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VIA EMAIL and RESS

June 12, 2020

Ms. Christine E. Long
Board Secretary
Ontario Energy Board
P.O. Box 2319,
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Long:

**Re: EB-2019-0172 Enbridge Gas Inc. (“Enbridge Gas”)
Windsor Pipeline Replacement Project (“Project”) – Section 101 Application**

Please find attached Enbridge Gas’ Application pursuant to Section 101 of the *Ontario Energy Board Act, 1998* in respect of the above noted project. Enbridge Gas has been unable to secure consent from The Corporation of the County of Essex (“Essex County”) for construction of the Project within the County Road 46 right-of-way. As the time for resolving this matter is short, Enbridge Gas will serve these materials upon all intervenors, Essex County and the Township of Lakeshore immediately following the filing upon RESS.

If there are any questions, please contact the undersigned.

Yours truly,

(Original Signed)

Rakesh Torul
Technical Manager, Regulatory Applications

cc: Scott Stoll, Aird and Berlis LLP
EB-2019-0172 Intervenors

EXHIBIT LIST

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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 THE MATTER OF an application by Enbridge Gas Inc. pursuant to Condition 4 from the Ontario Energy Board's Decision and Order, and Section 101 of the *Ontario Energy Board Act, 1998* for authority to construct a work upon, under or over a highway, utility line or ditch in the County of Essex for the purposes of a natural gas pipeline in respect of which the Ontario Energy Board granted leave to construct in EB-2019-0172 to Enbridge Gas Inc.;

APPLICATION FOR AUTHORITY TO CONSTRUCT

1. The Applicant, Enbridge Gas Inc. ("**Enbridge Gas**" or the "**Company**"), is an Ontario corporation with its head office in the City of Toronto. It carries on the business of selling, distributing, transmitting and storing natural gas within Ontario.
2. This Application is to resolve a dispute between Enbridge Gas and The Corporation of the County of Essex ("**Essex County**"), the road authority for County Road 46, where Essex County is withholding approval for construction unless Enbridge Gas makes significant and costly departures from the requirements of the CSA Z662 code and Enbridge Gas's construction policies and procedures.

Background

3. Enbridge Gas applied to the Ontario Energy Board (the “**Board**”) under sections 90 and 97 of the *Ontario Energy Board Act, 1998* (the “**Act**”) to install approximately 61.6 kms of NPS 6 inch high pressure steel natural gas pipeline known as the Windsor Line. The application for Leave to Construct (“LTC”) the pipeline was heard by the Board under docket number EB-2019-0172. On April 1, 2020 the Board issued a decision and order granting Leave to Construct for the Project subject to the Conditions of Approval. A map showing the location of the Pipeline along County Road 46 is provided at Exhibit B, Tab 1, Schedule 1, Attachment 1.
4. This project is intended to address a pipeline safety and integrity matter. As noted in the LTC application, the existing pipeline is between 50 to 70 years old which is the principal reason the pipeline is being replaced. As such, Enbridge Gas seeks to have the new Pipeline installed as soon as practicable and does not want any additional delays to the in-service date.
5. Enbridge Gas has commenced construction of the Pipeline where it has received the necessary municipal or environmental approvals. This start of construction was consistent with the LTC Application and Enbridge Gas is still seeking for the Project to be in service by early December 2020.
6. This Application will confirm to the Board that Enbridge Gas will install the NPS 6 steel for the entire length of the pipeline.

7. Paragraph 4 of the Conditions of Approval of the OEB order states the following:

4. Enbridge Gas shall advise the OEB of any proposed change in the project, including but not limited to changes in: OEB-approved construction or restoration procedures, the proposed route, construction schedule and cost, the necessary environmental assessments and approvals, and all other approvals, permits, licenses, certificates and rights required to construct the proposed facilities. Except in an emergency, Enbridge Gas shall not make any such change without prior notice to and written approval of the OEB. In the event of an emergency, the OEB shall be informed immediately after the fact.

8. Section 101 of the Act provides:

101 (1) The following persons may apply to the Board for authority to construct a work upon, under or over a highway, utility line or ditch:

1. Any person who has leave to construct the work under this Part.
2. Any person who intends to construct the work and who is exempted under section 95 from the requirement to obtain leave.
3. Where the proposed work is the expansion or reinforcement of a transmission or distribution system, any person who is required by the Board, pursuant to a condition of the person's licence, to expand or reinforce the transmission or distribution system.
4. The officers, employees and agents of a person described in paragraph 1, 2 or 3. 2006, c. 33, Sched. X, s. 3.

(2) The procedure set out in subsections 99 (1) to (4) applies with necessary modifications to an application under this section. 1998, c. 15, Sched. B, s. 101 (2).

(3) Without any other leave and despite any other Act, if after the hearing the Board is of the opinion that the construction of the work upon, under or over a highway, utility line or ditch is in the public interest, it may make an order authorizing the construction upon such conditions as it considers appropriate.

9. Typically, when Enbridge Gas seeks to install distribution mains within any municipality, including Essex County, it would apply to the applicable road authority for consent to install the project. Essentially, this consent is to approve the location for the installation of a pipeline to avoid conflicts with current and future infrastructure. These consents are usually not controversial as the applicable municipality and Enbridge Gas have been engaged in discussions to find a suitable location for several months.

10. These consents are required under the terms of the 1957 Franchise Agreement (see Exhibit B, Tab 1, Schedule 3, Appendix A) which provides Essex County staff with approval of the location of the pipeline to prevent conflicts and interference with the safe operation of the highway.

11. Enbridge Gas has been in discussion with Essex County for several months prior to filing the LTC Application. While Enbridge Gas and Essex County have agreed upon a number of matters, including the running line of the pipeline, Essex County has insisted on several unusual requirements:
 - a. Execution of a Road User Agreement (see Exhibit B, Tab 1, Schedule 7) in a form approved by Essex County;
 - b. A minimum depth of cover of 1.5 metres over an approximately 22.9 kms length of the project within 6 metres of the travelled portion of County Road 46; and
 - c. Removal of the to be abandoned existing NPS 10 steel main.

12. Enbridge Gas has made adjustments to its location in order to avoid planned or future conflict with County road projects. For example, Enbridge Gas has agreed to locate approximately 6.3 kms of NPS 6 steel main much closer to the edge of the right-of-way in order to avoid a future road widening that is planned to occur between 5 and 10 years into the future. While this new alignment will increase construction costs it will also reduce or eliminate conflict with the future road work.

13. For the remaining 22.9 kms of the Pipeline along County Road 46, which is to be installed less than 6.0 metres from the edge of the traveled portion of the roadway, Essex County has insisted on a depth of cover of 1.5 metres. The

County has not demonstrated a safety reason or future conflict with a road project supporting the increase in the depth of cover.

14. Essex County has also demanded that Enbridge Gas remove approximately 21.8 kms of NPS 10 Steel main from the right-of-way rather than permitting it to be abandoned in-place.
15. The changes demanded by Essex County will increase capital construction costs by more than \$13 million, increase operational costs and fail to provide meaningful enhancement to the safety of the line, people or property. Further, the additional depth creates additional construction risks and challenges for working around existing Town of Lakeshore watermains.
16. These costs would be in addition to the cost estimates provided in the LTC Application. If ordered to incur these costs, Enbridge Gas will seek recovery through rates.
17. Enbridge Gas cannot agree to these demands of Essex County which would constitute a “change” within the meaning of Condition 4 of the Decision and Order that requires prior Board approval before it can be implemented. Further, Enbridge Gas is unable to agree the demands are reasonable in the circumstances.
18. Essex County has premised their position regarding the depth of cover upon the transmission line provisions of the CSA Z662 code rather than the distribution provisions and upon a misinterpretation and application of the Transportation Association of Canada’s *Underground Utility Installations Crossing Highway*

Rights-of-Way (the “**TAC Manual**”), a copy of which is provided at Exhibit B, Tab 1, Schedule 5, Appendix E.

19. Despite the TAC Manual only suggesting a depth of cover of 1.5 metres beneath the traveled portion of the road way, Essex County has insisted on that depth of cover anywhere within 6 metres of the travelled edge of the road way.
20. Enbridge Gas has repeatedly explained the applicable CSA Z662 provisions and even took the unusual step of providing a certified engineering report from Enbridge as well as an independent third party engineering assessment of the loading demonstrating the appropriateness of the installation (Exhibit B, Tab 1, Schedule 5, Appendix A).
21. Essex County has provided no technical information that demonstrates Enbridge Gas’s proposed installation is unsafe or otherwise deficient. Despite this additional information from Enbridge Gas, and no information to the contrary, Essex County has not altered its demands.
22. Essex County chose not to participate in the LTC Application even though it was aware its position on the depth of cover would not meeting the following circumstances:
 - a. were not required to meet the CSA Z662;
 - b. were not required to ensure the safety of persons or property;
 - c. were not consistent with the purpose and intent of the existing 1957 Franchise Agreement (Exhibit B, Tab 1, Schedule 3, Appendix A); and
 - d. That Enbridge Gas would not readily agree to such demands.

23. Enbridge Gas notes that the additional depth of cover required without justification and evidence in relation safety, the property and future road widening conflicts may result in an increase in costs of constructing pipeline energy infrastructure projects in the future.
24. Enbridge Gas requests this proceeding be conducted expeditiously such that a decision is issued at the earliest opportunity and in any event prior to August 15, 2020 in order to avoid additional construction, demobilization and mobilization charges. Enbridge Gas will participate in written and/or oral proceedings, including, if ordered, virtual technical or settlement conferences to ensure an expeditious decision following a proper review and consideration of the matters herein.
25. The persons impacted by this Application are the Corporation of the County of Essex and the Corporation of the Town of Lakeshore. This Application and Pre-filed Evidence will be served upon the Corporation of the County of Essex, Corporation of the Town of Lakeshore and the parties in the Leave to Construct Application at the time it is being filed with the Board. Enbridge Gas will file an affidavit detailing service shortly.

Relief Requested:

26. Enbridge Gas requests the Board issue a decision with:
- a. an order, pursuant to section 101 of the *Ontario Energy Board Act, 1998*, S.O. 1998, c-15, Schedule B, granting Enbridge Gas authorization to, within the County Road 46 right of way, construct a work upon, under or over a highway, utility line or ditch at a depth of cover of approximately 1 metre and otherwise in accordance with Enbridge Gas's standards and procedure as

typically shown in Exhibit B, Tab 1, Schedule 1, Attachment 2; including abandoning the existing pipeline in-place; or

b. In the alternative to a), an order, pursuant to section 101 of the *Ontario Energy Board Act, 1998*, S.O. 1998, c-15, Schedule B and Condition 4 of the Decision and Order in the Leave to Construct Application, direction and authorization, in whole or in part, to:

i. construct a work upon, under or over a highway, utility line or ditch at a depth of cover of approximately 1.5 metres and otherwise in accordance with CSA Z662 and Enbridge Gas's construction policies and standards; and/or

ii. Removal and remediation of approximately 21.8 kms of NPS 10 steel existing steel main.

c. Such other orders as are necessary for the proper completion of this proceeding.

