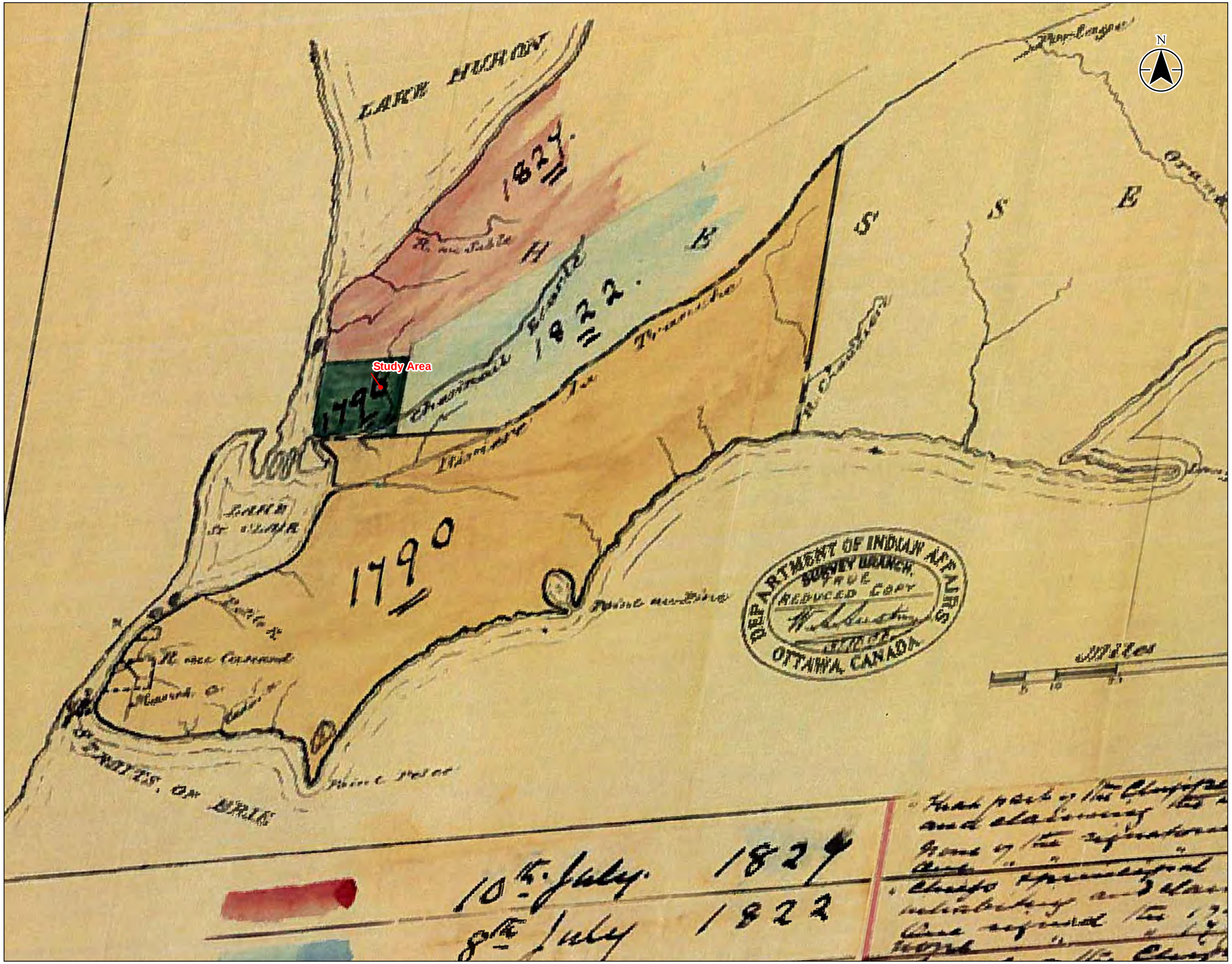
Project Location
Township Of St. Clair

160951156
Prepared by SPE on 2019-10-18
Quality Review by CC on 2019-10-18

Client/Project
ENBRIDGE GAS INC.

Figure No.
1

Title
Location of **the** Study Area



Stantec

Legend

Study Area (Approximate)

Notes
1. Not to Scale
2. Government of Canada. n.d.a. Map of Treaty Areas in Upper Canada. Ottawa: Department of Indian Affairs, Survey Branch.

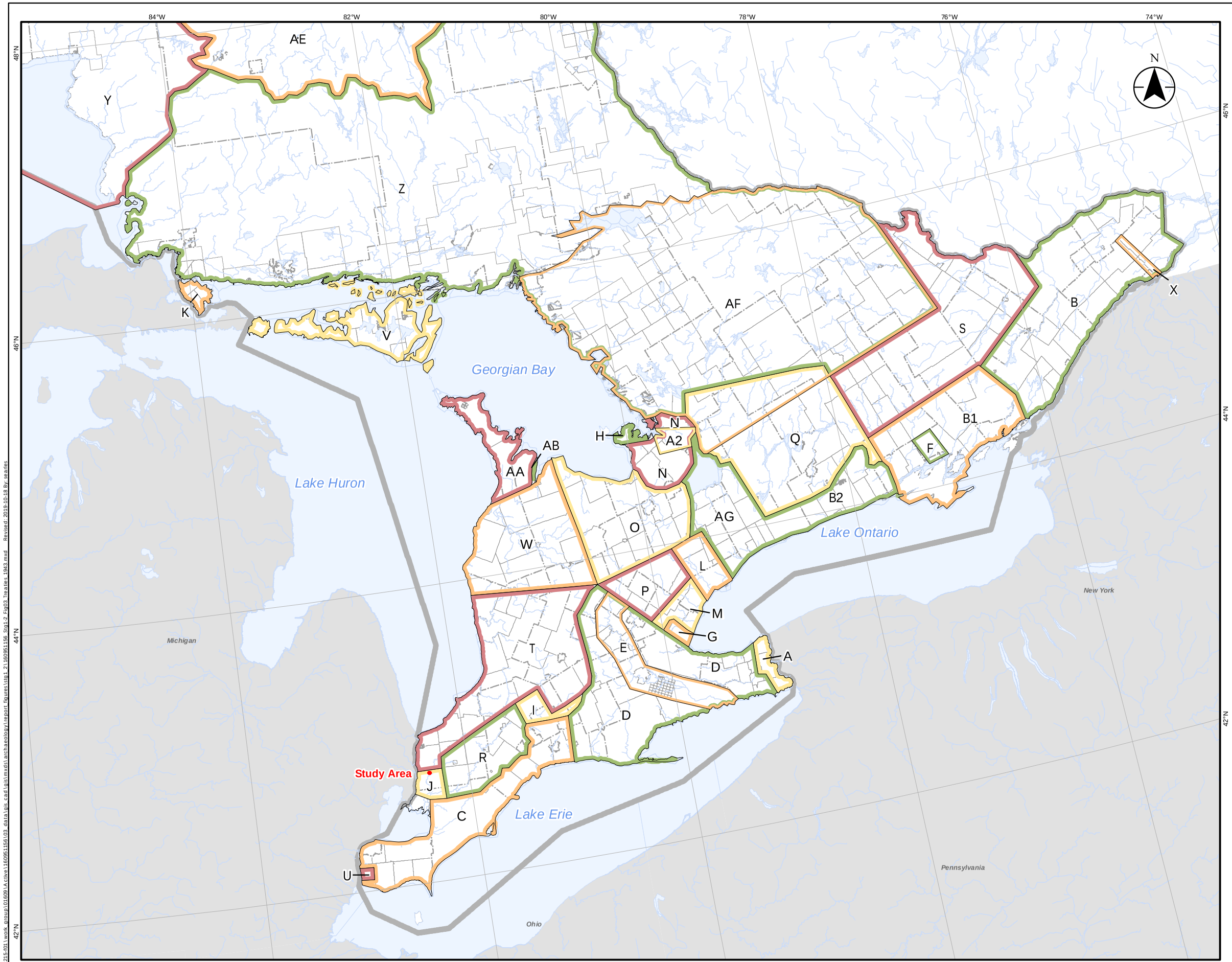
Project Location
Township Of St. Clair

160951156
Prepared by SPE on 2019-10-18
Quality Review by CC on 2019-10-18

Client/Project
ENBRIDGE GAS INC.

Figure No.
2

Title
Map of Treaty Areas in Upper Canada



Stantec

Legend

- Study Area
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower or Single Tier
- Watercourse
- Waterbody

A	Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
B	Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1	Crawford's Purchase, October 9th, 1783 (Mississauga)
B2	Crawford's Purchases, 1784, 1787 And 1788 (Mississauga)
A2	John Collins' Purchase, 1785 (Chippewa)
C	Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D	Treaty No. 3, December 2nd, 1792 (Mississauga)
E	Haldimand Tract:from the Crown to the Mohawk, 1793
F	Tyendinaga:from the Crown to the Mohawk, 1793
G	Treaty No. 3 3/4:from the Crown to Joseph Brant, October 24th, 1795
H	Treaty No. 5, May 22nd, 1798 (Chippewa)
I	Treaty No. 6, September 7th, 1796 (Chippewa)
J	Treaty No. 7, September 7th, 1796 (Chippewa)
L	Treaty No. 13, August 1st, 1805 (Mississauga)
M	Treaty No. 13A, August 2nd, 1805 (Mississauga)
N	Treaty No.16, November 18th, 1815 (Chippewa)
O	Treaty No. 18, October 17th, 1818 (Chippewa)
P	Treaty No. 19, October 28th 1818 (Chippewa)
Q	Treaty No. 20, November 5th, 1818 (Chippewa)
R	Treaty No. 21, March 9th, 1819 (Chippewa)
S	Treaty No. 27, May 31st, 1819 (Mississauga)
T	Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U	Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V	Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W	Treaty No. 45½, August 9th, 1836 (Saugeen)
X	Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Z	Treaty No. 61, September 9th, 1850 (Robinson Treaty:Ojibwa)
AA	Treaty No. 72, October 30th, 1854 (Chippewa)
AB	Treaty No. 82, February 9th, 1857 (Chippewa)
AF	Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG	Williams Treaty, October 31st, 1923 (Chippewa)

0 75 150 km

1:3,000,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint).

Project Location
Province of Ontario

160951156 REVA
Prepared by SPE on 2019-10-18
Quality Review by CC on 2019-10-18

Client/Project
ENBRIDGE GAS INC.

Figure No.
3

Title
Treaties and Purchases
(Adapted from Morris 1943)

\\cd1215-001.\work_group\01609\Active\160951156\03_data\gis_cad\gis\mxd\si_archaeology\report_figures\stg1_2\160951156_Stg1-2_Fig03_TreatiesPurchases_1943.mxd Revised: 2019-10-18 By: sandres

Stantec

Legend

Study Area (Approx.)

Notes
1. Not to Scale
2. Source: Government of Ontario. n.d.a. Crown Land Surveys. Personal communication: Lisa Caselman, Survey Records Clerk, Ministry of Natural Resources and Forestry.

Project Location
Township Of St. Clair

160951156
Prepared by SPE on 2019-10-18
Quality Review by CC on 2019-10-18

Client/Project
ENBRIDGE GAS INC.

Figure No.
4

Title
Portion of the 1820 Survey of Sombra Township

Stantec

Legend

Study Area (Approx.)

Notes
1. Not to Scale
2. Source: Belden & Co. 1880a. Illustrated Historical Atlas of Lambton Count, Ont. Toronto: H. Belden & Co.

Project Location
Township Of St. Clair

160951156
Prepared by SPE on 2019-10-18
Quality Review by CC on 2019-10-18

Client/Project
ENBRIDGE GAS INC.

Figure No.
5

Title
Portion of the 1880 Map of Sombra Township

Stantec

Legend

- Study Area
- Photo Location and Direction

Assessment Method

- Previously Disturbed, Low to No Archaeological Potential - No Further Archaeological Work Required
- Pedestrian Survey, 5 m Intervals

0 9.5 19 metres

1:500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery: © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS. Date of imagery, unknown.

Project Location

Township Of St. Clair

160951156

Prepared by SPE on 2019-10-21

Quality Review by CC on 2019-10-18

Client/Project

ENBRIDGE GAS INC.

Figure No.

6

Title

Stage 1-2 Assessment Methods and Results

10.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report. We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Quality Review 
(signature)

Jeffrey Muir – Senior Archaeologist

Independent Review 
(signature)

Tracie Carmichael – Managing Principal, Environmental Services

Ministry of Heritage, Sport, Tourism, Culture Industries

Archaeology Program Unit
Programs and Services Branch
Culture Division
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Archaeology@ontario.ca

Ministère des Industries du patrimoine, du sport, du tourisme et de la culture

Unité des programme d'archéologie
Direction des programmes et des services
Division de culture
401, rue Bay, bureau 1700
Toronto ON M7A 0A7
Archaeology@ontario.ca

Ontario

Nov 5, 2019

Parker S. Dickson (P256)
Stantec Consulting
171 Queens London ON N6A 5J7

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1-2 Archaeological Assessment: Delta Pressure Project, Part of Lot 14, Concession 13, Geographic Township of Sombra, now Township of St. Clair, Lambton County, Ontario ", Dated Oct 29, 2019, Filed with MTCS Toronto Office on N/A, MTCS Project Information Form Number P256-0593-2019, MTCS File Number 0011535

Dear Mr. Dickson:

The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.[1]

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to Archaeology@Ontario.ca

cc. Archaeology Licensing Officer
Sarah Kingdon-Benson,Enbridge Gas Inc.
Zora Crnojacki,Ontario Energy Board

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

RATES AND PROJECT FINANCING

1. The wellheads upgrades and the installation of emergency shut-down valves at the Black Creek, Coveny and Wilkesport pools within Enbridge Gas' storage system will form part of Enbridge Gas' unregulated storage operations. These upgrades will be funded by Enbridge Gas' shareholder. All costs associated with the wells will be captured in the unregulated accounts and no costs of the wells will be charged to the regulated utility accounts. Therefore there will be no rate impact to Enbridge Gas utility customers from the upgrade to the wells.

LAND USE REQUIREMENTS

Land Use – General

1. Land use requirements for Delta Pressuring the Pools will require the following features be constructed:
    - A temporary laneway and working area constructed of steel plating laid on top of the existing agricultural field to wells TW1 and TW7 in the Wilkesport DSA. The working area is shown in Attachment 1 to this Exhibit.
    - All other wells will be accessed via existing gravel laneways.

2. Attachment 2 to this Exhibit sets out the Affidavit of Title Search.

Negotiations to Date

3. Enbridge Gas has contacted the landowner where the temporary laneway and working area will need to be constructed. They are aware of the proposed work and at this time, have no concerns.

4. One landowner in the Coveny Pool has not been contacted as of yet, however all work will be completed off of the existing laneways. If any of this landowner's property is affected by the work, he will be compensated accordingly.

5. The contact information for the affected landowners can be found at Attachment 1 to this Exhibit.

6. All other lands are owned by Enbridge Gas.

7. Enbridge Gas is not aware of any unresolved land matters.

DELTA PRESSURE
2020

PROPERTY SKETCH SHOWING APPROXIMATE LOCATION
OF PROPOSED TEMPORARY LAND USE RIGHTS FOR
PT LT 14 CON 13 SOMBRA AS IN L384591; S/T L508098 AMENDED BY L556206;
S/T L827123; S/T L830307; S/T L442591, L839822; ST. CLAIR

OWNER: [redacted]

5 0 10 20 30 METRES
10 0 20 40 60 100 FEET

PART	APPROX. SIZE (metres)		APPROX. AREA		PART	APPROX. SIZE (metres)		APPROX. AREA	
	(width)	(length)	(hectares)	(acres)		(width)	(length)	(hectares)	(acres)
1 (TEMP)	IRREGULAR	IRREGULAR	0.2	0.5					

PIN: 434040097	SCALE: 1:1000	*ALL DISTANCES ARE APPROXIMATE.	DATE: 2019/09/18
			CAD NUMBER: PT2995

EB-2019-____

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998,* S.O. 1998, c. 15 (Schedule B);

AND IN THE MATTER OF an application by Enbridge Gas Inc. for permission to complete the proposed 2020 Storage Enhancement Project within the Coveny, Black Creek and Wilkesport Designated Storage Area.

AFFIDAVIT OF SEARCH OF TITLE

I, Ann L. Gray, of the City of Sarnia, Ontario, **MAKE OATH AND SAY AS FOLLOWS:**

1. I am a Free-Lance Title Searcher retained by Enbridge Gas Inc. (the "**Applicant**"), and as such have knowledge of the matters hereinafter deposed to.

2. On or about September 20, 2019, a search of title was conducted by myself, and abstracts of title and other title documents were obtained from the Land Registry Office for the Land Titles and the Land Registry Division of Lambton, in respect of the lands situate and surrounding the location of the Coveny, Black Creek and Wilkesport Designated Storage Area (the "**Subject Lands**"). The said searches were conducted for the purposes of determining the status of land tenure ownership and other registered interests or encumbrancers (collectively, "**Interested Parties**") of the Subject Lands.

3. As a result of the said searches conducted, I determined the Interested Parties of the Subject Lands who would be affected by the Coveny, Black Creek and Wilkesport Designated Storage Area. Attached and marked as Exhibit "A" is a list of all such Interested Parties.

4. The attached list of Interested Parties was compiled on the basis of the review of the existing and proposed Coveny, Black Creek and Wilkesport Designated Storage Area pursuant to plans provided to me and the searches of title undertaken in connection therewith. Addresses for service for such Interested Parties were derived from the registered documents and from municipal directories, where applicable.

SWORN before me at Sarnia,)
Ontario, this 6th day of)
November, 2019.)

A Commissioner for Taking Affidavits

Ann L. Gray

*This is **Exhibit "A"** to the Affidavit of*
Ann L. Gray, sworn before me
This 6th day of November, 2019

A Commissioner, etc.

COVENY POOL

PARTY	LAND	INTEREST	PIN NUMBER
[redacted]	Part of Lot 24, Concession 13, Sombra, St. Clair	Landowner	43393-0103
[redacted]	Part of Lot 22, Concession 12, Sombra, St. Clair	Landowner	43390-0059
[redacted]	Part of Lot 24, Concession 13, Sombra, St. Clair	Landowner	43393-0104
Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Part of Lot 23, Concession 12, Sombra, St. Clair	Landowner	43390-0060
The Corporation of the Township of St. Clair, 1155 Emily Street, Mooretown, ON N0N 1M0	Part of the Road Allowance between Conessions 12 & 13, Sombra, St. Clair	Landowner	43393-0054
[redacted]	Part of Lot 24, Concession 12, Sombra, St. Clair	Landowner	43390-0064
[redacted]	Part of Lots 22 & 23, Concession 13, and Part of Lot 23, Concession 13, MRO, Sombra, St. Clair	Landowner & Landholder--MRO	43393-0100
Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Part of Lot 23, Concession 13, Sombra, St. Clair	Landowner--SRO	43393-0101
Centra Gas Ontario Inc., 36 Charles Street East, Box 3040, North Bay, ON P1B 8K7	Parts of Lots 22, 23 & 24, Concession 12, and Parts of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	Lessee	43390-0059 43390-0060 43390-0064 43393-0100 43393-0103 43393-0104
Seven Oaks Resources Inc., Box 2273, Station A, London, ON N6A 4E3	Part of Lot 24, Concession 13, Sombra, St. Clair	Lessee	43393-0103

Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 22, 23 & 24, Concession 12,and Parts of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	Lessee, Agreement Holder	43390-0059 43390-0060 43390-0064 43393-0100 43393-0103 43393-0104
Henry A. True & David L. True, c/o True Oil LLC, 455 North Poplar Street, P.O. Drawer 2360, Casper, Wyoming USA 82602	Part of Lot 23, Concession 12, Sombra, St. Clair	Lessee, Agreement Holder	43390-0060
Ross Alfred Bradshaw, 2021 McCallum Line, Sombra, ON N3P 2R0	Part of Lots 22 & 23, Concession 13, and Part of Lot 23, Concession 13, MRO, Sombra, St. Clair	Life Interest Holder & Life Interest Holder--MRO	43393-0100
Canadian Imperial Bank of Commerce, 3461 St. Clair Parkway, Sombra, ON N0P 2H0	Part of Lot 24, Concession 13, Sombra, St. Clair	Mortgagee	43393-0103
Farm Credit Canada, Suite #200, 1133 St. George Blvd, Moncton, N.B. E1E 4E1	Part of Lot 22, Concession 12, Sombra, St. Clair	Mortgagee	43390-0059
National Trust Company Limited, 393 University Ave, 5th Floor, Toronto, ON M5G 2M7	Parts of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	Mortgagee	43393-0100 43393-0103
The Toronto-Dominion Bank, 827 Dufferin Ave., P.O.Box 100, Wallaceburg, ON N8A 4L5	Part of Lot 24, Concession 13, Sombra, St. Clair	Mortgagee	43393-0104
St. Clair Region Conservation Authority, 205 Millpond Crescent, Strathroy, ON N7G 3P9	Parts of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	Notice of Interest	43390-0100
The Corporation of the Township of St. Clair, 1155 Emily Street, Mooretown, ON N0N 1M0	Part of Lot 23, Concession 12, Sombra, St. Clair	Notice of Interest	43390-0060
Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 22, 23 & 24, Concession 12, and Part of Lots 22 & 23, Concession 13, Sombra, St. Clair	ROW/Easement	43390-0059 43390-0060 43390-0064 43393-0100

Transcanada Pipelines Limited, P.O.Box 1000, Station M, Calgary, Alberta T2P 4K5	Parts of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	ROW/Easement	43393-0100 43393-0103
Vector Pipeline Limited, 801 Upper Canada Drive, Sarnia, ON N7T 7H3	Part of Lots 22, 23 & 24, Concession 13, Sombra, St. Clair	ROW/Easement	43393-0100 43393-0103
Vector Pipeline Limited, 38705 Seven Mile Road, Suite 490, Livonia, Michigan USA 48152	Part of Lots 22 & 23, Concession 13, Sombra, St. Clair	Lessee	43393-0100

BLACK CREEK POOL

PARTY	LAND	INTEREST	PIN NUMBER
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0100
[redacted]	Part of Lot 16, Concession 11, Sombra, St. Clair	Landowner	43395-0071
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0099
Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0102
[redacted]	Part of Lot 15, Concession 12, Sombra, St. Clair	Landowner	43404-0055
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0101
[redacted]	Part of Lot 15, Concession 11, Sombra, St. Clair	Landowner	43403-0105
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0098
[redacted]	Part of Lot 16, Concession 12, Sombra, St. Clair	Landowner	43395-0056
[redacted]	Part of Lot 16, Concession 12, Sombra, St. Clair	Landowner	43395-0057
[redacted]	Parts of Lot 15, Concession 11, Sombra, St. Clair	Landowner	43403-0104

[redacted]	Parts of Lot 15, Concession 11, Sombra, St. Clair	Landowner	43403-0103
[redacted]	Part of Lot 14, Concession 12, Sombra, St. Clair	Landowner	43404-0066
[redacted]	Part of Lot 16, Concession 11, Sombra, St. Clair	Landowner	43395-0070
St. Clair Region Conservation Authority, 205 Millpond Crescent, Strathroy, ON N7G 3P9	Parts of Lots 14 & 15, Concession 12, Sombra, St. Clair	Landowner	43404-0056 43404-0064 43404-0067
The Corporation of the County of Lambton, 789 Broadway Street, Wyoming, ON N0N 1T0	Parts of Lots 14 & 15, Concessions 11, Part of Lot 15, Concession 12, Sombra, Part of the Road Allowance between Lots 15 & 16, Concessions 11 & 12 (Kimball Road), Part of the Road Allowance between Concession 11 & 12, (Bentpath Line) Sombra, St. Clair	Landowner	43395-0051 43395-0054 43404-0052
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Landowner	43403-0096
[redacted]	Part of Lot 16, Concession 12, Sombra, St. Clair	Landowner	43395-0055
[redacted]	Part of Lot 15, Concession 12, and Part of Lot 15, Concession 12 MRO, Sombra, St. Clair	Landowner & Landowner-- MRO	43404-0053
[redacted]	Part of Lot 15, Concession 12, SRO, Sombra, St. Clair	Landowner--SRO	43404-0054

[redacted]	Part of Lot 15, Concession 11, Sombra, St. Clair	Lessee	43403-0103
[redacted]	Part of Lot 14, Concession 11, Sombra, St. Clair	Lessee	43403-0096
Elexco Ltd., 555 Southdale Road East, London, ON N6E 1A2	Parts of Lot 14, Concession 12, Sombra, St. Clair	Lessee	43404-0064 43404-0067
Michigan Oil Company, c/o Albercan Oil Corporation, 360, 556-4th Avenue S.W., Calgary, AB T2A 3E7	Parts of Lot 14, Concession 12, Sombra, St. Clair	Lessee	43404-0064 43404-0067
Michigan Oil Company, 603 Lansing Avenue, Jackson, Michigan USA 49204	Parts of Lot 14, Concession 12, Sombra, St. Clair	Lessee	43404-0064 43404-0067
Atlas Oil & Gas Ltd., 1155 West Render Street, Vancourver, B.C.	Part of Lot 14, Concession 11, Parts of Lot 14, Concession 12, Sombra, St. Clair	Lessee, Agreement Holder	43403-0096 43404-0064 43404-0067
Dolphin Exlporations Ltd. (N.A.L.), 1155 West Render Street, Vancourver, B.C.	Part of Lot 14, Concession 11, Parts of Lot 14, Concession 12, Sombra, St. Clair	Lessee, Agreement Holder	43403-0096 43404-0064 43404-0067

Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 14, 15 & 16, Concessions 11, Parts of Lots 14, 15 & 16, Concession 12, Part of the Road Allowance between Lots 15 & 16, Concessions 11 & 12 (Kimball Road), Part of the Road Allowance between Concession 11 & 12, (Bentpath Line) Sombra, St. Clair	Lessee, Agreement Holder	43395-0051 43395-0054 43395-0055 43395-0056 43395-0057 43395-0070 43395-0071 43403-0096 43403-0098 43403-0099 43403-0100 43403-0101 43403-0102 43402-0103 43403-0104 43403-0105 43404-0052 43404-0053 43404-0054 43404-0055 43404-0056 43404-0064 43404-0066 43404-0067
LAGASCO Inc., 309 Commissioners Road West, Unit #D, London, ON N6J 1Y4	Parts of Lots 14, 15 & 16, Concession 11, Parts of Lots 14, 15 & 16, Concession 12, Sombra, St. Clair	Lessee, Agreement Holder	43395-0055 43395-0056 43395-0057 43395-0070 43403-0101 43403-0102 43403-0105 43404-0053 43404-0054 43404-0055 43404-0066
LAGASCO Inc., 2807 Woodhull Road, London, ON N6K 4S5	Parts of Lots 14, 15 & 16, Concession 11, Parts of Lots 14, 15 & 16, Concession 12, Sombra, St. Clair	Lessee, Agreement Holder	43395-0055 43395-0056 43395-0057 43395-0070 43403-0101 43403-0102 43403-0105 43404-0053 43404-0054 43404-0055 43404-0066