27. Enbridge Gas requests that copies of all documents filed with the Board in connection with this proceeding be served on it and on its counsel, as follows:

The Applicant:	Mark Kitchen Director, Regulatory Affairs Enbridge Gas Inc.
Address for personal service: Mailing Address:	500 Consumers Road Toronto, ON M2J 1P8 P. O. Box 650 Scarborough, ON M1K 5E3
Telephone:	(416) 495-5499
E-Mail:	EGIRegulatoryProceedings@enbridge.com

And to: Guri Pannu
Senior Legal Counsel
Enbridge Gas Inc.

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DATED June 12, 2020, at Toronto, Ontario.

ENBRIDGE GAS INC.
By its counsel

AIRD & BERLIS LLP

Scott Stoll

EVIDENCE OVERVIEW

1. Enbridge Gas has filed this Application pursuant to the requirements of Condition 4 of the Decision and Order dated April 1, 2020 from this Board and under the authority of Section 101 of the *Ontario Energy Board Act, 1998*.
2. Enbridge Gas requests the Board give direction and approval to install the pipeline with a depth of cover of 1 metre and to approve abandoning the existing NPS 10 pipeline with the municipal right-of-way in-place. In the event the Board is of the view that the additional depth of cover is required and/or the abandoned pipeline is to be removed, Enbridge Gas requests the Board to direct and authorize such installation pursuant to Condition 4 of the Decision and Order.

1.0 Description of the Project

3. On August 9, 2020, Enbridge Gas Inc. (“Enbridge Gas”) applied under section 90(1) of the *Ontario Energy Board Act, 1998* (“the Act”) for leave to construct approval to construct a natural gas pipeline and ancillary facilities replacing approximately 64 kms of the Windsor pipeline (“Windsor Line”) in the Municipality of Chatham-Kent, the Towns of Lakeshore and Tecumseh and the County of Essex (the Project). Enbridge Gas also applied under section 97 of the Act for approval of the form of land agreements (temporary land use and permanent easement) it offered to landowners in order to use their land for routing or construction of the Project. A map showing the general location of the Project is provided at Attachment 1 to this exhibit.

4. On April 1, 2020, the Ontario Energy Board (“OEB or the Board”) issued its Decision¹ for this proceeding approving the construction of a hybrid option of the pipeline which are detailed in Section 5 of the Decision. Furthermore, the leave to construct for the Project was granted subject to the Conditions of Approval attached as Schedule B to the Decision and Order.

5. The Windsor Line acts as a ‘trunkline’ to the local natural gas distribution system providing natural gas service to residents and businesses from Port Alma, in the Municipality of Chatham-Kent to the City of Windsor, located in the County of Essex. There are approximately 400 customers directly served off the section of pipeline being replaced and substantially more being served in the area with the associated distribution system being supplied by the Windsor Line. The direct and indirect customers being a mixture of residential and commercial services.

6. The existing Windsor Line is a distribution pipeline. It performs the same function as other distribution pipelines in the City of Windsor, Towns of Tecumseh, Lakeshore and Municipality of Chatham-Kent. Industry best practice for locating distribution pipelines is in road allowance as these distribution lines are the direct delivery facilities to natural gas using consumers. Further, the fact the new replacement pipeline is NPS 6, constructing this size of pipeline in road allowance is not only preferred but common practice for Enbridge Gas throughout Ontario.

7. As part of the Enbridge Gas Integrity Management Program and Standard Operating Procedures, the Windsor Line is surveyed and inspected on a regular basis. Leak surveys and emergency valve inspections are completed on an annual basis. The results from these inspections and subsequent analysis have identified multiple

¹ EB-2019-0172, Decision and Order, dated April 1, 2020

integrity and depth of cover issues that could pose safety and security of supply concerns if not addressed.

8. The Windsor Line has sections of pipe that are 50 to 70 years old. In addition to the vintage of the pipeline along with the significant effort, cost and resources spent already repairing leaks, the Windsor Line has been deemed an operational risk. The replacement of the proposed section of the Windsor Line is the most effective way of managing its ongoing safety and reliability.
9. The target completion date for the installation of the replacement NPS 6 pipeline is early December 2020.
10. In order to receive approval for installation within the County Road 46 right-of-way, Essex County has sought to impose certain requirements: (a) additional depth of cover; (b) removal of the abandoned pipeline; and (c) execution of a Road User Agreement. Each are explained below.
11. Essex County has not permitted Enbridge Gas to perform normal pre-construction engineering in the form of excavation of the proposed alignment to verify the existence of a clear path for the installation of the proposed pipeline and/or to verify the position of neighboring utilities. This departure from typical practice has restricted Enbridge Gas' ability complete detail engineering work.

1.1 NPS 6 Construction Installation

12. Following receipt of its leave to construct approval, Enbridge Gas moved forward seeking consent with Municipal and County partners to install approximately 29 kms

of the proposed NPS 6 distribution pipeline along County Road 46 in the County of Essex with a depth of cover of 0.75 metre and service connections to the pipeline installed to residential and commercial properties at 0.5 metre depth of cover as per Enbridge Gas's Construction and Maintenance specifications.

13. Essex County has requested that when the proposed pipeline is within 6 metres of the edge of the road that the pipeline be installed with a 1.5 metres minimum depth of cover. This depth is significantly in excess of Enbridge Gas' standards and code compliant installation specifications and impacts approximately 22 km of the 29 KM proposed route.
14. Enbridge Gas agreed to a 1 metre depth of cover within 6 metres of the edge of the traveled portion of the road. Any deeper than this additional depth of cover has material financial implications not only to immediate construction, but longer-term for future operation and maintenance of the pipeline and connections of future services.
15. The additional depth of cover would significantly alter a typical construction plan for installation of a distribution pipeline within any road allowance including the proposed County Road 46 location. A depth of cover of 1.5 metres changes the excavation requirements and increases the potential for the conflict with other third party utilities.
16. The reason an increased depth of cover impacts construction and increases costs substantially are:
 - a. Trench excavations greater than 1.2 m requires consideration for shoring or trench sloping to project workers from the risk of excavation collapse and workers

becoming buried. This issue is clearly addressed in Ontario's Occupational and Health Act (OHSA) through Regulation 213/91 Part III Excavations. This part of regulation mandates protection for workers once a trench is deeper than 1.2m.

- b. There are two methods to protect the worker: sloping the walls of the trench or with shoring/trench boxes.
- Sloping: The slope of the wall is dependent on the soil type and can range from no slope for Type 1 soils to a 1:3 slope for Type 4 soils. Along County Road 46 Type 2 soil is expected and will require a 1:1 slope. As noted, Essex County prevented investigation to confirm these facts. For a Type 2 soil, the trench will be approximately 3m wide at grade (the top of the excavation). This is a very wide trench paralleling a road with traffic management. The additional excavation will increase the size of the spill piles which are located near existing drains and ditches.
 - Trench Box - A trench box is typically 2 metre wide, but only 5 metre long. Movement of trench boxes will require additional equipment and will reduce productivity. Additionally, movement of trench boxes are slow and cumbersome and many will have to be used in a day to obtain any production where it is expected to install 300 metres of pipe a day. That means a trench box would have to be moved 60 separate times.
 - Service Connections - All open excavations for tie-in to the existing system or service connections would require the use of trench boxes for the protection of workers. Please see the figure in Attachment 2 depicting a typical tie-in or service connection excavation sizes based on depth of cover of the pipeline. Excavations to accommodate trench boxes are generally much larger than typical distribution work and will be highly disruptive in the higher population and growth areas along this route.

17. The utilization of trench boxes or shoring mechanisms is highly atypical for distribution pipeline installations of main or services and this equipment is not generally utilized in new customer attachments.
18. Conflicts with other utilities at similar depths (e.g. water, storm, fibre optics, etc) precipitates a high likelihood of requiring temporary support of existing utilities if exposed at tie-in locations or service connections. Enbridge Gas would need to request approvals with municipalities and other utilities at similar depths for support plans for open excavations if even permitted.
19. Both sloping and trench boxes increase the complexity of safely managing traffic and maintain a safe construction area.
20. The estimated increase in costs from County of Essex request to increase the NPS 6 pipe depth to 1.5 metres is provided at Exhibit B, Tab 1, Schedule 4.
21. Enbridge Gas did consider moving the running line to a location greater than 6 metres from the traveled portion of the roadway. While this would position the pipeline away from the road edge and minimize lane closure requests, the location is problematic as it generally positions the pipeline on the edge of, or under, municipal drains. Municipal drains are generally a regulated area with numerous conditions and restrictions for both construction methods, restoration and timing windows. Municipal drains are commonly treated as another utility because of their requirement for maintenance, including dredging.
22. Moving to such a location creates additional complications:

- a. The installation of pipelines beneath municipal drains is generally an avoided alignment. This request would require trenchless methods throughout the entire preferred route along County Road 46 and may prevent connection of distribution services. Dam and pump crossings for such drains along the entire route would be a minimum expectation throughout construction and in subsequent maintenance and operations to add services for growth in the Town of Lakeshore. The distribution services in this region would be required to employ dam and pump crossing methods within the environmental scheduling windows for service attachments.
 - b. Essex County's request to move further into these drainage areas also have restrictions to minimum depths at engineered bottoms, which in this case, is an additional 2 metres below engineered bottoms. Excavations would not only be significantly lower than grade of the road; but service connections would be an additional 2 metre depth.
23. Essex County's proposal to move the distribution main to this location offers no construction cost relief to Enbridge Gas. It also significantly compromises the prospect of any future growth in service attachments.
24. Essex County's demand for additional depth will make it more difficult to accommodate the required clearance to these other utilities. A number of conflicts present themselves at the 1.5 metre depth of cover requested by the County of Essex. For example, at 1.5 metre depth of cover the required 1 metre clearance to watermains from gas service lines cannot be met (see Attachment 2).
25. Enbridge Gas's typical installation of NPS 6 distribution pipelines can accommodate clearances to other utilities at the long standing 0.75 to 1 metre depth primarily using

open cut trenching methods which are most efficient and effective in terms of time and cost.

1.2 Existing Windsor Line Abandonment - Removal

26. Essex County's specific requests for the full abandonment and removal of the existing Windsor Line are inconsistent with Enbridge Gas's typical practice and were not planned as part of the Project's 2021 construction plan.
27. Enbridge Gas typically abandons pipelines located in public road allowance in place; sectioning and capping the pipeline to prevent it from becoming a conduit for underground water and filling it with grout under areas with above settlement concern or that would be too disruptive to excavate (i.e. under roadways, driveways, watercourse crossings and environmentally sensitive areas).
28. The existing pipeline being abandoned was installed primarily within 1 metre of the property line offering homeowners, municipalities and the County the ability to establish landscaping and tree coverage. There are currently 186 customer homes and in excess of 90 anticipated agricultural lands to cross that will require full temporary land use executions, archaeology assessments and soil remediation to remove fully.
29. Removal would require a significant excavation along the entire 21.9 kms route currently with the County Road 46 right of way to open, lift and remove this mechanically coupled pipe. Any suggestion of pulling pipe would result in stranded fittings and pipe segments in unknown areas.