Canadian Imperial Bank of Commerce, P.O.Box 38, 802 Dufferin Ave., Wallaceburg, ON N8A 4L5	Parts of Lot 16, Concession 12, Sombra, St. Clair	Mortgagee	43395-0055 43395-0056
Farm Credit Canada, Suite #200, 1133 St. George Blvd, Moncton, N.B. E1E 4E1	Parts of Lots 14 & 16, Concession 11, Part of Lot 15, Concession 12, Sombra, St. Clair	Mortgagee	43395-0071 43403-0098 43404-0055
Mainstreet Credit Union Limited, 4348 St. Clair Parkway, Port Lambton, ON N0P 2B0	Part of Lot 14, Concession 11, Sombra, St. Clair	Mortgagee	43403-0099
Peter Charles Pollet & Janet Helen Pollet, 2 Circlefield Court, Courtice ON L1E 1L6	Part of Lot 16, Concession 12, Sombra, St. Clair	Mortgagee	43395-0057
Royal Bank of Canada, 180 Wellington St. West, 2nd Floor, Toronto, ON M5J 1J1	Part of Lot 14, Concession 11, Sombra, St. Clair	Mortgagee	43403-0100
The Toronto-Dominion Bank, 402 James & Duncan Streets, P.O.Box 100, Station Main, Wallaceburg, ON N8A 4L5	Part of Lot 14, Concession 11, Sombra, St. Clair	Mortgagee	43403-0096
The Toronto-Dominion Bank, 4720 Tahoe Blvd., 6th Floor, Mississauga, ON L4W 5P2	Part of Lot 15, Concession 12, SRO, Part of Lot 14, Concession 12, Sombra, St. Clair	Mortgagee	43404-0054 43404-0066
2035881 Ontario Inc., 2 Lansing Square, 11th Floor, Toronto, ON M2J 4P8	Part of Lot 15, Concession 12, SRO, Sombra, St. Clair	Notice of Interest	43404-0054
Crich Holdings and Building Limited, 560 Wellington Street, London, ON N6A 3R4	Parts of Lots 15 & 16, Concession 11, Parts of Lots 14, 15 & 16, Concession 12, Sombra, St. Clair	Notice of Interest	43395-0055 43395-0057 43395-0070 43403-0105 43404-0053 43404-0054 43404-0055 43404-0066
Michael Joseph Foulon, 1421 Kimball Side Road, Sombra, ON N0P 2H0	Part of Lot 15, Concession 12, and Part of Lot 15, Concession 12 MRO, Part of Lot 15, Concession 12 SRO, Sombra, St. Clair	Notice of Interest	43404-0053 43404-0054

Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 14, 15 & 16, Concession 11, and Parts of Lots 14 & 15, Concession 12, Sombra, St. Clair	ROW/Easement	43395-0070 43403-0096 43403-0102 43403-0103 43403-0104 43404-0053 43404-0054 43404-0055 43404-0056
Plains Midstream Canada ULC, Attn. Manager Land, 1400-607 8th Ave S.W., Calgary, AB T2P 0A7	Parts of Lot 15, Concession 11, and Parts of Lots 14 & 15, Concession 12, Sombra, St. Clair	ROW/Easement	43403-0103 43403-0105 43404-0053 43404-0055 43404-0056
St. Clair Region Conservation Authority, 205 Millpond Crescent, Strathroy, ON N7G 3P9	Parts of Lots 14, Concession 11, Parts of Lots 14, 15 & 16, Concession 12, Sombra, St. Clair	ROW/Easement/ Limited Interest	43395-0055 43403-0096 43403-0098 43404-0052 43404-0055 43404-0066

WILKESPORT POOL

PARTY	LAND	INTEREST	PIN NUMBER
[redacted]	Part of Lots 14 & 15, Concession 13, Sombra, St. Clair	Landowner	43404-0098
[redacted]	Part of Lot 13, Concession 14, Sombra, St. Clair	Landowner	43404-0140
[redacted]	Part of Lot 15, Concession 13, Sombra, St. Clair	Landowner	43404-0110
[redacted]	Part of Lots 13 & 14, Concession 13, Sombra, St. Clair	Landowner	43404-0087
[redacted]	Part of Lot 14, Concession 13, Sombra, St. Clair	Landowner	43404-0097
[redacted]	Part of Lot 16, Concession 13, Sombra, St. Clair	Landowner	43404-0114
[redacted]	Part of Lots 13 & 14, Concession 13, Sombra, St. Clair	Landowner	43404-0088
[redacted]	Part of Lot 15, Concession 13, Sombra, St. Clair	Landowner	43404-0111
[redacted]	Part of Lot 14, Concession 14, Sombra, St. Clair	Landowner	43404-0134
[redacted]	Parts of Lots 14 & 15, Concession 14, Sombra, St. Clair	Landowner	43404-0131
[redacted]	Part of Lots 13 & 14, Concession 13, Sombra, St. Clair	Landowner	43404-0088

[redacted]	Part of Lot 13, Concession 13, Sombra, St. Clair	Landowner	43404-0090
[redacted]	Part of Lot 15, Concession 13, Sombra, St. Clair	Landowner	43404-0109
[redacted]	Part of Lot 13, Concession 14, Sombra, St. Clair	Landowner	43404-0139
[redacted]	Part of Lot 13, Concession 14, Sombra, St. Clair	Landowner	43404-0142
[redacted]	Parts of Lots 15 & 16, Concession 13, Parts of Lots 15 & 16, Concession 13 MRO, Sombra, St. Clair	Landowner	43394-0087 43404-0105 43404-0106
[redacted]	Part of Lot 13, Concession 14, Sombra, St. Clair	Landowner	43404-0138
Minister of Natural Resources, Parliament Buildings, Parliament Hill, Toronto, ON M7A 1W3	Parts of Lots 15 & 16, Concession 13, Part of Lots 15 & 16, Concession 14, Sombra, St. Clair	Landowner	43404-0113 43404-0234 43404-0235 Unpatented land
[redacted]	Part of Lot 16, Concession 14, Sombra, St. Clair	Landowner	43404-0129
[redacted]	Part of Lot 14, Concession 13, Sombra, St. Clair	Landowner	43404-0096
St. Clair Region Conservation Authority, 205 Millpond Crescent, Strathroy, ON N7G 3P9	Part of Lot 16, Concession 13, Sombra, St. Clair	Landowner	43394-0085

The Corporation of the County of Lambton, 789 Broadway Street, Wyoming, ON N0N 1T0	Parts of Lots 15 & 16, Concessions 13, Parts of Lot 16, Concession 14, Part of the Road Allowance between Lots 15 & 16, Concessions 13 & 14 (Kimball Road), Part of the Road Allowance between Concession 13 & 14, (White Line), Parts of Lot 14, Concession 13, (Baby Road), Part of Lot 15, Concession 13 SRO (Kimball Road,) Sombra, St. Clair	Landowner	43394-0051 43404-0092 43404-0104 43404-0107 43404-0117 43404-0118 43404-0119 43404-0120 43404-0121, 43404-0122, 43404-0123, 43404-0124 43404-0128 43404-0133
The Corporation of The Township Of St. Clair 1155 Emily Street, Mooretown ON N0N 1M0	Parts of Lots 14 & 16, Concession 13, Sombra, Part of the Road Allowance between Concessions 13 & 14, (White Line) (Black Creek Line), Part of the Road Allowance between Lots 15 & 16, Concessions 13 & 14, George Street, Plan 5, Wellington Street, Plan 5, William Street, Plan 5, Sombra, St. Clair	Landowner	43394-0083 43404-0095 43404-0116 43404-0117 43404-0118 43404-0119 43404-0120 43404-0121, 43404-0122, 43404-0123, 43404-0124 43404-0128 43404-0170 43404-0171 43404-0172
[redacted]	Parts of Lots 15 & 16, Concession 13, Parts of Lots 15 & 16, Concession 14, Sombra, St. Clair	Landowner	43404-0112 43404-0115 43404-0125 43404-0130
[redacted]	Parts of Lot 13, Concession 14, Sombra, St. Clair	Lessee	43404-0138 43404-0139 43404-0140 43404-0142
BP Exploration Canada Ltd., 335 8th Avenue SW, Calgary, AB	Parts of Lots 14 & 15, Concession 14, Sombra, St. Clair	Lessee	43404-0131
[redacted]	Part of Lots 14 & 15, Concession 13, Sombra, St. Clair	Lessee	43404-0098

Elexco Ltd., 555 Southdale Road East, London, ON N6E 1A2	Part of Lot 13, Concession 14, Sombra, St. Clair	Lessee	43404-0142
912176 Ontario Limited 3501 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 13, 14, 15 & 16, Concession 13, Parts of Lots 13, 14 & 15, Concession 14, Sombra, St. Clair	Lessee, Agreement Holder	43394-0085 43394-0087 43404-0087 43404-0088 43404-0095 43404-0096 43404-0097 43404-0098 43404-0105 43404-0106 43404-0109 43404-0110 43404-0111 43404-0112 43404-0114 43404-0115 43404-0116 43404-0125 43404-0129 43404-0130 43404-0131 43404-0134 43404-0138 43404-0139 43404-0140 43404-0142
ELS and Company Inc., P.O.Box 969, Grand Bend, ON N0M 1T0	Parts of Lot 16, Concession 13, Sombra, St. Clair	Lessee, Agreement Holder	43394-0085

Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 13, 14, 15 & 16, Concession 13, Parts of Lots 13, 14 & 15, Concession 14, Sombra, Part of the Road Allowance between Concessions 13 & 14 , (White Line), Part of the Road Allowance between Lots 15 & 16, Concessions 13 & 14, Sombra, St. Clair	Lessee, Agreement Holder	43394-0085 43404-0087 43404-0087 43404-0088 43404-0095 43404-0096 43404-0097 43404-0098 43404-0105 43404-0106 43404-0109 43404-0110 43404-0111 43404-0112 43404-0114 43404-0115 43404-0116 43404-0117 43404-0125 43404-0129 43404-0130 43404-0131 43404-0134 43404-0138 43404-0139 43404-0140 43404-0142
Imperial Oil Limited 505 Quarry Park Blvd., Calgary, AB T2C 5N1	Parts of Lot 16, Concession 13, Sombra, St. Clair	Lessee, Agreement Holder	43394-0085 43394-0087
Union Pacific Resources Inc., 4500-855 2nd Street S.W., Calgary, AB T2P 4K7	Parts of Lot 16, Concession 13, Sombra, St. Clair	Lessee, Agreement Holder	43394-0085
Bank of Montreal, 70 James Street, Wallaceburg, ON N8A 2P5	Part of Lot 14, Concession 14, Sombra, St. Clair	Mortgagee	43404-0134
[redacted]	Part of Lots 13 & 14, Concession 13, Sombra, St. Clair	Mortgagee	43404-0087
Farm Credit Canada, Suite #200, 1133 St. George Blvd, Moncton, N.B. E1E 4E1	Part of Lots 13 & 14, Concession 13, Sombra, St. Clair	Mortgagee	43404-0088

Mainstreet Credit Union Limited, 1295 London Road, Sarnia, ON N7S 1P6	Parts of Lots 15 & 16, Concession 13, Parts of Lots 15 & 16, Concession 14, Sombra, St. Clair	Mortgagee	43404-0112 43404-0115 43404-0125 43404-0130
Royal Bank of Canada, 10 York Mills Road, 3rd Floor, Toronto, ON M2P 0A2	Part of Lot 14, Concession 13, Sombra, St. Clair	Mortgagee	43404-0096
The Bank of Nova Scotia, 541 James Street, Wallaceburg, ON N8A 2P1	Parts of Lots 14 & 15, Concession 14, Sombra, St. Clair	Mortgagee	43404-0131
The Bank of Nova Scotia, 10 Wright Blvd., Stratford, ON N4Z 1H3	Part of Lot 13, Concession 14, Sombra, St. Clair	Mortgagee	43404-0142
The Toronto-Dominion Bank, 402 James & Duncan Streets, P.O.Box 100, Station Main, Wallaceburg, ON N8S 4L5	Part of Lot 14, Concession 13, Sombra, St. Clair	Mortgagee	43404-0097
[redacted]	Part of Lot 15, Concession 13, Sombra, St. Clair	Notice of Interest	43404-0111
[redacted]	Parts of Lot 14, Concession 13, Sombra, St. Clair	Notice of Interest	43404-0095 43404-0096
The Corporation of The Township Of St. Clair 1155 Emily Street, Mooretown ON N0N 1M0	Parts of Lots 14 & 15, Concession 13, Sombra, St. Clair	Notice of Interest	43404-0098 43404-0105
Canada Mortgage and Housing Corporation, 700 Montreal Road, Ottawa, ON K1A 0P7	Part of Lot 16, Concession 13, Sombra, St. Clair	Notice of Interest--Sheriff Writ	43404-0114 43404-0116
Dome NGL Pipeline Ltd., 240-4th Avenue S.W., Calgary, AB T2P 4H4	Part of Lot 15, Concession 13, Sombra, St. Clair	ROW/Easement	43404-0105

Enbridge Gas Inc., 3595 Tecumseh Road, Mooretown, ON N0N 1M0	Parts of Lots 13, 14, 15 & 16, Concession 13, Part of Lot 14, Concession 14, Sombra, St. Clair	ROW/Easement	43394-0085 43394-0087 43404-0087 43404-0096 43404-0097 43404-0098 43404-0134 43404-0235
Imperial Oil Limited 505 Quarry Park Blvd., Calgary, AB T2C 5N1	Part of Lots 14 & 15, Concession 13, Sombra, St. Clair	ROW/Easement	43404-0098
Plains Midstream Canada ULC, Attn. Manager Land, 1400-607 8th Ave S.W., Calgary, AB T2P 0A7	Parts of Lots 14 & 15, Concession 13, Part of Lots 14 & 15, Concession 14, Sombra, St. Clair	ROW/Easement	43404-0098 43404-0105 43404-0106 43404-0110 43404-0111 43404-0131 43404-0234
The Corporation of The Township Of St. Clair 1155 Emily Street, Mooretown ON N0N 1M0	Parts of Lots 15 & 16, Concession 13, Sombra, St. Clair	ROW/Easement	43404-0105 43404-0115
The Hydro-Electric Power Commission of Ontario (Ontario Hydro) 185 Clegg Road, P.O. Box 4300, Internal R32, Markham, ON L6G 1B7	Parts of Lots 15 & 16, Concession 13, Part of Lot 13, Concession 14, Sombra, St. Clair	ROW/Easement	43394-0051 43394-0085 43404-0104 43404-0115 43404-0142
[redacted]	Part of Lot 15, Concession 13, Sombra, St. Clair	Notice of Interest	43404-0106
[redacted]	Part of Lot 13, Concession 14, Sombra, St. Clair	Notice of Interest	43404-0142

St. Clair Region Conservation Authority, 205 Millpond Crescent, Strathroy, ON N7G 3P9	Parts of Lots 14, 15 & 16, Concession 13, Parts of Lots 14 & 15, Concession 14, Sombra, Part of the Road Allowance between Concessions 13 & 14 , (White Line), Sombra, St. Clair	ROW/Easement/ Limited Interest	43394-0085 43394-0087 43404-0095 43404-0096 43404-0097 43404-0098 43404-0104 43404-0105 43404-0106 43404-0107 43404-0110 43404-0111 43404-0112 43404-0113 43404-0114 43404-0115 43404-0116 43404-0125 43404-0129 43404-0130 43404-0131 43404-0134

INDIGENOUS[1] CONSULTATION

1. Enbridge Gas Inc. ("Enbridge Gas") is committed to creating processes that support meaningful engagement with potentially affected Indigenous groups (First Nations and Métis). Enbridge Gas works to build an understanding of project related interests, ensure regulatory requirements are met, mitigate or avoid project-related impacts on Aboriginal interests including rights, and provide mutually beneficial opportunities where possible.

2. Pursuant to the Ontario Energy Board's Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition, 2016, Enbridge Gas provided the Ontario Ministry of Energy, Northern Development and Mines ("MENDM") with a project description for the Black Creek, Coveny and Wilkesport pools ("Project") on August 1, 2019. This Project description is set out at Attachment 1 to this Exhibit.

3. Subsequently, on September 23, 2019, Enbridge Gas received a letter from the MENDM indicating that the MENDM did not anticipate any appreciable adverse impact on the asserted or established rights of First Nation or Métis communities. Based on this determination, no duty to consult was triggered and the MENDM will not be providing a letter of opinion regarding the sufficiency of consultation. This letter is found at Attachment 2 to this Exhibit.

4. Should new information on the Project become available that indicates a potential to impact Aboriginal and treaty rights, Enbridge Gas will notify the MENDM.

[1] Enbridge Gas has used the terms "Aboriginal" and "Indigenous" interchangeably in its application. "Indigenous" has the meaning assigned by the definition "aboriginal peoples of Canada" in subsection 35(2) of the *Constitution Act, 1982.*

ENBRIDGE

Joel Denomy
Technical Manager,
Regulatory Applications
Regulatory Affairs

tel 416-495-5676
fax 416-495-6072
EGIregulatoryproceedings@enbridge.com

Enbridge Gas Inc.
500 Consumers Road
North York, Ontario M2J 1P8
Canada

August 1, 2019

VIA EMAIL – Shannon.McCabe@ontario.ca

Ministry of Energy, Northern Development and Mines
Shannon McCabe
Manager, Indigenous Energy Policy
Unit 77 Grenville St.
6th Floor
Toronto, ON
M7A 2C1

Dear Ms. McCabe:

Re: 2020 Storage Enhancement Project

The *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition* (the "Guidelines") issued by the Ontario Energy Board (the "Board") indicate that a project applicant shall provide the Ministry of Energy, Northern Development and Mines (the "Ministry") with a description of a project, in the planning process, such that the Ministry can determine if there are any Duty to Consult requirements for the project.

The purpose of this letter is to inform the Ministry that Enbridge Gas Inc. ("Enbridge Gas") intends to increase the maximum operating pressure ("MOP") of three storage pools (the "Project"). The three storage pools are: the Black Creek pool, the Coveny pool and the Wilkesport pool. All three pools are part of Enbridge Gas' Tecumseh storage operations. Each of the pools is a designated storage area as defined in the *Ontario Energy Board Act, 1998*.

The Project will require upgrades to wellheads at each of the storage pools. No other new facilities are required for the Project. Enbridge Gas will be applying to the Board for leave to vary the MOP of each of the three storage pools. Enbridge Gas is therefore contacting the Ministry to determine whether the Project triggers the Duty to Consult.

Attachment 1 contains a description of the Project's characteristics and its location for the Ministry's review and to assist it with its determination as to whether it will delegate the procedural aspects of the Duty to Consult to Enbridge Gas. While work on the Project is still in its early stages, Enbridge Gas would be pleased to discuss the Project with you should you have any questions.

Regards,

Joel Denomy, M.A. CFA
Technical Manager, Regulatory Applications
Enbridge Gas Inc.

416-495-5676

Cc: Emma Sharkey, Ministry of Energy, Northern Development and Mines

Attachment 1: 2020 Storage Enhancement Project

1.0 Project Summary

Enbridge Gas Inc. ("Enbridge Gas") intends to increase the maximum operating pressure ("MOP") of three storage pools (the "Project"). The three storage pools are: the Black Creek pool, the Coveny pool and the Wilkesport pool. All three pools are part of Enbridge Gas' Tecumseh storage operations. Each of the pools is a designated storage area ("DSA") as defined in the *Ontario Energy Board Act, 1998*.

Increasing the MOP of the storage pools will allow Enbridge Gas to store additional natural gas. The additional storage capacity created by the Project will be sold to third parties as part of Enbridge Gas' unregulated storage portfolio. It is proposed that work required for the Project will be completed between April 2020 and October 2020 in order to be able to operate the storage pools at the new MOP for the 2020 injection season.

The Project requires the installation of wellhead upgrades and the installation of emergency shut-down valves on each of the natural gas storage wells within each DSA.

Enbridge Gas plans to file an application with the Ontario Energy Board (the "Board") for leave to vary the current MOP of the storage pools. There are no pipelines to be constructed for the Project, a leave to construct application is therefore not required. No new wells are proposed as part of the Project, therefore a favourable report from the Ministry of Natural Resources and Forestry ("MNRF") is not required.

No new lands are required for the Project. All work will take place on previously disturbed lands and on existing natural gas storage wells located on property for which Enbridge Gas has the right to inject gas into, store gas in and remove gas from and to enter into and upon the land in the area and use the land for such purposes.

Figure 1 below shows the location of the three DSAs and the location of the natural gas storage wells and the observation wells within each DSA.

2.0 Project Information

Enbridge Gas' is involved in the sale, transmission, distribution and storage of natural gas. As part of its business, Enbridge Gas provides gas storage services to third parties, such as power generators or other natural gas utilities. These third parties purchase storage capacity from Enbridge Gas and in turn use that storage capacity to meet their gas demand requirements. The gas storage services offered by Enbridge Gas allow these third parties to optimize their gas purchases. Over 100 customers have gas storage contracts with Enbridge Gas. The additional storage capacity created by increasing the MOP of the storage pools will be offered as additional storage services to natural gas market participants.

Enbridge Gas currently operates approximately 280 billion cubic feet of gas storage in 35 DSAs. Gas storage operations include 241 natural gas storage wells and 80 observation wells.

The Black Creek, Coveny and Wilkesport storage pools have been in operation since 1998, 1997 and 1978 respectively. There are two natural gas storage wells and one observation well in the Black Creek DSA, four natural gas storage wells and two observation wells in the Coveny DSA, and seven natural gas storage wells and one observation well within the Wilkesport DSA.

3.0 Authorizations and Recommendations Required

Enbridge Gas has land-use agreements in place for each of the three DSAs. Permanent or temporary access roads will be required to complete the work required for some of the wells. Environmental Screenings will be completed for all DSAs and depending on the location of the access roads, a Stage 1 Archaeological Assessment ("AA") will be completed. Based on the results of the Stage 1 Archaeological Assessment, further assessments may be required.

Planning activities for the Project commenced in early 2019 and will continue throughout the life of the Project. Environmental Screening Reports ("ESR") will be prepared in accordance with the Board's *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition 2016* (the "Guidelines"). The ESRs will identify potential authorizations required.

The MOP of the natural gas storage pools is regulated by the Board. Natural gas storage facilities are also regulated by the MNRF through the Oil, Gas and Salt Resources Act and the Canadian Standards Association Z341 Standard – Storage of Hydrocarbons in Underground Formations.

Based on preliminary work completed for the Project it is expected that the following recommendations and approvals will be required:

- Recommendation from the MNRF indicating that the MOP increase is acceptable; and
- Approval from the Board for the MOP increase

Other authorizations, notifications, permits and/or approvals may be required in addition to those identified above.

4.0 Project Activities

The Project will be planned in accordance with the requirements of CSA Z341 – Storage of Hydrocarbons in Underground Formations. Pursuant to the requirements of CSA Z341 the following studies and reviews will be completed to support the Project:

- Engineering studies to confirm that the maximum safe operating pressure for each pool exceeds the proposed maximum operating pressure for each pool;
- An assessment of neighbouring activities to determine the impact of the Project on: a) wells within 1 kilometer, b) operations within 5 kilometers and c) the integrity of all wells penetrating the storage zone; and
- A "what if" analysis of hazards and operability ("HAZOP") for each of the storage pools.

5.0 Potential Environmental Effects and Mitigation Measures

The ESRs will assess physical, natural and socio-economical features potentially impacted by construction activities for the Project. Mitigation measures will be recommended as part of the ESRs to minimize potential adverse effects to the environment. The mitigation recommendations, together with Enbridge Gas' drilling program, which meets the requirements of the Oil, Gas & Salt Resources Act, should effectively serve to protect environmental and socio-economic features within the proposed work locations.

The objectives of the Stage 1 AA are to gather information about the geography, history, current land conditions and previous archaeological research within the vicinity of the ESRs study area. The Stage 1 AA will be used to determine the archaeological potential of the study area and, if necessary, recommend further archaeological work in the form of a Stage 2 AA.

It is anticipated that the majority of adverse and/or socio-economic effects will be construction related, temporary and transitory as Project work will be completed on existing wells situated within previously disturbed lands.

6.0 Project Benefits

Demand for natural gas storage is expected to continue to increase. The Project will allow Enbridge Gas to expand its storage capacity and provide additional storage services to natural gas market participants.

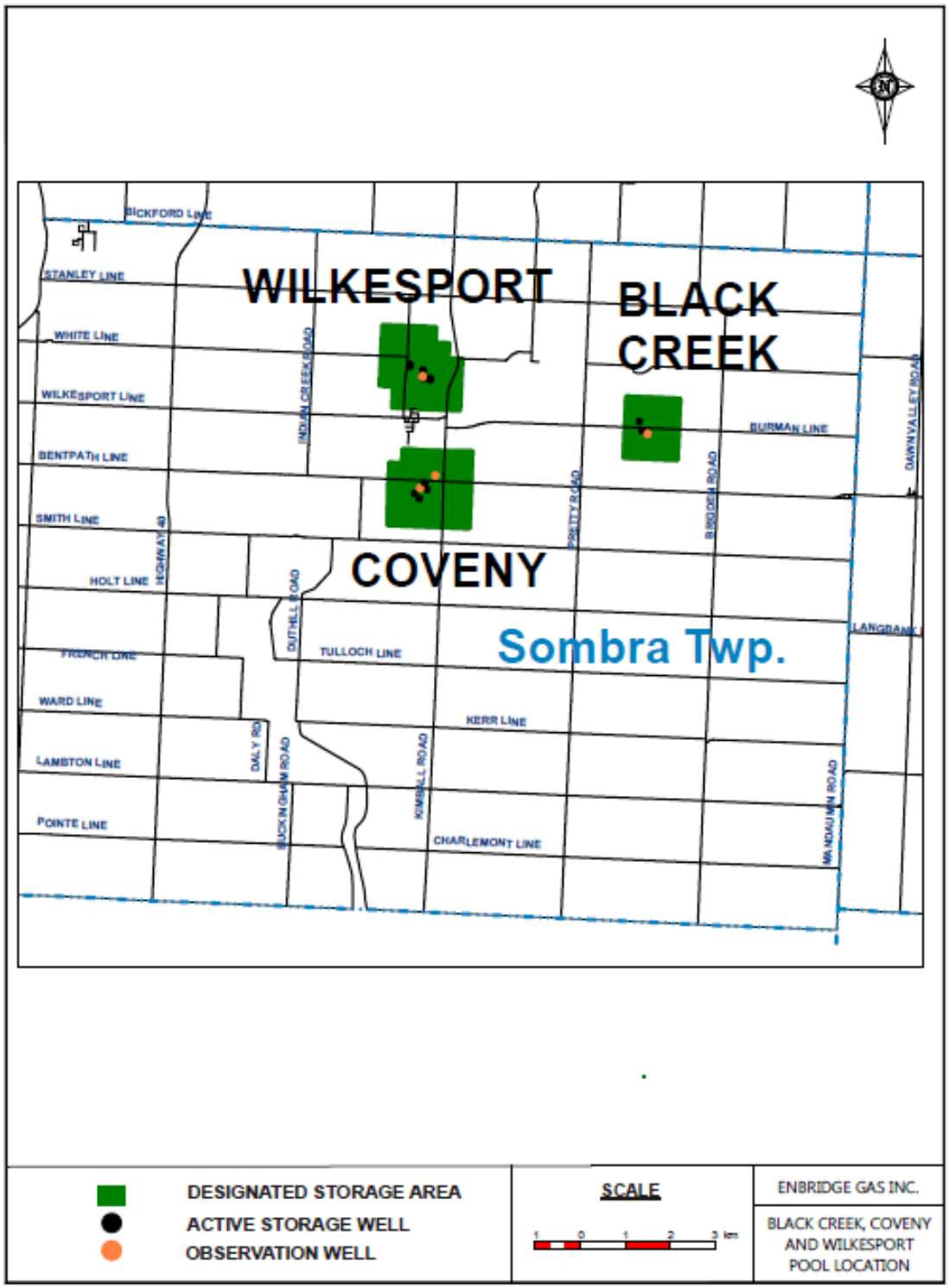
7.0 Contact Information

Regulatory Affairs:
Joel Denomy
joel.denomy@enbridge.com
416-495-5676

Technical / MNRF Contact:
Kathy McConnell
kathy.mcconnell@enbridge.com
519-862-6032

Indigenous Affairs:
Sonia Fazari
sonia.fazari@enbridge.com
416-753-6962

Figure 1: Location of the Black Creek, Coveny & Wilkesport DSAs



Ministry of Energy, Northern Development and Mines

77 Grenville Street
6th Floor
Toronto ON M7A 2C1

Tel: (416) 325-6544

Ministère de l'Énergie, du Développement du Nord et des Mines

77, rue Grenville
6e étage
Toronto ON M7A 2C1

Tél: (416) 325-6544

Ontario

Indigenous Energy Policy

VIA EMAIL

September 23, 2019

Joel Denomy & Sonia Fazari
Enbridge Gas Inc.
500 Consumers Rd.
North York ON M2J 1P8

Re: 2020 Enbridge Storage Enhancement Project

Dear Mr. Denomy & Ms. Fazari:

Thank you for your email dated August 1, 2019, notifying the Ministry of Energy, Northern Development and Mines of Enbridge Gas Inc.'s intention to apply to the Ontario Energy Board for leave to vary the maximum operating pressure at the 2020 Storage Enhancement Project and requesting clarification on Duty to Consult requirements.