30. Full abandonment and removal along an area that for decades has been built up and established within a metre of property line would result in significant long-term remediation for restorations.

31. The estimated increase in costs from County of Essex request to abandon the existing NPS 10 are provided at Exhibit B, Tab 1, Schedule 4.

2.0 Communication with Essex County

32. Enbridge Gas entered into an agreement with the Corporation of the County of Essex on December 11, 1957 ("1957 Agreement"). A copy of the 1957 Agreement is provided at Exhibit B, Tab 1, Schedule 3, Appendix A.

33. The 1957 Agreement grants to Enbridge Gas the right to install, use, maintain, repair, abandon, reconstruct or alter pipelines in the highways under the jurisdiction of Essex.

34. It is a condition of the 1957 Agreement that any pipeline constructed shall be laid at locations approved by the Roads Superintendent for Essex County and shall be constructed so as to not interfere with the use of the highway or any sewers, water-pipes, drains, or ditches therein or thereon.

35. As a result of these requirements, Enbridge Gas contacted the County of Essex in May 2019 to review the details of the Project, the pipeline construction plan and discuss any concerns, questions, or conditions which they might have in order to secure the above-noted consents.

36. Enbridge Gas conducted meetings and presentations with both Essex County elected officials (County Council) as well as meetings with Essex County staff starting in May 2019 and continuing through to May 2020.
37. During the initial meetings, Essex County advised Enbridge Gas that it would require Enbridge Gas to enter into a Road User Agreement (“RUA”). This RUA outlines the terms of the consent from the County Engineer regarding pipeline construction and location.
38. During those meetings with council and staff, Essex County had questions regarding the location of the pipeline within the limits of County Road 46 as well as the size of the pipeline.
39. Specifically, Essex County questioned why the pipeline was to be constructed within the limits of a public highway and not on private easements acquired from landowners adjacent to County Road 46. Essex County also questioned the size of the pipeline and whether it was adequately sized to meet the future growth projected in the area.
40. Enbridge Gas provided answers to these questions. Enbridge Gas advised the County of Essex that they might want to consider participating in the OEB’s leave to construct hearing as an intervenor where these issues would be reviewed in the public forum and ultimately decided by the Board.
41. Essex County chose not to intervene in the leave to construct application.

42. Notwithstanding the responses provided by Enbridge Gas, and the fact the 1957 Agreement specifically grants Enbridge Gas the right to install the pipeline within a highway, Essex County continues to take the position that the OEB approved pipeline should not be constructed within the limits of County Road 46 but rather on private easement. Most recently, this position was again put forward by the County of Essex staff during discussions in May 2020.
43. Between May 2019 and December 2019, Essex County advised Enbridge Gas of its position that they would not issue any permits or draft RUA for the construction of the pipeline within County Road 46 until its concerns regarding pipeline capacity and pipeline location were satisfactorily addressed.
44. During the months of December 2019, January 2020 and February 2020, Enbridge Gas provided further documentation to Essex County in an attempt to address its questions. Enbridge Gas proposed revised traffic control plans and pipeline alignment drawings. Essex County advised Enbridge Gas however that the drawings and documentation provided did not address their concerns. The County of Essex did not offer Enbridge Gas any examples of what documentation would in fact address their concerns.
45. During this time period, Essex County advised Enbridge Gas that in addition to its requirements regarding pipeline location it also insisted that at no time would Essex County permit any lane closures at any time for County Road 46. Essex County confirmed, that always, two lanes of traffic must remain open.

46. During a meeting with the County of Essex on February 6, 2020, Essex County re-affirmed its requirements that the pipeline must be installed with a depth of cover of 1.5 metres and that at no time will it permit any lane closures on County Road 46.

47. Enbridge Gas then provided the county with revised pipeline alignment drawings and a revised Traffic Control Plan ("TCP").

48. Between March 8, 2020 and April 8, 2020, Essex County advised Enbridge Gas of new additional requirements which they must review, approve, and include in the RUA.

49. Such specific requirements are not typically provided by Enbridge Gas for any similar type of pipeline construction. These requirements include:

- a. The TCP must be created for every type of construction activity, the location of the work for everyday calendar day of the Project.
- b. Essex County requested a pipeline removal plan, notwithstanding they agree that it will be separately permitted, for work that will take place in 2021 or 2022.
- c. Essex County requires a pavement protection plan, identifying types of vehicles, equipment, as well as Ministry of Transportation Book 7 plans, specific daily work schedules and hours of lane closures. The re-routing of traffic to HWY 401 will not be considered as part of plan.
- d. Require pace vehicles to be written into plan.

50. In addition, Essex County advised that RUA will be available by March 18, 2020.

51. On March 18, 2020, Essex county advised Enbridge Gas that the RUA is with their solicitor and will be available within a few days.
52. Enbridge Gas and AECON (contractor) sent revised plans to Essex county.
53. On March 24, 2020, Essex County advised they have not reviewed the TCP, but that the road closure days are not acceptable. Essex County did not provide direction on what is acceptable and indicated that RUA will be delayed.
54. With respect to the requirement from the county regarding road closures and TCP on every portion of County Road 46 for every day of Project construction, Enbridge Gas advised this is not possible, as it is impossible to predict weather delays or equipment delays. Enbridge Gas did commit to a daily/weekly communication plan with the County of Essex to keep them up to date.
55. On April 8, 2020 the county advised Enbridge Gas of a new requirement. It now requires that the pipeline design must comply with TAC Manual. The standard and industry accepted CSA Z662 and TSSA guidelines are not acceptable. Essex County commented on the detailed pipeline alignment plans as provided by Enbridge Gas on February 28, 2020, and stated the plans as provided require additional significant changes.
56. Essex County advised that the RUA is with their solicitor and may be available April 17, 2020.
57. Between April 17, 2020 and May 15, 2020 Enbridge Gas and the county held various discussions and meetings to review all requirements of the RUA.

58. Enbridge Gas agreed to a number of conditions and requirements insisted by the County of Essex.
59. Enbridge Gas did not however agree that the depth of pipeline should be 1.5 metres as this was not supported by either the applicable code requirements or engineering evidence. To address the depth of cover issue, Enbridge Gas provided its certified engineering analysis as part of Article 4 of the RUA. The purpose of Enbridge Gas providing an engineering report was to demonstrate through objective analysis to Essex County that the depth of cover at 1.0 metre was safe and the load analysis was reasonable.
60. Essex County never provided an explanation or sufficient explanation about why there was reluctance to accept this analysis. It's unclear to Enbridge Gas why a certified report was prepared for Essex County if it did not intend to accept the report.
61. On May 11, 2020 Essex County and Enbridge Gas met further to address the depth of cover and any concerns. Essex County had raised a concern about the risk of legal liability at a depth of 1.0 metre but Essex County had failed to explain how it was exposed to increase risk particularly in light of the following:
- a. Enbridge Gas had provided a certified engineering report;
 - b. There has been no history of claims/concerns regarding pipeline depth with Enbridge Gas or legacy Union Gas;

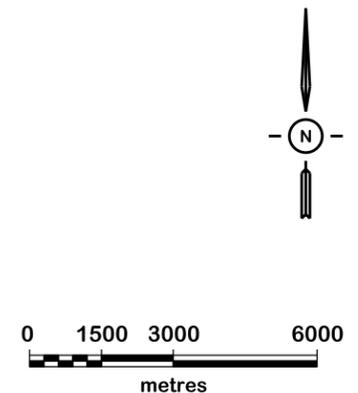
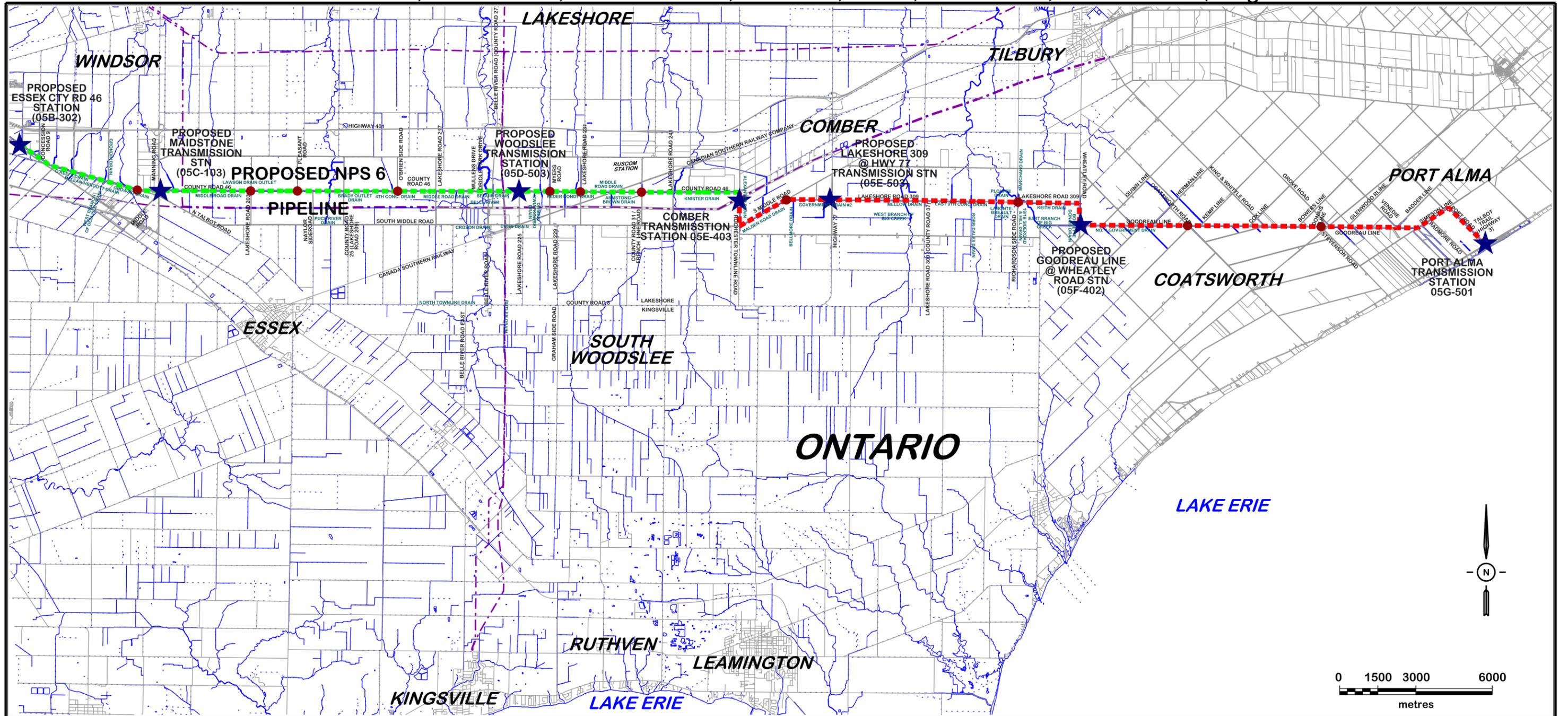
- c. The critique by Haddad, Essex County's third party reviewer, is erroneously relying on a transmission pipeline standard for depth and not the distribution pipeline standard;
- d. The TAC guidelines are being misapplied, and
- e. That there is no difference with respect to the TSSA standards for the depth of cover clauses in the CSA-Z662-15 and CSA Z662-19.