We understand that the planned project includes the installation of wellhead upgrades and the installation of emergency shut down valves at the Black Creek pool, the Coveny pool and the Wilkesport pool within Enbridge Gas' Tecumseh storage operations in Sombra Township. The information provided by Enbridge Gas also notes that no new lands are required, and the work will occur in previously disturbed areas.

Based on the information Enbridge Gas has provided to date, the Ministry is of the view that the project will not result in any appreciable adverse impact on the asserted or established rights of First Nation or Métis communities. Should an Indigenous community provide Enbridge Gas with information indicating a potential adverse impact of the project on its Aboriginal or Treaty rights, I request that you notify the Ministry as appropriate.

Given that the Ministry has determined, based on currently available information, that the duty to consult has not been triggered, it will not be necessary for the Ministry to provide a letter of opinion regarding the sufficiency of consultation.

Please contact Shannon McCabe, Senior Advisor at 647-924-8139 or shannon.mccabe@ontario.ca if you have any questions or if you wish to discuss the matter in more detail.

Sincerely,

Dan Delaquis
Manager
Indigenous Energy Policy

c: Ontario Pipeline Coordinating Committee
Ontario Energy Board

RISK ASSESSMENT

1. Risks and mitigations related to the 2020 Storage Enhancement Project for the Black Creek, Coveny and Wilkesport pools are set out below.

Risk to Project Scope

2. The risk to project scope is interrelated with scheduling and cost risks.

3. A 'construction window' has been provided by Enbridge Gas Storage Operations to complete the well work during which time the reservoirs will be below 4,800 kpa. This will provide a suitable and safe environment to complete the proposed well work. The reservoirs must be returned to Enbridge Gas Storage Operations by late September to ensure that there is no disruption to services for storage injections. If Enbridge Gas is not able to complete within the work alloted window, the Project will need to be deferred to the following year.

Risk to Schedule

4. The well work must take place between April and September 2019 to ensure that there will be no disruption to service to ensure that the pressure will be suitable to safely complete the well work. The pressure in the reef must remain low so that the well can be effectively controlled in compliance with the Oil, Gas & Salt Resources legislation and the CSA Z341 Standard. This is one of the mitigation measures employed for well control. If the well work cannot be completed in this time frame, the work will have to be deferred until 2021 when withdrawal operations are completed.

Risk to Project Cost

5. The Project is part of Enbridge Gas's unregulated storage business and therefore project costs will not have any rate impact.

Risk to Land Use Requirements

6. Enbridge Gas has existing all-weather laneways and pads to most wells and therefore access should not be an issue. A temporary access road will be installed for 2 wells in the Wilkesport pool on land owned by private landowners as identified at Exhibit E, Tab 1, Schedule 1, Attachment 1. The landowners will be compensated for use of the lands and any crop loss associated with the operations.

Risks to the Environment

7. Risks and mitigants related to the environment are set out in the C series of Exhibits at Exhibit C, Tab 1, Schedule 1 and Exhibit C, Tab 1, Schedule 2.

Risk to Consultations

8. Duty to Consult was not required for the Project as per the Ministry of Energy, Northern Development and Mines letter dated September 23, 2019.

MINISTRY OF NATURAL RESOURCES AND FORESTRY REQUIREMENTS

1. It is Enbridge Gas Inc.'s ("Enbridge Gas") understanding that the Ontario Energy Board ("OEB" or the "Board") will require Enbridge Gas to conform to CSA Z341.1-18 Storage of Hydrocarbons in Underground Storage Formations to the satisfaction of the Ministry of Natural Resources and Forestry ("MNRF").

2. Enbridge Gas met with the MNRF on January 7, 2020 to discuss the Project. At that meeting Enbridge Gas provided the MNRF with details of the Project and copies of the engineering reports which were prepared for the Project.

3. At that meeting Enbridge Gas provided the MNRF with a presentation that summarized the Project. A copy of the presentation can be found at Attachment 1 to this Exhibit.

4. The following technical information has been provided to the Petroleum Resources Section of the MNRF:
    - Engineering studies completed by Geofirma Engineering Ltd. ("Geofirma") confirming that the maximum safe operating pressure exceeds 17.2 kPa/m (0.76 psi/ft) for the Black Creek, Coveny, and Wilkesport Pools. The approach used by Geofirma is consistent with previous studies completed for the storage pools currently operated at the elevated pressure gradient of 17.2 kPa/m (0.76 psi/ft).
    - A review of each pool as prescribed by CSA Z341.1-18 Clause 5.2 assessing: a) wells within 1 kilometre; b) operations within 5 kilometres and; c) the integrity of all wells penetrating the storage zone.
    - An analysis of hazards and operability ("HAZOP") for each of the storage pools.

5. Summaries of these reports can be found at the following attachments to this Exhibit:
    a. Attachment 2 for Black Creek Pool
    b. Attachment 3 for Coveny Pool
    c. Attachment 4 for Wilkesport Pool

6. The MNRF informed Enbridge Gas that they would be participating in the hearing process including asking interrogatories and filing submissions.

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

2020 Storage Enhancement Project

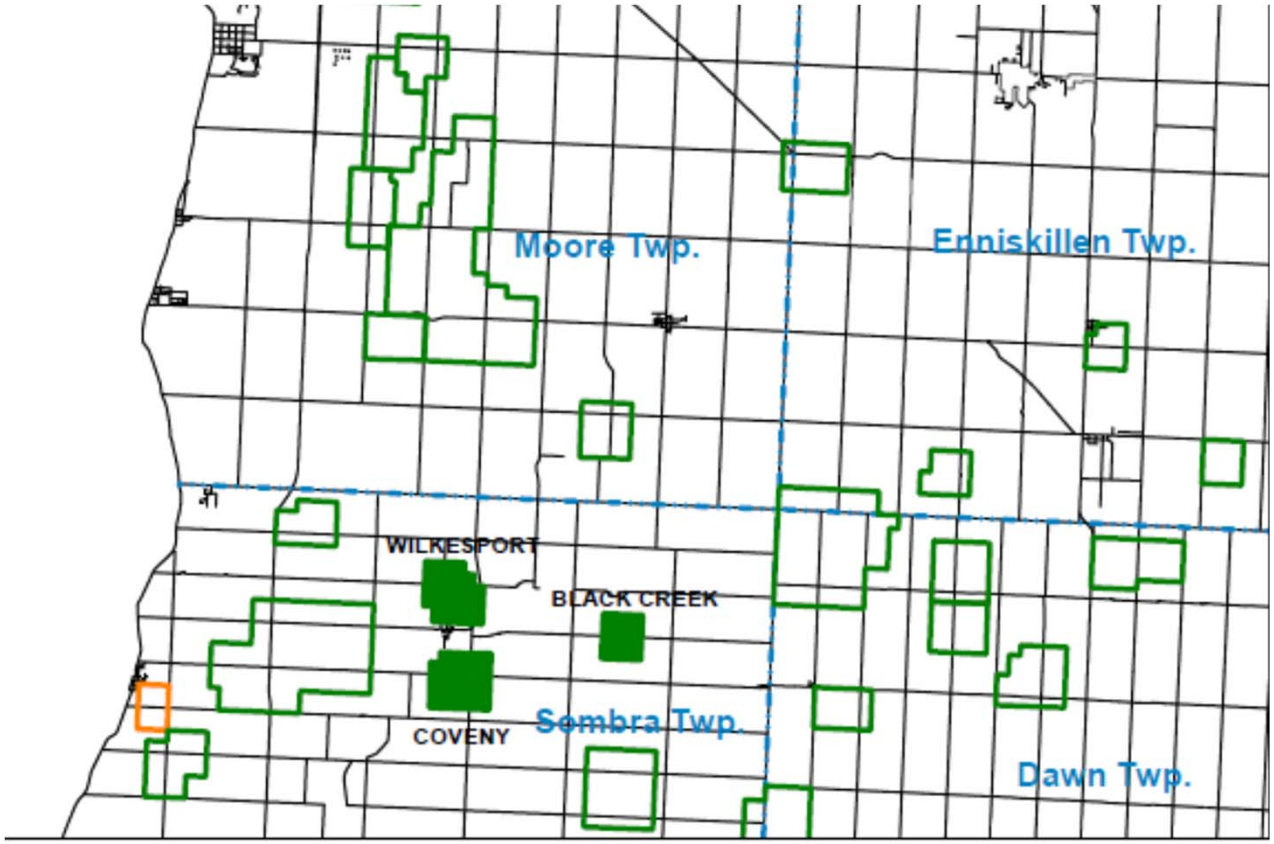
Ministry of Natural Resources and Forestry
January 7, 2020

ENBRIDGE

Project Purpose

- Proposing to increase the pressure at Black Creek, Coveny and Wilkesport Pools to 17.2 kPa/m (0.76 psi/ft)
- Increase working capacity by 46,800 10^3m^3 (1.6 Bcf)

Pool Location



Pressure increases

Pool	Current PMOP (kPaa)	Proposed PMOP (kPaa)	Increase in Pressure (kPa)
Black Creek	9,090	9,860	770
Coveny	8,140	8,830	690
Wilkesport	8,230	8,930	700

Black Creek Storage Pool

- Delta pressure the Black Creek Pool to 17.2 kPa/m (0.76 psi/ft)
  - Increase the operating pressure to 9,860 kPaa (770 kPa)
  - Increase working capacity to 29,400 10^3m^3 (3,400 10^3m^3)
- Currently 2 Natural Gas Storage wells and 1 Guelph Observation well
  - Replace wellhead and master valve on 1 well
  - Install ESV on 1 well

Coveny Storage Pool

- Delta pressure the Coveny Pool to 17.2 kPa/m (0.76 psi/ft)
  - Increase the operating pressure to 8,830 kPaa (690 kPa)
  - Increase working capacity to 113,300 10^3m^3 (13,100 10^3m^3)
- Currently 4 Natural Gas Storage and 2 Observation Wells
  - Replace wellhead and/or master valve on 6 wells
  - Install ESV on 4 Natural Gas Storage wells

Wilkesport Storage Pool

- Delta pressure the Wilkesport Pool to 17.2 kPa/m (0.76 psi/ft)
  - Increase the operating pressure to 8,930 kPaa (700 kPa)
  - Increase working capacity to 263,400 10^3m^3 (30,300 10^3m^3)
- Currently 7 Natural Gas Storage wells and 1 Guelph Observation well
  - Replace wellhead and/or master valve on 4 wells
  - Install ESV on 3 Natural Gas Storage wells

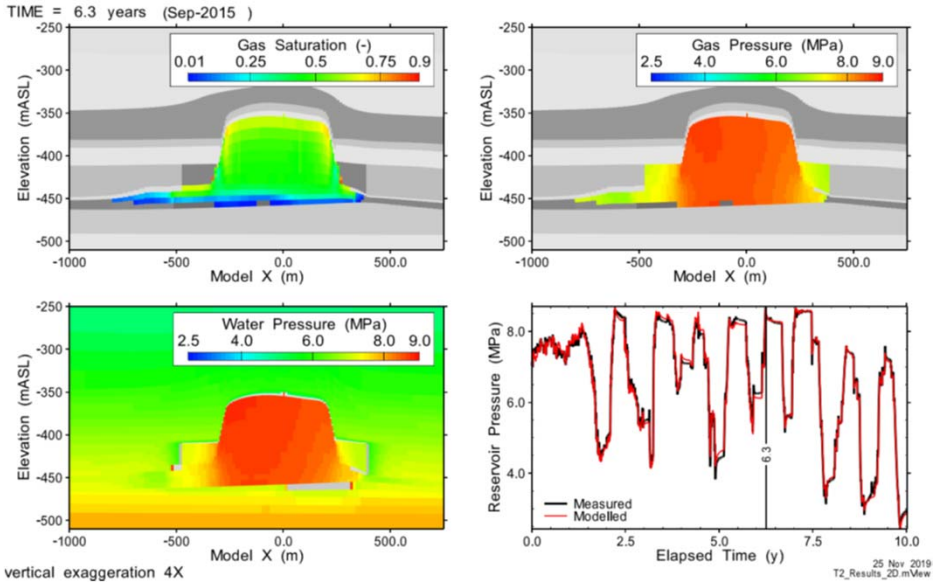
Data and Reports

- New/updated reports for the Black Creek, Coveny and Wilkesport Pools were completed for this project:
  - Geo-mechanical Assessment – Geofirma Engineering Ltd.
  - Risk Assessment – “What If” Analysis of Hazards and Operability Issues Report (“HAZOP”) – UGM Engineering Ltd.
  - Assessment of Neighbouring Activities – Enbridge Gas Inc.
  - Environmental Screening Report – Stantec Consulting Ltd.