62. Following the meeting, Essex County staff advised that regardless of any engineering evidence or conclusion it would not be agreeable to deviate depth of less than 1.5 metres. Further, Essex Staff indicated the position was based on their interpretation of the TAC guidelines. Enbridge Gas's opinion on the TAC guideline is provided at Exhibit B, Tab 1, Schedule 5.

63. At this point, discussions with Essex have concluded without a signed RUA or other approval for the work to proceed. Further discussion on the RUA is provided at Exhibit B, Tab 1, Schedule 7.

64. Enbridge Gas cannot resolve this matter without the approval of the Board. Either the Board determines Enbridge Gas has an appropriate and safe design and exercises the authority granted by Section 101 of the *Ontario Energy Board Act, 1998* or the Board approves, pursuant to Condition 4 of the Decision and Order, the incorporation of the demands of Essex County.

65. Enbridge Gas has commenced construction of the Pipeline in other areas. If there is no resolution of this matter prior to August 15, 2020, additional costs will be incurred as a result of construction demobilization and mobilization.

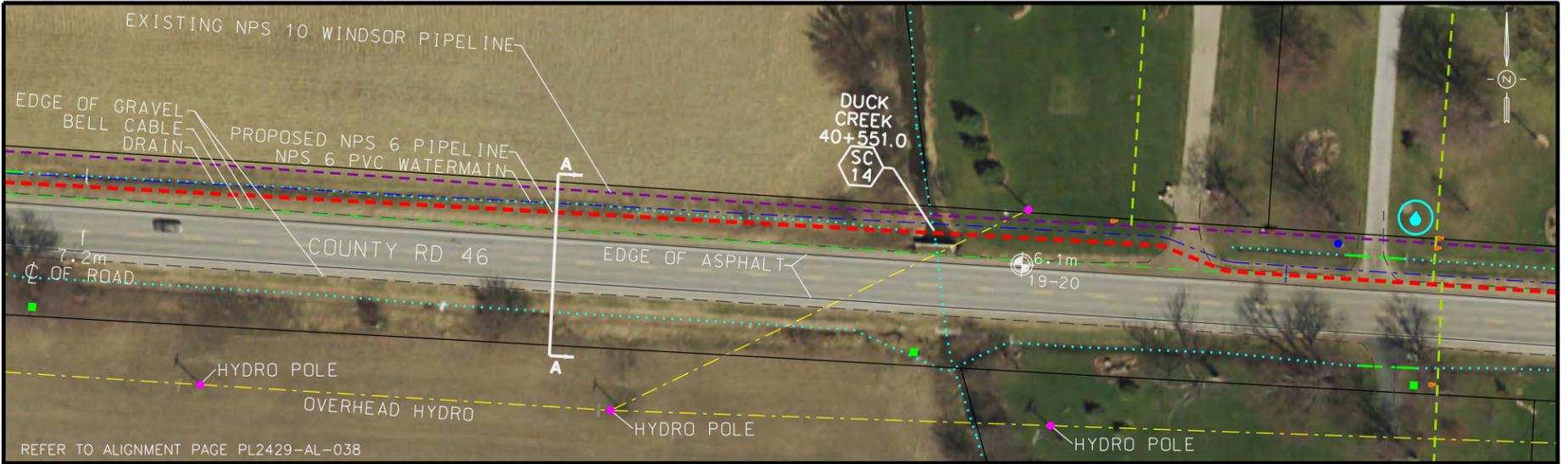


ENBRIDGE GAS SHEET
 KEY MAP - HIGHLIGHTED COUNTY ROAD 46 ALIGNMENT 1 OF 1

PLOT SCALE 1:150000

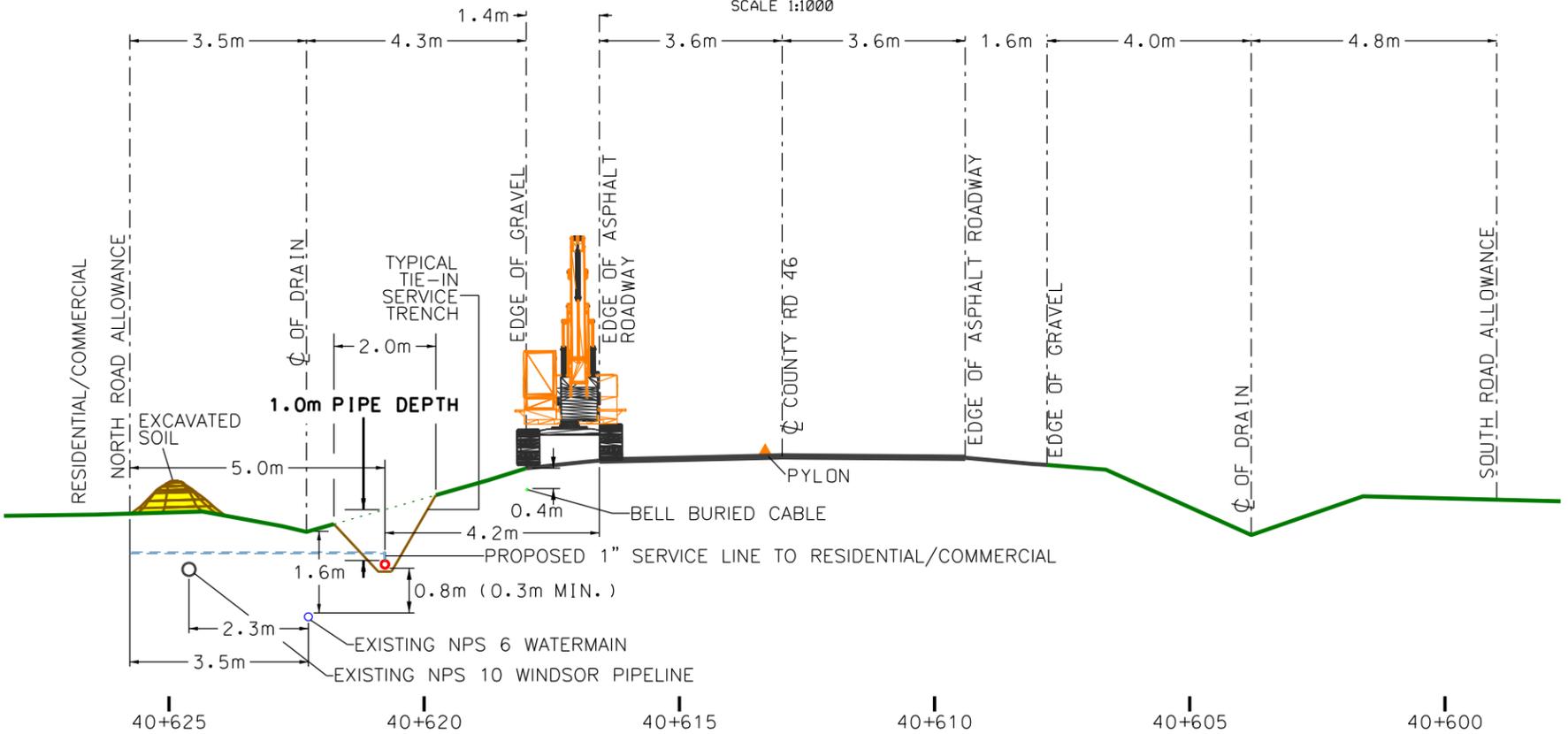
LEGEND

PROPOSED NPS 6 WINDSOR	-		CLASS 7 (SMALL) STATION	-	
HYDRO LINES	-		WATERCOURSE / DRAIN	-	
STATION	-		ROADS	-	
			COUNTY ROAD 46 REPLACEMENT - (NPS 6)	-	



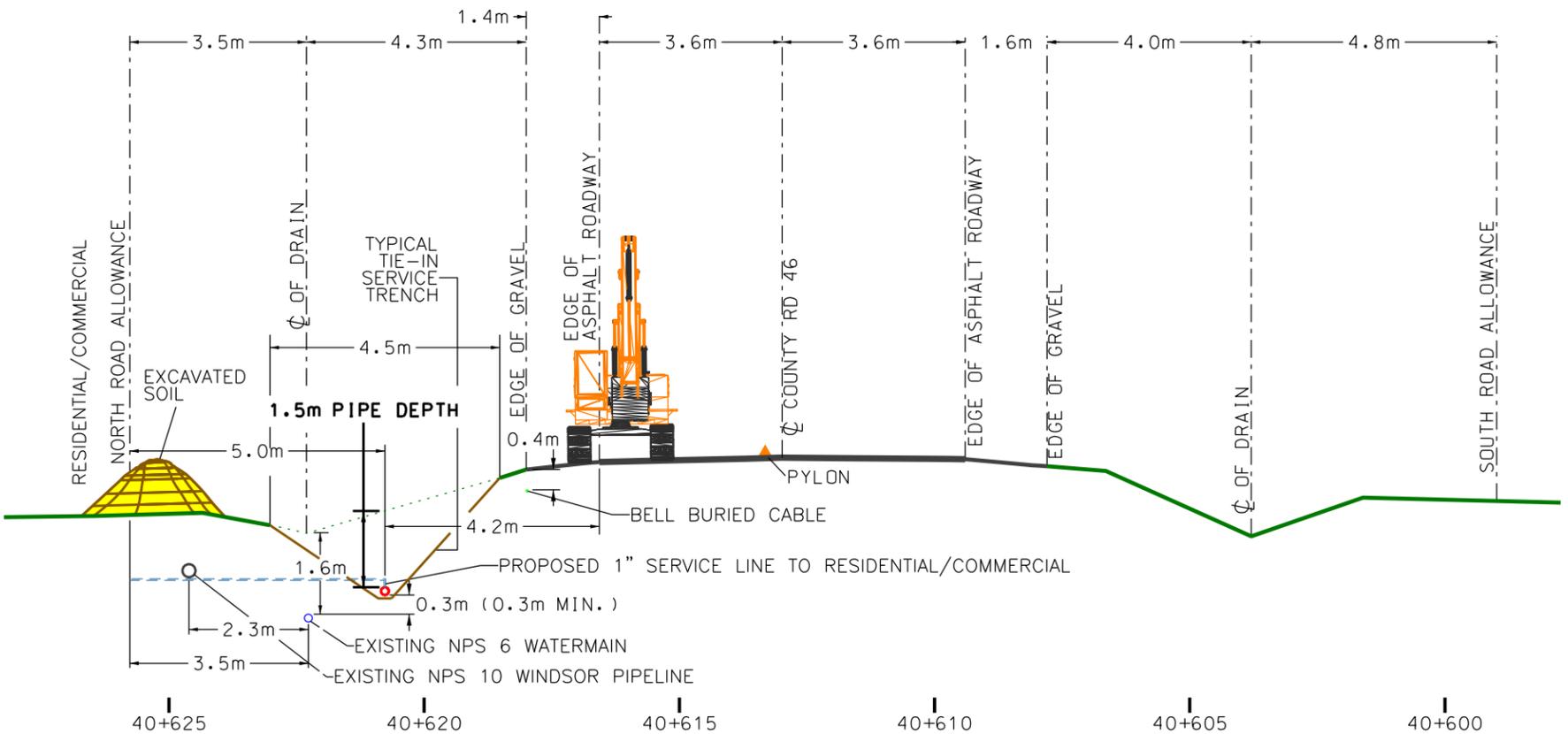
PLAN VIEW

SCALE 1:1000



ROW CORRIDOR CROSS SECTION A-A

SCALE 1:150
PIPE DEPTH 1.0m



ROW CORRIDOR CROSS SECTION A-A

SCALE 1:150
PIPE DEPTH 1.50m

NOTE: DEPTH OF UTILITIES ARE ESTIMATED.

NOTE: DEPTH OF UTILITIES ARE ESTIMATED.

REVISIONS

NO.	DATE	BY	APP'D	REMARKS
A	2020-06-09	N.C.	B.N.W.	ISSUED FOR INFORMATION



2020 NPS 6 WINDSOR LINE REPLACEMENT
ROW CORRIDOR CROSS SECTION - COUNTY ROAD 46
SAMPLE TIE-IN OR SERVICE ATTACHMENT TRENCH

DRAWN BY	NICO CARIATI	DATE	2020-06-01	SCALE	AS SHOWN	PLOT SPEC.	1:1
CHECKED BY		DATE		AC/DRAW CODE	PL2429-RWCS-03.dgn		
APPROVED BY	BLAIR WARNOCK	DATE	2020-06-09	FILE REVISION DATE	2020-06-09		
SIZE	B	DRAWER	N/A	SHEET	1 of 1		
				DRAWING NO.	PL2429-RWCS-03		

PIPELINE INSTALLATION DEPTH OF COVER AND ABANDONMENT
STANDARDS

1.0 CSA Standard

1. Ontario Regulation 210/01 requires that all Oil & Gas pipelines in Ontario must comply with the standards, procedures and other requirements of the CSA Z662 standard. Therefore, this standard in conjunction with the Technical Safety and Standards Authority ("TSSA") Code Adoption Document form the basis of how all pipelines are designed, constructed and maintained in Ontario. The LTC Application included multiple references to these requirements.
2. The CSA Z662 is structured in such a way that the requirements of this standard are considered to be adequate under conditions normally encountered in the oil and natural gas industry. Specific requirements for abnormal or unusual conditions are not prescribed, nor are all details related to engineering and construction prescribed. In practical terms this means that under normal conditions, if the minimum requirements of this standard are met, the pipeline is considered safe to operate by the regulatory authorities governing this industry.
3. The premise of this standard is to allow the majority of pipeline projects to be clearly and easily designed, constructed and maintained without the need to design it from first principles every time.
4. The CSA Z662 standard contains many different sections related to design, installation and maintenance of pipelines. Section 12 of this document is specific to distribution pipelines. As the proposed pipeline operates at less than 30% SMYS, is downstream of a higher pressure supply system, is odourized, has a number of

distribution stations attached to it and, has several hundred customers (residential and commercial) connected directly to the pipeline, it meets the definition of a distribution system in the CSA Z662.

5. Section 12.7 of the CSA Z662 addresses appropriate depth of cover for pipelines and includes the following clauses.

12.4.7.1

The requirements for cover specified in Clause 4.11 shall not apply. Except as allowed by Clause 12.4.7.2, the cover requirements for buried pipelines shall be as given in Table 12.2.

Note: *Where erosion or other factors are likely to reduce the cover, consideration should be given to providing additional cover or other means of protection.*

Table 12.2

Cover

(See Clauses [12.4.7.1](#), [12.4.7.2](#), and [12.4.8.2](#).)

Location	Cover for buried pipelines, minimum, m	
	Distribution lines	Service lines
Private property	0.60	0.30*
Right-of-way (road)	0.60	0.45
Right-of-way (railway)	0.75	0.75
Below travelled surface (road)	0.60	0.45
Below base of rail (railway):	1.20	1.20
Cased	2.00	2.00
Uncased steel or polyethylene		
Water crossing	1.20†	1.20†
Drainage or irrigation ditch invert	0.75	0.75

* *Consideration should be given to providing additional cover in areas to be cultivated or gardened.*

2.0 Company Standard

6. Similar to the intent of the CSA Z662, Enbridge Gas's internal procedures are based on providing minimum requirements that must be met to ensure the pipeline is safely designed, constructed and maintained. The requirements are conservative and facilitate quick and standard design requirements that can easily be applied within the different regions of the Company. In situations where these conservative minimum requirements cannot be met, Engineering would need to analyze and approve an appropriate alternative.

7. Enbridge Gas's Construction & Maintenance Manual Section 3.9 contains the requirements that apply to this pipeline installation.

Minimum Cover Requirements for New Installations

Location	Minimum Cover for Buried Pipelines		
	Distribution Main	Distribution Service	Transmission (30% SMYS)
GENERAL			
Agricultural	1200 mm	1200 mm	1200 mm
Non-agricultural	1000 mm ³	500 mm ¹	1200 mm
Non-agricultural, rock excavation	600 mm ¹	300 mm ²	1200 mm
ROADWAYS			
Road crossing ⁴	1000 mm	750 mm	1200 mm
Untravelled portion of right-of-way	750 mm	500 mm	1200 mm
RAILWAYS			
Below base of rail (uncased)	3250 mm	3250 mm	3250 mm
Within rail ROW/ditch (uncased)	2000 mm	2000 mm	2000 mm
Below base of rail (cased)	2000 mm	2000 mm	2000 mm
Within rail ROW/ditch (cased)	1200 mm	1200 mm	1200 mm

WATERCOURSE			
Water crossing	1200 mm	1200 mm	1200 mm

3.0 Normal Circumstances - Further Cover Not Required

8. Enbridge Gas has reviewed the Project in detail and is not aware of any unusual circumstances that would warrant increasing the depth of cover beyond 1.0 metre within the untraveled portion of the County Road 46 right of way. Enbridge Gas has planned to abandon the existing Windsor Line in place within the road allowance of County Rd 46. This is consistent with Enbridge's Construction and Maintenance specifications and meets the intent of the CSA Z662 code for pipeline abandonment.

4.0 Abandonment

9. Abandonment involves isolating the pipeline from other inservice piping, purging it of gas, sectioning it into pieces and plugging it so it does not become an underground water conduit. The abandoned line would be grouted in place in areas where subsidence is a concern and anywhere it is exposed the pipeline would be removed, i.e. at aerial crossings of watercourses. Removal is normally only considered for buried pipeline when the abandoned line is in conflict with a proposed facility.

10. Abandonment in place is permitted under the CSA Z662 and is the common practice by Enbridge Gas.

FRANCHISE AGREEMENT

1. Enbridge Gas entered into an agreement with the Corporation of the County of Essex on December 11, 1957 ("**1957 Agreement**"). A copy of the 1957 Agreement is provided at Appendix A to this exhibit.
2. The 1957 Agreement grants to Enbridge Gas the right to install, use, maintain, repair, abandon, reconstruct or alter pipelines in the highways under the jurisdiction of Essex.
3. Enbridge Gas has installed distribution mains in Essex County without issue many times. Essex County has not previously required Enbridge to enter into any additional Road User Agreement in furtherance of the Franchise Agreement.
4. Further, in its review of prior pipeline installations, Essex County has not required additional depth of cover except under the travelled portions of the roadway or where a direct conflict would exist. Further, Essex County has previously accepted the practice of abandoning facilities in place.
5. It is a condition of the 1957 Agreement that any pipeline constructed shall be laid at locations approved by the Roads Superintendent for Essex County and shall be constructed so as to not interfere with the use of the highway or any sewers, water-pipes, drains, or ditches therein or thereon. The current proposal by Enbridge Gas does not interfere with the use of the highway or any sewers, waterpipes, drains or ditches. Enbridge did agree to additional requirements in

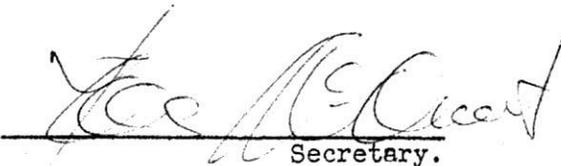
respect of the future road construction that is planned for between 5 and 10 years into the future.

6. The request for additional depth by Essex County increases the likelihood of interference with the watermains of the Town of Lakeshore. The Town of Lakeshore has a watermain that was installed several decades ago at a depth of approximately 1.5 metres. The Town of Lakeshore wishes to maintain 1.5 metres of separation from its watermain to reduce the potential impact of the Pipeline installation on the watermain. By increasing the depth of cover for the Pipeline, it will increase the likelihood of disturbing the watermain.

7. The Franchise Agreement limits the pervue of the Road Superintendent to reviewing proposed pipeline installations for such interference and does not grant the Road Superintendent authority to impose design or other restrictions beyond those necessary to limit such interference.

I HEREBY certify the attached to be true copies of
By-law # 1270 of the County of Essex,
finally passed the 11th day of December, 19 57,
and agreement pursuant thereto dated the 11th day
of December, 19 57, between the said County
of Essex and Union Gas Company of Canada,
Limited, duplicate originals of which are in the
possession of the said Union Gas Company of Canada,
Limited.

AS WITNESS my hand as Secretary and the corporate seal
of the said Union Gas Company of Canada, Limited this
11th day of May, 1965.


Secretary.

BY-LAW NUMBER 1272

- of -

THE CORPORATION OF THE COUNTY OF ESSEX

A By-law to authorize Union Gas Company of Canada, Limited (hereinafter called "the Company") to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the Council of The Corporation of the County of Essex.

FINALLY PASSED the ^{17th} ~~10th~~ day of December, A.D. 1957.

WHEREAS the Company has requested The Corporation of the County of Essex (hereinafter called "the Municipality") to grant it a franchise or right to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality, and is not used or operated in the Municipality for any other purpose, except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

AND WHEREAS subject to the terms and conditions hereinafter set forth, the Council of the said Municipality has agreed to grant the said franchise.

BE IT THEREFORE ENACTED by the Council of The Corporation of the County of Essex as follows:-

BY-LAW NUMBER 1270

-- of --

THE CORPORATION OF THE COUNTY OF ESSEX

A By-Law to authorize Union Gas Company of Canada, Limited (hereinafter called "the Company") to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the Council of The Corporation of the County of Essex.