Geo-mechanical Assessment

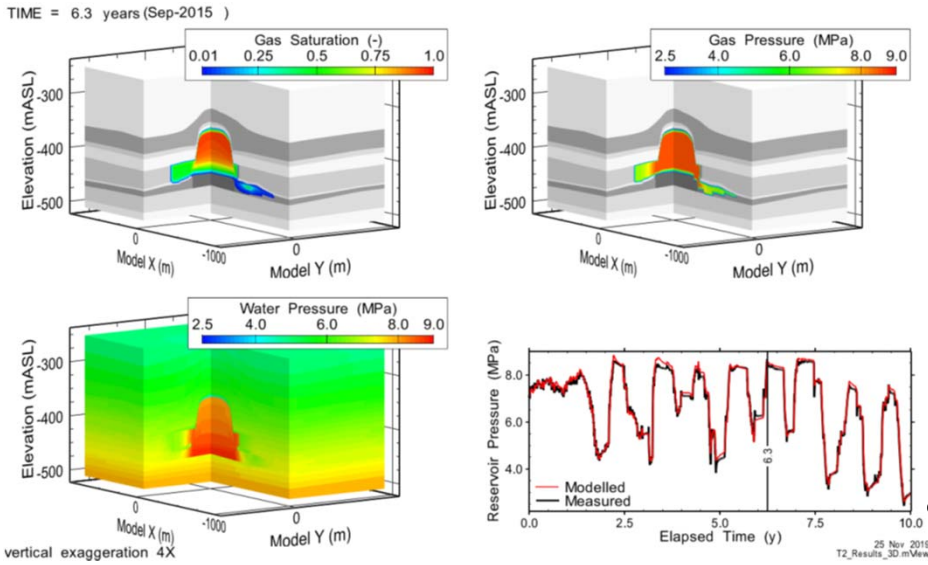
- An Engineering analysis of the Black Creek, Coveny and Wilkesport Pools was completed by Geofirma Engineering Ltd.
- The model assesses the potential for pressure and gas propagation in the caprock, and the geomechanical response to pressure changes in the reservoir
- All 3 Pools were modelled to 18.1 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

Geo-Mechanical Assessment - Probabilistic Approach

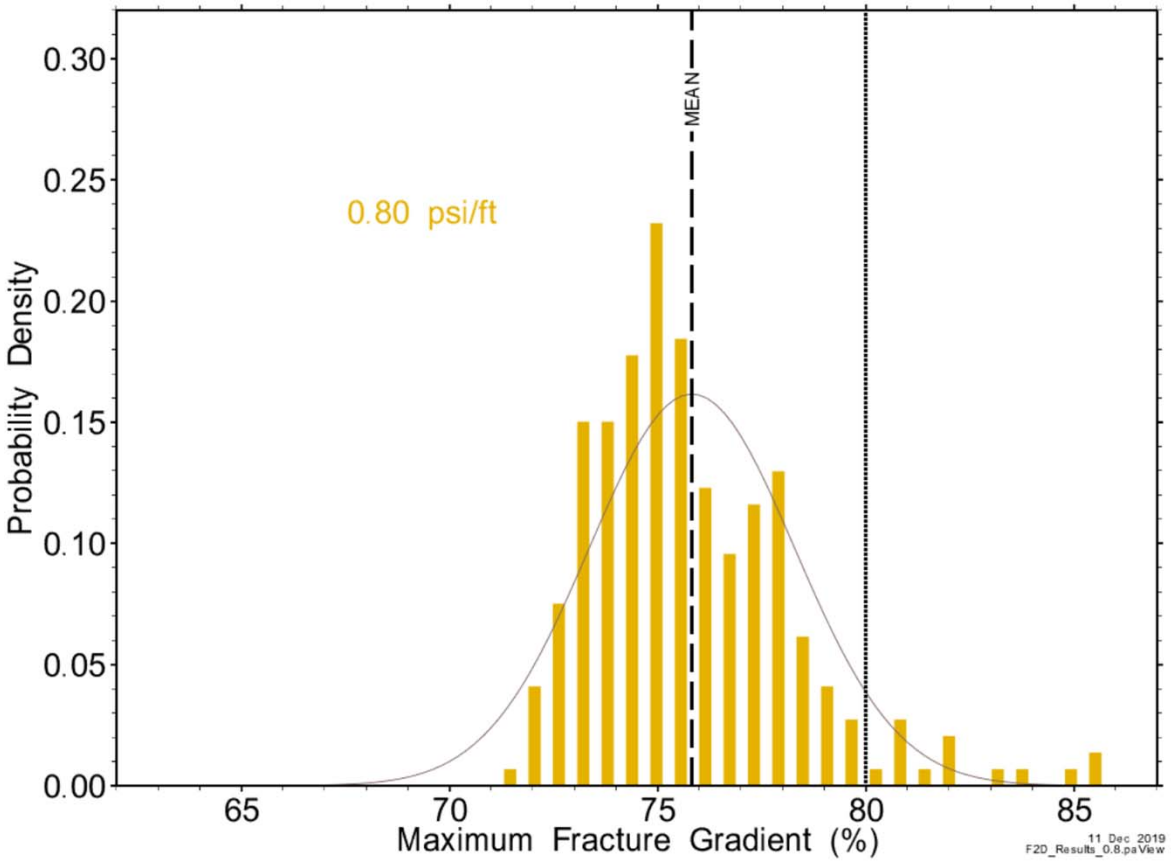


Fluid pressures and saturations at maximum pressure
2D base case model

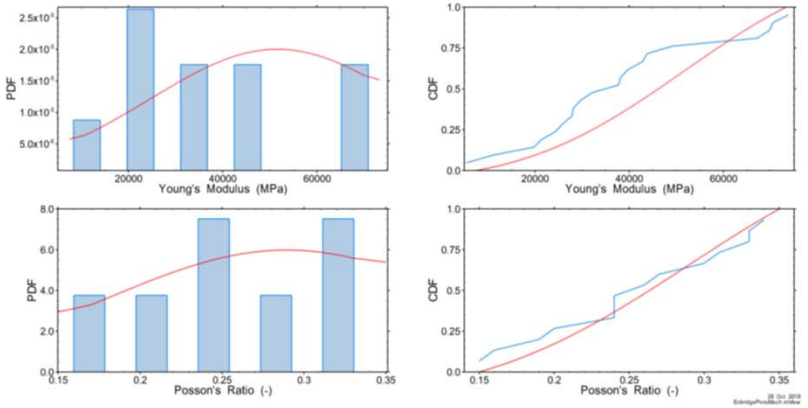
Fluid pressures and saturations at maximum pressure
3D base case model



Geo-Mechanical Assessment - Probabilistic Approach



- Probabilistic approach examines the effects of varying:
  - In-situ stress
  - Elastic properties of the caprock
  - Elastic properties of the storage reservoir
  - Gas permeability of the caprock



Risk Assessment

- “What If” Analysis of Hazards and Operability Issues (HAZOP)
- A “What If” analysis identifies hazards, hazardous situations, and specific incidents that could arise and discusses the likelihood, consequences and mitigation of scenarios that are identified
- The session records and risk rankings indicate “acceptable risk” with respect to the Black Creek, Coveny and Wilkesport Pools
- The sessions did not indicate further mitigation or actions

Assessment of Neighbouring Activities

- Assessment of Neighbouring Activities Reports were completed/updated for the Black Creek, Coveny and Wilkesport Pools
- 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 concern

Current Status

- No First Nations consultation required for this project as per Ministry of Energy, Northern Development and Mines, under the Indigenous Energy Policy
- Provide MNRF with information necessary to review the project

Next Steps

- File Ontario Energy Board application in January 2020
- Notifying surrounding Landowners, Municipalities and Utility Right-of-Way Owners
- MNRF will be notified when the application is submitted
- Request MNRF to intervene and participate in the process
- OEB wants confirmation that the project meets the requirements of CSA Z341 as part of the MNRF's final submission

Questions

Executive Summary

Title: Assessment of Neighbouring Activities
2020 Storage Enhancement Project – The Black Creek Pool

Authors: Enbridge Gas Inc.

The "Assessment of Neighbouring Activities" report has been completed to comply with the requirements of Clause 5.2 of Standard CSA Z341.1-18 – Storage of Hydrocarbons in Underground Formations – Reservoir Storage ("CSA Z341.1-18") in support of an increase in the delta pressure in the Black Creek Pool.

Enbridge Gas Inc (Enbridge) proposes to increase pressure in the Black Creek Pool. The Black Creek Pool is protected by a Designated Storage Area (DSA) which was approved by Ontario Energy Board in 1997. The DSA is comprised of approximately 166 hectares. Enbridge is confident that the DSA adequately protects the Black Creek 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 six wells have been drilled within 1 km of the base of gas of the Black Creek Pool. Enbridge 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 Z341.1-18 Clause 5.2(a).

A review of records from the OGSRL for subsurface activities within 5 kilometres of the Black Creek Pool indicates that there are 10 subsurface operations, including oil and natural gas production and natural gas storage operations. Enbridge is satisfied that there is no "impact on the integrity of the storage zone" as required by the CSA Z341.1-18 Clause 5.2(b).

Four wells penetrate the Black Creek storage zone. Three of the wells are associated with storage operations and one of the wells is abandoned. The integrity of each well that penetrates the storage zone, including casing, cement, and abandonment records was reviewed. Enbridge is satisfied that the wells penetrating the Black Creek Pool meet the requirements of CSA Z341.1-18 Clause 5.2(c).

In conclusion, the Black Creek Pool has been safely operated as a natural gas storage pool since 1997 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 Black Creek Pool. All active wells that penetrate the storage zone within the Black Creek Pool are utilized as part of storage operations.

All the active wells are operated and maintained in accordance with CSA Z341.1-18 Storage of Hydrocarbons in Underground Formations and in accordance with the Oil, Gas and Salt Resources Act, its regulations and Provincial Operating Standards. Enbridge is satisfied that the new operating pressure will not compromise the integrity of the Black Creek Pool or any associated facilities.

Executive Summary

Title: "What If" Analysis of Hazards and Operability Issues
Delta Pressuring Project 2019 – Black Creek Pool
Author: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Black Creek Pool with regards to the Delta Pressuring Project. It describes the "What if" session of hazard assessment that took place over a two day period held on September 10 and 11, 2019.

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

Risk ranking was performed in sessions for each "What if". A total of 234 "What if" entries concerning the Black Creek Pool were generated from the scope of the CSA Z341.1-18, and examined in the session. As part of the evaluation the 7+7 Enbridge Standardized Operational Risk Matrix was used to express the risk. The Enbridge 7+7 matrix is a type which is often used on a corporation basis in order to provide a means to compare perceived risk across different and frequently disparate portions of the total company. Risk as expressed by the 7+7 matrix, is a qualitative expression made up of the session group's assignment of values for likelihood and severity (labelled "Consequence" on the matrix), which are then added together to provide and expression of risk. The 7+7 matrix represents the use of a matrix which features greater detail for each level presented. All "What ifs" were ranked. The sessions team could enter new "What ifs" in addition to the pre-entered "What ifs," at any point in session time.

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

After consideration, it was concluded that the session was a complete study of the Black Creek Pool Delta Pressuring Project within the scope of the CSA Z341.1-18 regulation. It was agreed that the session had examined safety, operability and technical integrity in a responsible and diligent manner.

Geofirma Engineering Ltd
1 Raymond St., Suite 200
Ottawa, Ontario K1R 1A2
Tel: (613) 232-2525
Fax: (613) 232-7149

December 16, 2019 Doc. ID.: 19-210-1

EXECUTIVE SUMMARY

Title: **Enbridge Delta Pressuring Project: Black Creek Pool Geomechanical Modeling Report**

Authors: **Robert Walsh, P.Eng., Nicolas Sgro, Eric Tharumalingam**

This report describes modeling studies assessing the feasibility of increasing the maximum storage pressure in the Black Creek underground natural gas storage reservoir. This required an assessment of the potential for fluid propagation in the caprock, and the geomechanical response to pressure changes in the storage reservoir. To efficiently solve this problem, the modeling codes TOUGH2 and FLAC3D were combined in series. Two-phase flow models were developed in TOUGH2 and calibrated with operational data collected by Enbridge, reproducing the pool pressure history, and thereby validating our flow model. The mechanical response of the caprock to delta pressuring was modeled using FLAC3D, allowing assessment of the induced stresses in formations surrounding the reservoir.

To assess the impact of some key, but uncertain, model parameters, a probabilistic safety assessment (PSA) was undertaken. For the PSA, probability density functions (PDF) are assigned to important input parameters. The execution control software then randomly samples from these PDFs and runs hundreds of realizations of the model. This allowed us to generate a probability density function of the model output of interest – in our case, the maximum fracture gradient. Conservatively, we have applied very broad ranges to the input parameter probability density functions – representing the broad range of values that have been measured at Enbridge's many gas storage reservoirs. This means that the resulting output PDFs of maximum percent fracture gradient (MPFG) also vary broadly. The tails of the MPFG PDF represent extreme scenarios – for example, the improbable combination of low regional stress, a relatively deformable reservoir, and unusually stiff cap rock will lead to a higher MPFG.

The current CSA criterion assumes deterministic assessments of fracture gradient. These provide only a single numerical estimate of the MPFG without quantification of uncertainty. CSA Z341.1-18 sets a threshold of 80% of the MFPG, acknowledging this unquantified uncertainty, and providing a mitigating buffer. By using geomechanical modeling and a probabilistic framework, we are able to quantify the level of uncertainty in determining MPFG, thereby making explicit the uncertainty which was implied in the original standards. The mean value returned by a probabilistic assessment provides a better representative estimate of the MPFG than the single value returned by a deterministic assessment. To be consistent with the regulatory intent, the mean value returned by PSA – rather than the maximum (or extreme value scenario) – should be compared to the 80% threshold.