-- --

1st READING - December 10, 1957

2nd READING - December 11, 1957

3rd READING - December 11, 1957

FINALLY PASSED - December 11, 1957

-- --

McNeill, Gee & O'Connor,
Barristers, etc.
Bank of Montreal Bldg.
CHATHAM, Ontario.

AGREEMENT made in duplicate this ~~11th~~ ^{11th} day of December, ¹⁹⁵⁷

A.D. 1957.

B E T W E E N:

THE CORPORATION OF THE COUNTY OF ESSEX,
hereinafter called "the Corporation"

- OF THE FIRST PART -

2

A N D

UNION GAS COMPANY OF CANADA, LIMITED,
hereinafter called "the Company"

- OF THE SECOND PART -

WHEREAS the Company has requested The Corporation of the County of Essex (hereinafter called "the Municipality") to grant it a franchise or right to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

AND WHEREAS the Council of the Corporation has by By-law passed on the ~~10th~~ ^{11th} day of December, A.D. 1957, granted the said franchise from and after the date of the execution of this Agreement and has authorized and empowered the Warden and Clerk of the Corporation to execute this Agreement and to affix the corporate seal thereto.

NOW THEREFORE THIS AGREEMENT

- 2 -

ted, its successors and assigns, to keep, use, operate, repair, maintain, remove, abandon, replace, reconstruct, alter and extend its existing lines, pipes and works in the highways under the jurisdiction of the Council of the Municipality and to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

2. The rights and privileges hereby granted shall continue and remain in force for a period of ten years from the date hereof and so long thereafter as the said lines are in actual use for the transportation of gas.

3. The said pipelines shall be laid across the said highways in locations approved by the Road Superintendent of the County of Essex for the time being or such other officer as may be appointed by the Council for that purpose, and the charges of such Road Superintendent or other officer attending to give such approval shall be paid by the Company.

4. All pipelines shall be placed underground, if required by the officer of the Corporation and shall be so constructed as not to obstruct or interfere with the use of the highway or with any sewers, water-pipes, drains or ditches thereon or therein, or with works of

it was entered upon or opened.

6. In the event that the Corporation in pursuance of its statutory powers shall deem it expedient to alter the construction of any highway or of any municipal drain, ditch, bridge, culvert or other municipal works or improvements thereon or therein and in the course thereof it shall become reasonably necessary that the location of a main, line, pipe or works of the Company laid or operated under this By-law should be altered at a specified point to facilitate the work of the Corporation, then upon receipt of reasonable notice in writing from the Clerk of the Corporation specifying the alteration desired, the Company shall, at its own expense, alter or re-locate its main, pipe, line or works at the point specified.

7. The Company shall and does hereby at all times indemnify and save harmless the Municipality from and against all loss, damage, injury or expense which the Municipality may bear, suffer or be put to by reason of any damage to property or injury to persons caused by the construction, repair, maintenance, removal or operation by the Company of any of its mains, pipes, lines or works in the Municipality unless such loss, damage, injury or expense is occasioned by Act of God or by the act, neglect, or default of some person, firm or corporation other than the Company, its servants, contractors, sub-contractors, agents or employees.

8. This agreement shall enure to the benefit of and be binding upon the parties hereto, their successors and assigns.

IN WITNESS WHEREOF the said parties have caused to be affixed hereto their respective corporate seals duly attested by the hands of their proper officers in that behalf.

SIGNED, SEALED AND DELIVERED



of

THE CORPORATION OF THE COUNTY OF ESSEX

Laurence Barrett
Warden.

DATED December 11th A.D. 1957.

THE CORPORATION OF THE COUNTY OF
ESSEX

-- and --

UNION GAS COMPANY OF CANADA,
LIMITED

--: AGREEMENT :--

McNevin, Gee & O'Connor,
Barristers, etc.
Bank of Montreal Bldg.
CHATHAM, Ontario.

INCREASED COSTS FROM ESSEX COUNTY'S REQUIREMENTS

1. As previously noted in the evidence, Enbridge Gas has stated the demands of Essex County will increase the cost of construction above what was provided in the LTC Application. Enbridge Gas notes that there was significant interest from the OEB and the intervenors with respect to the cost difference of approximately \$1.3 million for replacing a segment of the then proposed NPS 6 steel pipeline with NPS 4 steel pipeline.
2. Enbridge Gas has estimated the cost for removing the abandoned pipeline and for providing the additional depth of cover at 1.5 meters as compared to the costs provided in the LTC Application. The combined potential increased cost is approximately \$13.1 million.

Cost of Removal v. Abandon In-Place

3. A map showing the extent of the removal of the abandoned NPS 10 steel main is provided at Exhibit B, Tab 1, Schedule 1, Attachments 1 and 2.
4. The estimated cost for the scope of work to remove the NPS 10 steel requested by the County of Essex rather than to abandon the existing NPS 10 is as follows:

General Construction	\$3,500,000
Lands TLU	\$1,100,000
Environmental and Archaeology	\$800,000
Hydro Pole Support	\$255,000
Tree Clearing	\$225,000
<hr/>	
TOTAL	\$5,875,000

5. Removal of abandoned pipeline is not the standard practice within the industry and there are a number of activities that must be completed to properly remove such a pipeline. In order to comply with the demand of Essex County, Enbridge Gas has forecasted removing approximately 21.9 kms of NPS 10 pipeline. Road crossings would not be removed and the above estimate excludes costs associated with any removal activities that were included in the LTC Application.

6. For the LTC Application, Enbridge Gas forecasted abandonment activities and remediation would occur in 2021 and potentially 2022. Compliance with the demands of Essex County would:
 - a. Require additional environmental and archaeological permitting as the excavation requirements are increasing;
 - b. Extend the duration and level of construction activity in 2021 significantly, potentially as much as 7 months;
 - c. Increase post-construction remediation significantly in 2022; and
 - d. Result in greater inconvenience for adjacent property owners and motorists along the highway which was a significant concern of Essex County.

7. For example, where the old pipeline was to be abandoned in-place, Enbridge Gas would, if removing such pipeline be required to conduct such removal around all existing infrastructure – such as hydro poles – which may require support.

Cost of Additional Cover: 1.5 metres v. 1 metre

8. The LTC Application was premised upon the requirements of CSA Z662 and Enbridge Gas’s construction standards, policies and procedures. The costs provided in the LTC Application did not include the additional costs of achieving a depth of cover of 1.5 metres for approximately 22.9 kms.
9. The estimated cost to increase the NPS 6 pipe depth of cover to 1.5 metres is as follows:

General Construction	\$6,700,000
Service Install Impacts	\$350,000
Tiling, Insurance, Compaction	\$137,000
<hr/>	
TOTAL	\$7,187,000

10. These costs are incremental to the proposed scope and cost described in the LTC Application. It should be noted that the additional depth changes several aspects of the proposed project, including:
- a. The additional depth requires different trenching protection and the use of shoring (see Exhibit B, Tab 1, Schedule 1);
 - b. The spoil piles from the excavation are larger meaning a larger footprint for the construction activities;

- c. Activities such as backfilling the excavation will take longer as there are more levels and a greater area for compaction;
- d. Service connections will be more costly as there is more third party infrastructure to constrain the work; and
- e. Post-construction remediation is increased as there is greater likelihood of increased settlement as both the footprint and depth of excavation increased.

11. Enbridge Gas also notes the increased depth will increase the potential for conflict with the Town of Lakeshore's watermain. The existing watermain is fragile and any movement or disturbance of the watermains can loosen the joints and result in leaks. These additional potential costs of reduced production and watermain leaks have not been included.

12. These are the capital costs associated with these activities. Please note that the cost of new service installation and maintenance costs of the new pipeline will increase with the increased depth.

APPLICABLE CONSTRUCTION STANDARDS

1. As noted in the LTC application¹, Enbridge Gas has designed the Pipeline to meet or exceed the requirements of the CSA Z662. Essex County has insisted upon the additional depth of cover and removal of the abandoned NPS 10 Pipeline purportedly based upon the requirements of the Transportation Association of Canada (“TAC”), “Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way (“TAC Manual”) and the imposition of conditions that would be more typical of transmission pipelines.

1.0 Opinion regarding Safety – loading

2. As noted in the LTC application², Ontario Regulation 210/01 requires that all Oil & Gas pipelines in Ontario must comply with the standards, procedures and other requirements of the CSA Z662 standard. This standard, in conjunction with the Technical Safety and Standards Authority (TSSA) Code Adoption Document, form the basis of how all pipelines are designed, constructed and maintained in Ontario.
3. Enbridge Gas has designed the Pipeline to meet those requirements. In the LTC application³, Enbridge Gas identified that the minimum depth of cover is 0.6 metres as set out in section 12.4.7 and Table 12.2 of the CSA Z662 and that additional cover may be provided to accommodate existing or planned facilities were ground conditions allow greater depth.

¹ EB-2019-0172, Exhibit B, Tab 1, Schedule 5, paragraph 4, filed: 2019-08-09

² EB-2019-0172, Exhibit B, Tab 1, Schedule 5, paragraph 3, filed: 2019-08-09

³ EB-2019-0172, Exhibit B, Tab 1, Schedule 5, page 2, filed: 2019-08-09

4. Enbridge Gas notes that the Environmental Report (page 4.4)⁴ filed with the LTC application, and other materials provided as part of the consultation on the Pipeline identified that the depth of excavation would be approximately 1 metre except for road and water crossings.
5. Enbridge Gas notes it has incorporated the TSSA guidelines and the CSA Z662 requirements regarding the proposed abandonment of the NPS 10 pipeline which were filed in the LTC Application at Exhibit C, Tab 5, Schedule 2 and Exhibit C, Tab 5, Schedule 3 respectively. Enbridge Gas provided the TSSA with the plans for the Pipeline which were accepted and approved without comment.
6. During the several months long consultation period for the Environmental Report and subsequently during the LTC Application Essex County remained silent. Further, during that time, there was no statement by Essex County about the applicability of the CSA Z662 or suggestion that the TAC Manual is applicable.
7. The minimum requirements provided in the CSA Z662 are conservative to allow wide spread use such that pipelines may be installed without the need for an individual engineering from first principles every time. Where conditions are abnormal or unusual, engineering judgement may require further more detailed analysis.
8. While none of the conditions that this Pipeline would be exposed to are considered abnormal or unusual, at the request of the Essex County, Enbridge Gas completed a detailed engineering analysis of the stresses that would be transferred to the pipe

⁴ EB-2019-0172, Exhibit C, Tab 6, Schedule 1, filed: 2019-08-09

under the most severe loading conditions permissible by law in Ontario and found that the pipe could withstand these stresses with a large margin of safety at the proposed 1 metre depth. Enbridge Gas's stress analysis is provided at Appendix A to this exhibit. This exercise was completed again with an independent third party, Wood PLC, that also concluded the pipe could be safely operated under the most severe loadings expected (the "**Wood Report**"). A copy of the Wood Report is provided at Appendix B to this exhibit.

9. Essex County retained another engineer, Haddad Morgan & Associates (the "**Haddad Report**"), to review the findings by Wood. The Haddad Report is provided at Appendix C to this exhibit. Within the Haddad Report there is:
 - a) A criticism that Enbridge Gas did not use the latest version of the CSA Z662. In response, Enbridge Gas noted that it used the version of the CSA Z662 that has been adopted in Ontario and has the force of law. Further, Enbridge Gas noted the provisions in both versions of the code were the same so it did not matter;
 - b) An erroneous characterization of the Pipeline as a transmission line rather than a distribution line thereby applying the incorrect cover criteria;
 - c) A criticism of the assumption in the Wood Report regarding the nature of the soil. However, the Haddad Report omitted the fact that Essex County has not permitted investigation of the soil by Enbridge Gas;
 - d) A misapplication of the TAC Manual that ignores the limitations expressly provided in the TAC Manual. Further correspondence from Haddad is provided at Appendix D to this exhibit.

10. Essex County provides no technical analysis that Enbridge Gas's proposal is unsafe.

2.0 The TAC Manual

11. While Essex County had requested additional depth of cover, it had not provided a basis for that request until April 2020 when it presented the proposed Road User Agreement. It was only at that time that Enbridge Gas became aware that Essex County was seeking to rely upon the TAC Manual. Enbridge Gas views the requests as a misapplication of the suggestions dixprovided by the TAC Manual.

12. Enbridge Gas works with numerous municipalities for the installation of its distribution main. This is the first time any municipality has raised the TAC Manual with Enbridge Gas. Enbridge Gas is of the view that the TAC Manual is not intended to apply to pipelines running parallel within the road right of way. Further, Enbridge Gas does not view its current proposal as in any way conflicting with a proper review of the TAC Manual.

13. The TAC Manual is intended to be a voluntary guidance document for road authorities to achieve consistency in the installation of infrastructure crossing roadways. As noted in the TAC Manual, "Objectives of the Guidelines", page ii

The purpose of these general guidelines is to assist the various road authorities in establishing and administering reasonably uniform criteria for the accommodation of utilities crossing highway (and freeway) rights of way.

14. Enbridge Gas notes the TAC Manual, page 1 reproduced below, is not specific to Ontario nor the legal requirements applicable to pipeline construction within Ontario.

These guidelines make no reference to the legal right of utilities to use or occupy highway rights-of-way or the financial responsibility involved in the adjustment or relocation of utilities on such rights-of-way.

15. One intent of the TAC Manual is to avoid unnecessary costs being placed upon utilities and their ratepayers. The following text is copied from the foreward of the TAC Manual, *page ii*"

Utility companies provide essential services to the public. They often install their facilities within the rights-of-way of public roads. If the utilities were not allowed to use the rights-of-way, they could be required to purchase their own land, which would drive up the overall cost to the utility company. This could significantly increase the cost to the public.

However, the responsibility of road authorities includes operating the highway rights-of-way in a manner that ensures the safety, traffic-carrying ability and physical integrity of their installations. The presence of a utility within the right-of-way can affect these characteristics, so it is necessary for road authorities to reasonably regulate the presence of utilities.

16. It is Enbridge Gas's view that the TAC Manual is intended to apply to situations where utilities cross rights-of-way and is not intended to apply to utilities running in parallel with the rights-of-way. However, even if one accepts the TAC Manual is intended to apply to pipelines paralleling rights-of-way the depth of cover, the only reference to pipe paralleling the highway is a brief reference in Figure 4 and Table 1, Column C, reproduced below, that suggests longitudinal pipe have a depth of cover of 1 metre. Enbridge Gas notes that any installation beyond the existing subgrade of the travelled portion is only suggested to have a depth of cover of 1 metre.

**TABLE 1 -- Minimum Cover DEPTH FOR Underground Installations
 Crossing Highways (and Freeways)**

Utility Facility Type		A	B	C	D
		Below pavement structure (subgrade) mm	Below pavement surface mm	Below ground elevation mm	Below ditch line elevation mm
High Pressure Gas or Liquid Petroleum Pipelines (> 680 kPa)	unencased existant	450	1 200	900	900
	unencased new	450 or ½Ø	1 500	1 000	1 200
	encased existant	300	1 000	750	750
	encased new	450 or ½Ø	1 200	900	1 200
Medium and Low Pressure Gas or Liquid Petroleum Pipelines (< 680 kPa)	unencased existant	450	1 000	600	750
	unencased new	450 or ½Ø	1 200	600 750 plastic	900
	encased existant	300	1 000	600	750
	encased new	450 or ½Ø	1 200	600	900

17. Essex County is seeking a depth of cover as if the Pipeline was crossing under the travelled portion of the right-of-way. Such is not the case and Enbridge Gas notes where Essex County has identified a potential area of road expansion within the next 10 years, Enbridge Gas has made accommodation for such potential future road construction.

18. Essex County's request for a depth of cover of 1.5 metres is not consistent with their position that it is applying the TAC Manual. The TAC Manual is provided at Appendix E to this exhibit.

19. Section 3.4.9 of the TAC Manual does not require removal of abandon facilities. The TAC Manual, page 8, contemplates that removal should occur when "*necessary to avoid interference with the operation, maintenance or reconstruction of the highway*". Essex County has not identified any such interference with current or future needs.

20. Enbridge Gas has identified the additional work and disruption that would be necessitated to remove approximately 21.9 kms of NPS 10 steel main.

Enbridge Pipeline Vehicle Loading Analysis

Proposed NPS 6 Windsor Line along County Road 46, County of Essex Ontario

Introduction:

Enbridge is proposing to replace the existing NPS 10 Windsor Line with a new NPS 6 pipeline. The pipeline will be installed within the road allowance parallel to roads for approximately 64 kms between Chatham-Kent and The County of Essex. There was a concern about the stress of the pipeline in its proposed location as it is likely to be exposed to vehicle loading including but not limited to superloads, particularly on County Road 46 in the County of Essex as the pipeline's proposed alignment is within approximately 2m of road edge in some locations. The following analysis will provide results of a load assessment on this new pipeline under vehicle loading conditions to meet the Enbridge's design and operating requirements and those of CSA Z662-15 and to determine the max allowable axle load that can be accepted by the pipeline. Analysis considers the hoop stress due to internal pressure and those imposed on it by the soil and vehicle loading.

Assumptions:

- Basis for axle load will be the Ministry of Transportation Ontario (MTO) legal axle load limit of 9000kgs per axle.
- Superload is considered a vehicle weighing more than 120000kgs, from MTO, A Guide to Oversize/Overweight Vehicles and Loads in Ontario, but is limited to max axle load of 9000kgs per axle.
- Vehicle axle load is to be positioned directly vertical over the pipeline. This arrangement will create the maximum loading for this condition.
- An imbalance factor of 10% which increases the wheel load of the axle to allow for consideration of illegal loads and an impact factor of 1.5 was used to simulate vehicles driving on uneven surface over the pipeline.
- Analysis will consider tired vehicles only, which will simulate the maximum ground pressure over the pipeline. Other vehicles, such as those that ride on tracks generally disperse their weight over a larger area and therefore have a lower ground pressure values than those of tired vehicles.
- Assume the pipeline is backfilled only with the native material found within the road allowance, which is known to be ordinary clay. This is considered a conservative assumption as compacted granular fill over and/or around the pipeline would bear more of the vehicle loading than clay and transfer less to the pipeline.

Pipeline Design Parameters:

Outside Diameter (OD): NPS 6 (168.3mm)

Wall Thickness: 4.8mm

Material: Gr. 359, Cat. I, HFERW seam, CSA Z245.1-18 steel pipe

Specified Minimum Yield Strength: 359 MPa

Cover Depth: 100cm

Max Op Temp: 20C degree

Max Op Pressure: 3450 kPa

Min Install Temp: 0C degree

Content: Sweet Natural Gas

Pipeline design to meet the requirements of Clause 12, of CSA Z661-15

During vehicle loading pipeline shall operate at less than 85% SMYS

Live Loads To Calculate:

1. MTO road legal limit or 9000kgs per axle. See analysis equipment label SHL.
2. 5 x MTO road legal limit or ~45000kgs per axle. See analysis equipment label 5xSHL
3. 10 x MTO road legal limit or ~90000kgs per axle, to simulate a maximum pipeline loading. See analysis equipment label 10xSHL

Results:

In all live load cases the results display that the pipeline operates below allowable stress limits under the proposed design conditions for the pipeline located near or under the travelled portion of the roadway. This includes a superload.

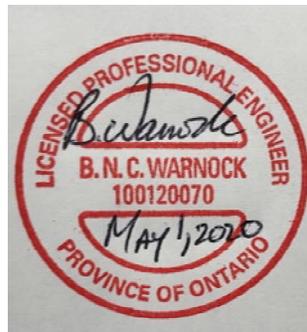
The results of the analysis meet the requirements of the Transportation Association of Canada (TAC) Guidelines For Underground Utilities Crossing Highway Right-Of-Ways.

Results for the 9000kgs and ~45000kgs per axle load considered the impacts of fluctuating hoop stresses or fatigue loading. This can be assumed to represent the case of loads sustained by regular vehicle traffic over the roadway and pipeline.

Results for the ~45000kgs per axle analysis displays an allowable loading factor of safety of 5 over what could be expected the normal vehicle use along the roadway.

Results for the ~90000kgs per axle analysis display a near maximum loading that can be accepted by the pipeline. In this case if a superload were to be overweight or given a permit to operate an axle load at greater than 9000kgs up to ~90000kgs per axle the pipeline is robust enough to carry that extreme load.

Analysis performed by Blair Warnock, P.Eng, Senior Pipeline Design Engineer, Enbridge Inc.