For the Black Creek study we ran 250 realizations of the model each at planned maximum operating pressure (PMOP) gradients of 0.70, 0.76, and 0.80 psi/ft. These realizations tested the sensitivity of model predictions to changes in mechanical properties of caprock, mechanical properties of storage

formations, gas mobility in the caprock, and minimum principal stress. At 0.70 psi/ft PMOP, the average maximum percent fracture gradient is estimated to be 66.5%, with a standard deviation of ±1.5%. Increasing the maximum operating gradient to 0.76 psi/ft increased the average maximum fracture gradient to 72.8%, with a standard deviation of ±2.0% (see Figure 1). A further increase to 0.80 psi/ft increases the average maximum fracture gradient to 76.9% with a standard deviation of ±2.3%. At 0.8 psi/ft a small number of realizations, which may be considered worst cases, exceeded the 80% standard. These low probability scenarios did not result in an MPFG high enough that a real risk of caprock failure was present. Model scenarios were not run to assess the potential for shear failure due to increased delta pressuring, as this is expected to be a very unlikely failure mode based on previous experience.

The results showed that a maximum delta pressure of 0.76 psi/ft does not exceed 80% of the fracture gradient in any of the realizations which were run, in compliance with CSA Z341.1-18. Furthermore, a pressure increase to 0.8 psi/ft would be feasible and in compliance with CSA Z341.1-18. Ongoing field characterization will allow us to better constrain the model inputs, likely permitting an increase beyond 0.80 psi/ft.

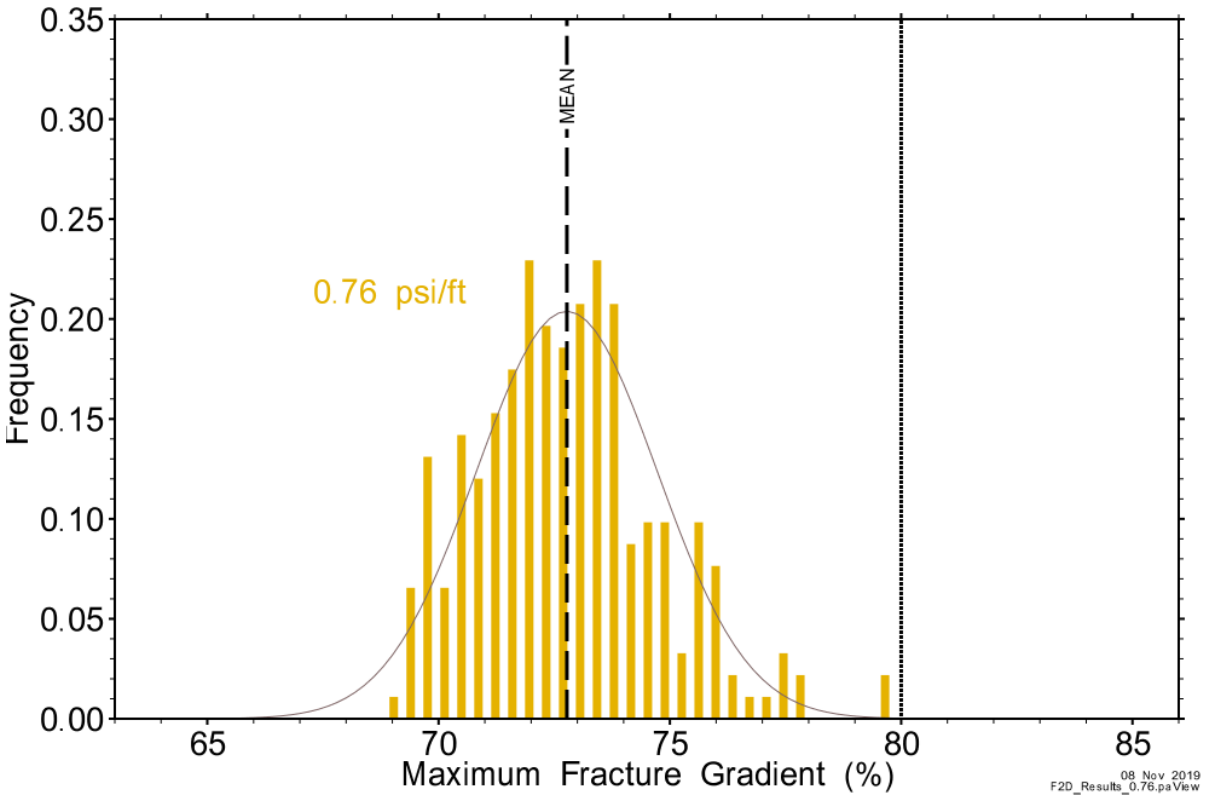


Figure 1 Distribution of maximum fracture gradients from PSA at 0.76 psi/ft.

Executive Summary

Title: Assessment of Neighbouring Activities
2020 Storage Enhancement Project – The Coveny Pool

Authors: Enbridge Gas Inc.

The "Assessment of Neighbouring Activities" report has been completed to comply with the requirements of Clause 5.2 of Standard CSA Z341.1-18 – Storage of Hydrocarbons in Underground Formations – Reservoir Storage ("CSA Z341.1-18") in support of an increase in the delta pressure in the Coveny Pool.

Enbridge Gas Inc (Enbridge) proposes to increase pressure in the Coveny Pool. The Coveny Pool is protected by a Designated Storage Area (DSA) which was approved by Ontario Energy Board in 1997. The DSA is comprised of approximately 305 hectares. Enbridge is confident that the DSA adequately protects the Coveny 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 21 wells have been drilled within 1 km of the base of gas of the Coveny Pool. Enbridge 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 Z341.1-18 Clause 5.2(a).

A review of records from the OGSRL for subsurface activities within 5 kilometres of the Coveny Pool indicates that there are nine subsurface operations, including oil and natural gas production and natural gas storage operations. Enbridge is satisfied that there is no "impact on the integrity of the storage zone" as required by the CSA Z341.1-18 Clause 5.2(b).

Nine wells penetrate the Coveny storage zone. Six of the wells are associated with storage operations and three of the wells are abandoned. The integrity of each well that penetrates the storage zone, including casing, cement, and abandonment records was reviewed. Enbridge is satisfied that the wells penetrating the Coveny Pool meet the requirements of CSA Z341.1-18 Clause 5.2(c).

In conclusion, the Coveny Pool has been safely operated as a natural gas storage pool since 1997 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 Coveny Pool. All active wells that penetrate the storage zone within the Coveny Pool are utilized as part of storage operations.

All the active wells are operated and maintained in accordance with CSA Z341.1-18 Storage of Hydrocarbons in Underground Formations and in accordance with the Oil, Gas and Salt Resources Act, its regulations and Provincial Operating Standards. Enbridge is satisfied that the new operating pressure will not compromise the integrity of the Coveny Pool or any associated facilities.

Executive Summary

Title: "What If" Analysis of Hazards and Operability Issues
Delta Pressuring Project 2019 – Coveny Pool
Author: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Coveny Pool with regards to the Delta Pressuring Project. It describes the "What if" session of hazard assessment that took place over a two day period held on September 10 and 11, 2019.

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

Risk ranking was performed in sessions for each "What if". A total of 234 "What if" entries concerning the Coveny Pool were generated from the scope of the CSA Z341.1-18, and examined in the session. As part of the evaluation the 7+7 Enbridge Standardized Operational Risk Matrix was used to express the risk. The Enbridge 7+7 matrix is a type which is often used on a corporation basis in order to provide a means to compare perceived risk across different and frequently disparate portions of the total company. Risk as expressed by the 7+7 matrix, is a qualitative expression made up of the session group's assignment of values for likelihood and severity (labelled "Consequence" on the matrix), which are then added together to provide and expression of risk. The 7+7 matrix represents the use of a matrix which features greater detail for each level presented. All "What ifs" were ranked. The sessions team could enter new "What ifs" in addition to the pre-entered "What ifs," at any point in session time.

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

After consideration, it was concluded that the session was a complete study of the Coveny Pool Delta Pressuring Project within the scope of the CSA Z341.1-18 regulation. It was agreed that the session had examined safety, operability and technical integrity in a responsible and diligent manner.

Geofirma Engineering Ltd
1 Raymond St., Suite 200
Ottawa, Ontario K1R 1A2
Tel: (613) 232-2525
Fax: (613) 232-7149

December 13, 2019 Doc. ID.: 19-210-2

EXECUTIVE SUMMARY

Title: **Enbridge Delta Pressuring Project: Coveny Pool Geomechanical Modeling Report**

Authors: **Robert Walsh, P.Eng., Nicolas Sgro, Eric Tharumalingam**

This report describes modeling studies assessing the feasibility of increasing the maximum storage pressure in the Coveny underground natural gas storage reservoir. This required an assessment of the potential for fluid propagation in the caprock, and the geomechanical response to pressure changes in the storage reservoir. To efficiently solve this problem, the modeling codes TOUGH2 and FLAC3D were combined in series. Two-phase flow models were developed in TOUGH2 and calibrated with operational data collected by Enbridge, reproducing the pool pressure history, and thereby validating our flow model. The mechanical response of the caprock to delta pressuring was modeled using FLAC3D, allowing assessment of the induced stresses in formations surrounding the reservoir.

To assess the impact of some key, but uncertain, model parameters, a probabilistic safety assessment (PSA) was undertaken. For the PSA, probability density functions (PDF) are assigned to important input parameters. The execution control software then randomly samples from these PDFs and runs hundreds of realizations of the model. This allowed us to generate a probability density function of the model output of interest – in our case, the maximum fracture gradient. Conservatively, we have applied very broad ranges to the input parameter probability density functions – representing the broad range of values that have been measured at Enbridge's many gas storage reservoirs. This means that the resulting output PDFs of maximum percent fracture gradient (MPFG) also vary broadly. The tails of the MPFG PDF represent extreme scenarios – for example, the improbable combination of low regional stress, a relatively deformable reservoir, and unusually stiff cap rock will lead to a higher MPFG.

The current CSA criterion assumes deterministic assessments of fracture gradient. These provide only a single numerical estimate of the MPFG without quantification of uncertainty. CSA Z341.1-18 sets a threshold of 80% of the MFPG, acknowledging this unquantified uncertainty, and providing a mitigating buffer. By using geomechanical modeling and a probabilistic framework, we are able to quantify the level of uncertainty in determining MPFG, thereby making explicit the uncertainty which was implied in the original standards. The mean value returned by a probabilistic assessment provides a better representative estimate of the MPFG than the single value returned by a deterministic assessment. To be consistent with the regulatory intent, the mean value returned by PSA – rather than the maximum (or extreme value scenario) – should be compared to the 80% threshold.

For the Coveny study we ran 250 realizations of the model each at planned maximum operating pressure (PMOP) gradients of 0.70, 0.76, and 0.80 psi/ft. These realizations tested the sensitivity of model predictions to changes in mechanical properties of caprock, mechanical properties of storage formations, gas mobility in the caprock, and minimum principal stress. At 0.70 psi/ft PMOP, the

average maximum percent fracture gradient is estimated to be 65.3%, with a standard deviation of ±1.4%. Increasing the maximum operating gradient to 0.76 psi/ft increased the average maximum fracture gradient to 71.5%, with a standard deviation of ±2.0% (see Figure 1). A further increase to 0.80 psi/ft increases the average maximum fracture gradient to 75.8% with a standard deviation of ±2.5%. At 0.8 psi/ft a small number of realizations, which may be considered worst cases, exceeded the 80% standard. These low probability scenarios did not result in an MPFG high enough that a real risk of caprock failure was present. Model scenarios were not run to assess the potential for shear failure due to increased delta pressuring, as this is expected to be a very unlikely failure mode based on previous experience.

The results showed that a maximum delta pressure of 0.76 psi/ft does not exceed 80% of the fracture gradient in any of the realizations which were run, in compliance with CSA Z341.1-18. Furthermore, a pressure increase to 0.8 psi/ft would be feasible and in compliance with CSA Z341.1-18. Ongoing field characterization will allow us to better constrain the model inputs, likely permitting an increase beyond 0.80 psi/ft.

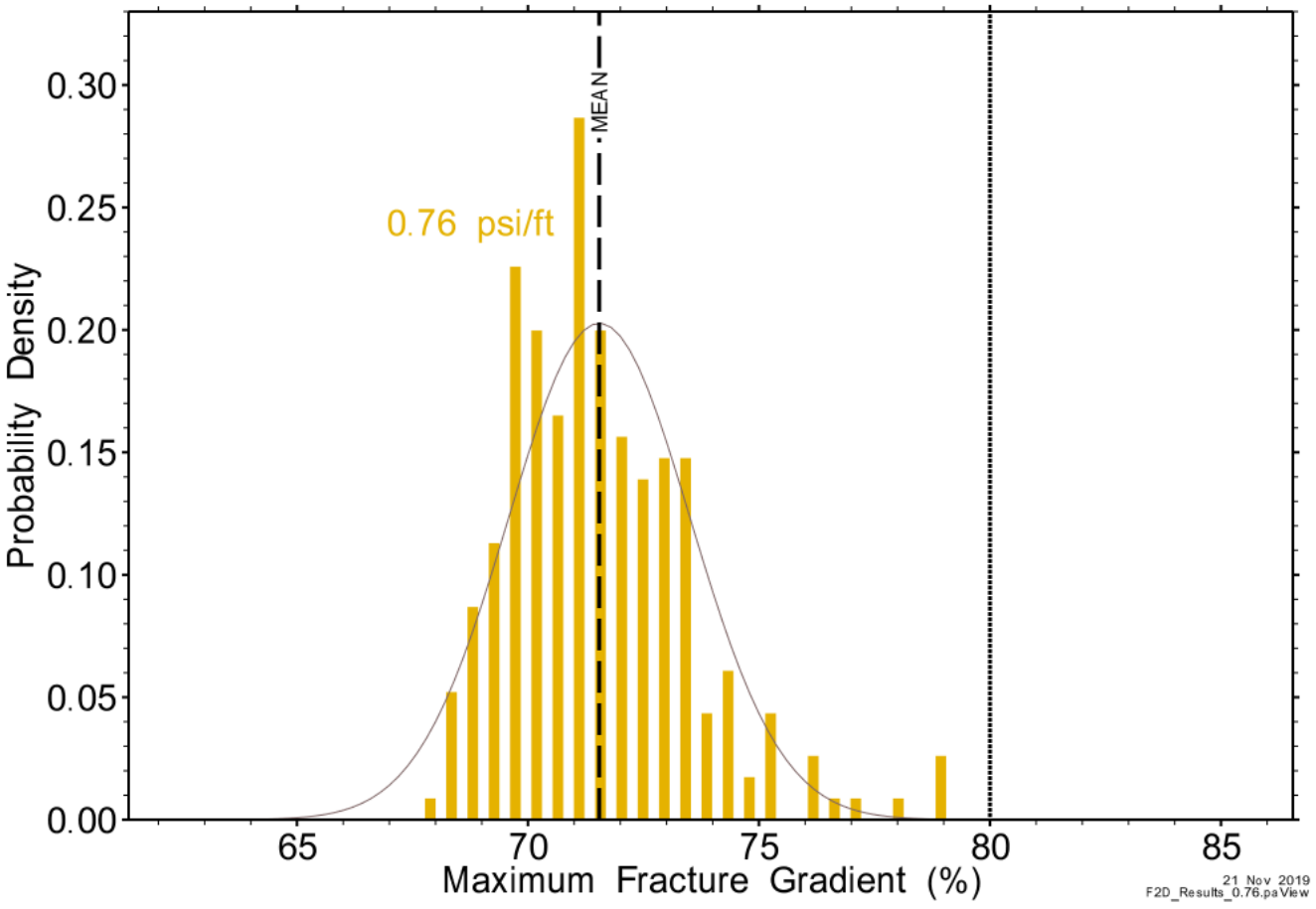


Figure 1 Distribution of maximum fracture gradients from PSA at 0.76 psi/ft.

Executive Summary

Title: Assessment of Neighbouring Activities
2020 Storage Enhancement Project – The Wilkesport Pool

Authors: Enbridge Gas Inc.

The "Assessment of Neighbouring Activities" report has been completed to comply with the requirements of Clause 5.2 of Standard CSA Z341.1-18 – Storage of Hydrocarbons in Underground Formations – Reservoir Storage ("CSA Z341.1-18") in support of an increase in the delta pressure in the Wilkesport Pool.

Enbridge Gas Inc (Enbridge) proposes to increase pressure in the Wilkesport Pool. The Wilkesport Pool is protected by a Designated Storage Area (DSA) which was approved by Ontario Energy Board in 1978. The DSA is comprised of approximately 279 hectares. Enbridge is confident that the DSA adequately protects the Wilkesport 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 six wells have been drilled within 1 km of the base of gas of the Wilkesport Pool. Enbridge 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 Z341.1-18 Clause 5.2(a).

A review of records from the OGSRL for subsurface activities within 5 kilometres of the Wilkesport Pool indicates that there are eight subsurface operations, including oil and natural gas production and natural gas storage operations. Enbridge is satisfied that there is no "impact on the integrity of the storage zone" as required by the CSA Z341.1-18 Clause 5.2(b).

17 wells penetrate the Wilkesport Pool storage zone. Eight of the wells are associated with storage operations and seven of the wells are abandoned. The integrity of each well that penetrates the storage zone, including casing, cement, and abandonment records was reviewed. Enbridge is satisfied that the wells penetrating the Wilkesport Pool meet the requirements of CSA Z341.1-18 Clause 5.2(c).

In conclusion, the Wilkesport Pool has been safely operated as a natural gas storage pool since 1978 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 Wilkesport Pool. All active wells that penetrate the storage zone within the Wilkesport Pool are utilized as part of storage operations.

All the active wells are operated and maintained in accordance with CSA Z341.1-18 Storage of Hydrocarbons in Underground Formations and in accordance with the Oil, Gas and Salt Resources Act, its regulations and Provincial Operating Standards. Enbridge is satisfied that the new operating pressure will not compromise the integrity of the Wilkesport Pool or any associated facilities.

Executive Summary

Title: "What If" Analysis of Hazards and Operability Issues
Delta Pressuring Project 2019 – Wilkesport Pool
Author: Gordon Cowan, P.Eng., UGM Engineering Ltd.

UGM Engineering Ltd. was contracted to prepare a "What If" Analysis for the Wilkesport Pool with regards to the Delta Pressuring Project. It describes the "What if" session of hazard assessment that took place over a two day period held on August 21 and 22, 2019.

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

Risk ranking was performed in sessions for each "What if". A total of 236 "What if" entries concerning the Wilkesport Pool were generated from the scope of the CSA Z341.1-18, and examined in the session. As part of the evaluation the 7+7 Enbridge Standardized Operational Risk Matrix was used to express the risk. The Enbridge 7+7 matrix is a type which is often used on a corporation basis in order to provide a means to compare perceived risk across different and frequently disparate portions of the total company. Risk as expressed by the 7+7 matrix, is a qualitative expression made up of the session group's assignment of values for likelihood and severity (labelled "Consequence" on the matrix), which are then added together to provide and expression of risk. The 7+7 matrix represents the use of a matrix which features greater detail for each level presented. All "What ifs" were ranked. The sessions team could enter new "What ifs" in addition to the pre-entered "What ifs," at any point in session time.

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

After consideration, it was concluded that the session was a complete study of the Wilkesport Pool Delta Pressuring Project within the scope of the CSA Z341.1-18 regulation. It was agreed that the session had examined safety, operability and technical integrity in a responsible and diligent manner.

Geofirma Engineering Ltd
1 Raymond St., Suite 200
Ottawa, Ontario K1R 1A2
Tel: (613) 232-2525
Fax: (613) 232-7149

December 17, 2019 Doc. ID.: 19-210-3

EXECUTIVE SUMMARY

Title: **Enbridge Delta Pressuring Project: Wilkesport Pool Geomechanical Modeling Report**

Authors: **Robert Walsh, P.Eng., Nicolas Sgro, Eric Tharumalingam**

This report describes modeling studies assessing the feasibility of increasing the maximum storage pressure in the Wilkesport underground natural gas storage reservoir. This required an assessment of the potential for fluid propagation in the caprock, and the geomechanical response to pressure changes in the storage reservoir. To efficiently solve this problem, the modeling codes TOUGH2 and FLAC3D were combined in series. Two-phase flow models were developed in TOUGH2 and calibrated with operational data collected by Enbridge, reproducing the pool pressure history, and thereby validating our flow model. The mechanical response of the caprock to delta pressuring was modeled using FLAC3D, allowing assessment of the induced stresses in formations surrounding the reservoir.

To assess the impact of some key, but uncertain, model parameters, a probabilistic safety assessment (PSA) was undertaken. For the PSA, probability density functions (PDF) are assigned to important input parameters. The execution control software then randomly samples from these PDFs and runs hundreds of realizations of the model. This allowed us to generate a probability density function of the model output of interest – in our case, the maximum percent fracture gradient. Conservatively, we have applied very broad ranges to the input parameter probability density functions – representing the broad range of values that have been measured at Enbridge's many gas storage reservoirs. This means that the resulting output PDFs of maximum percent fracture gradient (MPFG) also vary broadly. The tails of the MPFG PDF represent extreme scenarios – for example, the improbable combination of low regional stress, a relatively deformable reservoir, and unusually stiff cap rock will lead to a higher MPFG.

The current CSA criterion assumes deterministic assessments of fracture gradient. These provide only a single numerical estimate of the MPFG without quantification of uncertainty. CSA Z341.1-18 sets a threshold of 80% of the MFPG, acknowledging this unquantified uncertainty, and providing a 20% buffer as mitigation. By using geomechanical modeling and a probabilistic framework, we are able to quantify the level of uncertainty in determining MPFG, thereby making explicit the uncertainty which was implied in the original standards. The mean value returned by a probabilistic assessment provides a better representative estimate of the MPFG than the single value returned by a deterministic assessment. To be consistent with the regulatory intent, the mean value returned by PSA – rather than the maximum (or extreme value scenario) – should be compared to the 80% threshold.

For the Wilkesport study we ran 250 realizations of the model each at planned maximum operating pressure (PMOP) gradient of 0.70, 0.76, and 0.80 psi/ft. These realizations tested the sensitivity of

model predictions to changes in mechanical properties of caprock, mechanical properties of storage formations, gas mobility in the caprock, and minimum principal stress. At 0.70 psi/ft, the average MPFG is estimated to be 64.1%, with a standard deviation of ±1.6%. Increasing the maximum operating gradient to 0.76 psi/ft increased the average maximum fracture gradient to 73.2%, with a standard deviation of ±2.3%. A further increase to 0.80 psi/ft increases the average maximum fracture gradient to 78.5% with a standard deviation of ±3.0%. These scenarios did not result in an MPFG high enough that a real risk of caprock failure was present.

As compared to 3D scenarios, the 2D models used for the PSA are generally representative of the geomechanics of the system, but very conservative, especially for higher MPFG scenarios. When we corrected the 2D PSA results to better agree with equivalent 3D models, the average MPFG at 0.76 psi/ft drops to 72.0% with a standard deviation of ±1.3% (see Figure 1) and the average MPFG at 0.8 psi per foot drops to 77.2% with a standard deviation of ±1.7%.

The results showed that a PMOP gradient of 0.76 psi/ft does not exceed 80% of the fracture gradient, in compliance with CSA Z341.1-18. Furthermore, a pressure increase to 0.8 psi/ft would be feasible and in compliance with CSA Z341.1-18. Ongoing field characterization will allow us to better constrain the model inputs, and might permit an increase beyond 0.80 psi/ft. Despite ample conservatism built into this probabilistic safety assessment model we have determined that the planned pressure increases entail no risk of fracturing the caprock.

Model scenarios were not run to assess the potential for shear failure due to increased delta pressuring, as this is expected to be a very unlikely failure mode based on previous experience.

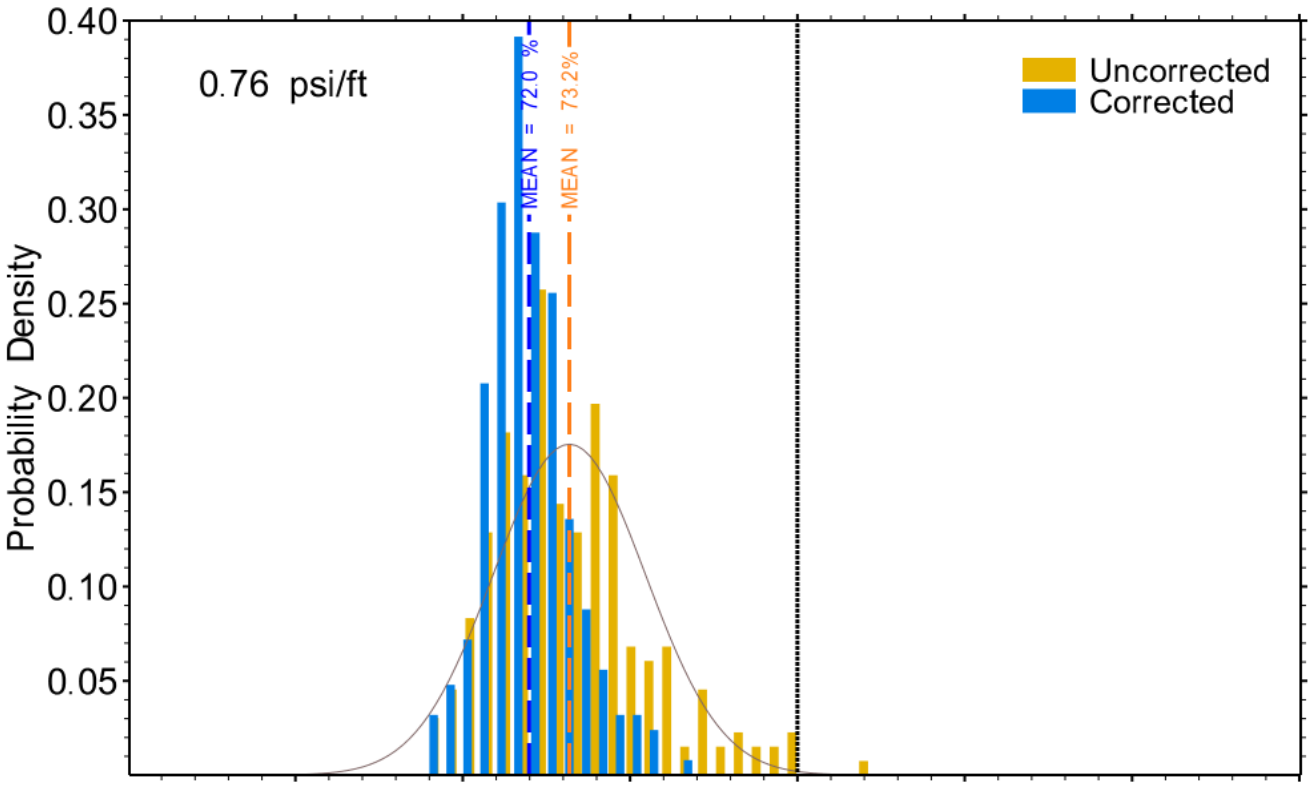


Figure 1 Corrected and uncorrected PSA distributions of MPFG at 0.76 psi/ft.