Pipelines Crossed by Equipment on Tires

Location:		Description & Purpose NPS 6 Windsor Line - Oversize Vehicle Load Analysis							
Province ON		Permanent crossing? Yes		Type		3rd Party			
Equipment:		Label SHL		Tire or ground bearing pressure, psi kPa		110 758			
Description		MTO limit of 9000kgs/axle under Fatigue/Cyclic loading		Distance between axles in set, in cm		48 122			
Axle Load, lb kg		19,841 8,998		Axle gauge, ft m		6.0 1.83			
# axles in set		3		Impact Factor		1.5			
				Imbalance Factor		10%			
Line(s) to be crossed:		Line Name 6WL							
OD, in cm		6.625 16.8							
Wall thickness, in mm		0.189 4.8							
Pipe grade, ksi MPa		52 359							
Pressure, psi kPa		500 3447							
Long seam type		ERW							
Installation:		Depth of cover, in cm		39 100					
Installation type		Settled							
Bottom Reaction Angle, deg		60							
Trench or bore width, in cm		7 17							
Soil Unit Weight, pcf kg/m ³		120 1922							
Soil Type		4							
Modulus of soil reaction E', psi kPa		250 1724							
Slab or Matting:		no slab							
Slab thickness, in cm									
Impact Factor on slab or mat									
Slab material									
Slab width across pipe, ft m									
Slab length along pipe, ft m									
Modulus of subgrade reaction k, pci MPa/m									
Maximum Hoop Stress, % SMYS:		Calculated		26.3%					
		Allowable		85%					
Fluctuating Hoop Stress, psi MPa:		Calculated		4.2 28.7					
		Allowable		20 138					
Requirements / Notes:		Axle load for analysis of ~9000 kgs or MTO Road Legal Axle limit. Results show pipeline still remains below maximum allowable hoop stress limit and max allowable fluctuating hoop stress limit, which considers fatigue or cyclic loading which can be assumed to be representative of continuous vehicle traffic over the pipeline/roadway.							
Analyzed by:		BNW 4/17/2020							

Pipelines Crossed by Equipment on Tires

Location:		Description & Purpose NPS 6 Windsor Line - Oversize Vehicle Load Analysis		Province ON		Permanent crossing? Yes		Type 3rd Party	
Equipment:		Label SHLx5		Tire or ground bearing pressure, psi kPa		110 758			
		Description 5 x MTO limit of 9000kgs/axle under Fatigue/Cyclic loading		Distance between axles in set, in cm		48 122			
		Axle Load, lb kg 99,000 44,898		Axle gauge, ft m		6.0 1.83			
		# axles in set 1		Impact Factor		1.5			
				Imbalance Factor		10%			
Line(s) to be crossed:		Line Name 6WL							
		OD, in cm 6.625 16.8							
		Wall thickness, in mm 0.189 4.8							
		Pipe grade, ksi MPa 52 359							
		Pressure, psi kPa 500 3447							
		Long seam type ERW							
Installation:		Depth of cover, in cm 39 100							
		Installation type Settled							
		Bottom Reaction Angle, deg 60							
		Trench or bore width, in cm 7 17							
		Soil Unit Weight, pcf kg/m ³ 120 1922							
		Soil Type 4							
		Modulus of soil reaction E', psi kPa 250 1724							
Slab or Matting:		no slab							
		Slab thickness, in cm							
		Impact Factor on slab or mat							
		Slab material							
		Slab width across pipe, ft m							
		Slab length along pipe, ft m							
		Modulus of subgrade reaction k, pci MPa/m							
Maximum Hoop Stress, % SMYS:		Calculated 50.5%							
		Allowable 85%							
Fluctuating Hoop Stress, psi MPa:		Calculated 19.4 133.7							
		Allowable 20 138							
Requirements / Notes:		Axle load for analysis of ~45000kgs or ~5 x MTO Road Legal Axle limit of 9000kgs. Results show pipeline still remains below maximum allowable hoop stress limit and max allowable fluctuating hoop stress limit, which considers fatigue or cyclic loading which can be assumed to be representative of continuous vehicle traffic over the pipeline/roadway.							
		Analyzed by: BNW 4/17/2020							

Pipelines Crossed by Equipment on Tires

Location:		Description & Purpose NPS 6 Windsor Line - Oversize Vehicle Load Analysis					
	Province	ON	Permanent crossing?		No	Type	3rd Party
Equipment:		Tire or ground bearing pressure, psi kPa				110	758
	Label	SHLx10		Distance between axles in set, in cm		157	400
	Description	10 x MTO limit of 9000kgs/axle assumed Super Load				Axle gauge, ft m	
	Axle Load, lb kg	198,000		89,796	Impact Factor		1.5
	# axles in set	1		Imbalance Factor		10%	
Line(s) to be crossed:							
	Line Name	6WL					
	OD, in cm	6.625		16.8			
	Wall thickness, in mm	0.189		4.8			
	Pipe grade, ksi MPa	52		359			
	Pressure, psi kPa	500		3447			
	Long seam type	ERW					
Installation:							
	Depth of cover, in cm	39		100			
	Installation type	Settled					
	Bottom Reaction Angle, deg	60					
	Trench or bore width, in cm	7		17			
	Soil Unit Weight, pcf kg/m ³	120		1922			
	Soil Type	4					
	Modulus of soil reaction E', psi kPa	250		1724			
Slab or Matting:		no slab					
	Slab thickness, in cm						
	Impact Factor on slab or mat						
	Slab material						
	Slab width across pipe, ft m						
	Slab length along pipe, ft m						
	Modulus of subgrade reaction k, pci MPa/m						
Maximum Hoop Stress, % SMYS:							
	Calculated	77.1%					
	Allowable	85%					
Fluctuating Hoop Stress, psi MPa:							
	Calculated	N/A		N/A			
	Allowable	20		138			
Requirements / Notes:		Axle load for analysis of ~90000kgs or ~10 x MTO Road Legal Axle limit of 9000kgs. Results show pipeline still remains below maximum allowable hoop stress limit. This load is considered to represent a superload or over weight vehicle permitted load.					
Analyzed by:		BNW 4/17/2020					



ENBRIDGE PIPELINE VEHICLE LOADING ANALYSIS STRESS REPORT

WINDSOR TO PORT ALMA PIPELINE REPLACEMENT ESSEX AND KENT COUNTIES, ONTARIO

Prepared for:

Enbridge Gas Inc.

50 Keil Dr, Chatham, Ontario



VEHICLE LOADING ANALYSIS AND STRESS REPORT

Windsor To Port Alma Pipeline Replacement, Essex And Kent Counties, Ontario

Project No.: SYS197128-4 Wood Project No. 244569

Prepared for:

Enbridge Gas Inc.
50 Keil Dr, Chatham, Ontario
Attention: Ms. Olivia Curti

Prepared by:

Wood Canada Limited
Calgary Alberta

May 19, 2020

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1.0 INTRODUCTION

Wood Canada Limited (“Wood”) has been retained by Enbridge Gas Inc. (“Enbridge”) to carry out a stress analysis related to vehicle loading on a new high pressure NPS 6 steel pipeline to be installed by Enbridge.

The overall project consists of the construction of approximately 60 kilometres (km) of pipeline between the Town of Tecumseh in Essex County and the Town of Port Alma in Chatham-Kent County, Ontario. The existing pipeline to be replaced by the NPS 6 pipeline is understood to be an NPS 10 steel pipeline with mechanical connections and numerous aerial crossings.

Site and Project Description

The site is located within Essex and Chatham-Kent Counties, Ontario. Land use in the area of the site is primarily agricultural and rural residential.

The proposed alignment for the replacement pipeline is in a generally east-west orientation and traverses relatively flat, mainly rural lands adjacent to Essex County Road 46 and Lakeshore Road 309 in Essex, and Goodreau Line in Chatham-Kent County. The pipeline's proposed alignment is located within the county road allowance.

The proposed alignment begins at a new proposed station on County Road 46, east of Concession Road 8 and continues easterly following the alignment of County Road 46 for about 30 km through a rural/residential setting to Rochester Townline. It then continues east on Lakeshore Road 309 for about 13 km to the Essex County border. The alignment crosses an inactive rail corridor on County Road 46, approximately 5 km west of Rochester Townline.

Crossing into Chatham-Kent, the proposed alignment follows the west side of the Highway 77 (Wheatly Road) ROW and extends about 13 km east on the north side of Goodreau Road to the south side of Simpson Line. The new pipeline alignment then travels easterly to County Road 14 and then south on the west side of the ROW to the existing station in Port Alma where it crosses County Road 14.



2.0 SCOPE OF THE ANALYSIS

There is a concern about the stress of the pipeline in its proposed location as it is likely to be exposed to vehicle loading including, but not limited to super loads, particularly on County Road 46 in the County of Essex as the pipeline's proposed alignment is within approximately 2m of road edge in some locations. The following analysis provides the results of a load assessment on this new pipeline under vehicle loading conditions to meet Enbridge's design and operating requirements and those of CSA Z662-15 and to determine the maximum allowable axle load that can be accepted by the pipeline. The analysis considers the hoop stress due to internal pressure and those imposed on it by the soil and vehicle loading.

A geotechnical report was previously completed for the project and the results discussed in the report titled "Geotechnical Investigation and Design Report, Windsor to Port Alma Pipeline Replacement, Essex and Kent Counties, Ontario", report number SYS197128-1.

3.0 PIPELINE TECHNICAL DATA

The design and operating characteristics for the new pipeline are:

-) Design and stress analysis to be as per the requirements of Clause 12, of CSA Z662-15;
-) During vehicle loading pipeline shall operate at less than 85% specified minimum yield strength (SMYS);
-) Pipe properties: NPS 6 (168.3 mm), 4.8mm, Gr 359, Cat I, CSA Z245.1-18;
-) Maximum Operating Temperature: 20C degree;
-) Design/Maximum Operating Pressure: 3450 kPa;
-) Minimum Installation Temperature: 0C degree; and
-) Contents: Sweet Natural Gas.

The assumptions and data used for the stress analysis are:

-) The stress analysis to be provided as if pipeline was under the travelled portion of the road with minimum cover should the road expand over the pipeline in the future;
-) Legal loads used were per API RP 1102, Steel Pipeline Crossing Railroads and Highways;
-) The pipeline will be driven over by superloads that may be too large to stay in their lane, i.e. the tire load could be directly over the pipeline.

-) The assumed cover depth was 100 cm to the top of the pipe;
-) It is assumed that the pipeline is in a Class 3 location (with location factor 0.625);
-) Required data and soil characteristics for computer simulations were retrieved from the geotechnical report.

4.0 SOFTWARE USED FOR ANALYSIS AND TECHNICAL ASSUMPTIONS

The stresses of the pipeline with the live load applied were analyzed in accordance with CSA Z662-2015 and 2019. Table 1 lists the analyzed cases. Software Caesar II (Version 9.00.00.5900) was used in this analysis.

Table 1: Load Cases for Analysis

Case	Combination	Category	Description	Allowable
L1	W+T1+P1	Operation	Operation case in maximum T and MOP	SMYS
L2	W+T2+P1	Operation	Operation case in minimum T and MOP	SMYS
L3	W+T1+P1+U1	Operation	Operation case in maximum T and MOP with live load	SMYS
L4	W+P1	Sustain	Weight and pressure	0.5 x SMYS
L5	W+P1+U1	Occasional	Stress due to sustained load and vehicle load	0.5 x SMYS
L6	L1-L4	Expansion	Thermal stress ranges from installation T to maximum T	0.72 x SMYS
L7	L2-L4	Expansion	Thermal stress ranges from installation T to minimum T	0.72 x SMYS
* if pipe is buried and axial stress is compressive				

Where the load abbreviations in the table are defined as follows:

- W: Dead weight
- P1: MOP
- T1: Maximum Operation Temperature
- T2: Minimum Soil Temperature
- U1: Vehicle Load

The following assumptions were made:

-) The localized stresses in the pipe and the pipe ovality are evaluated in accordance with ASCE ALA Guidelines for the Design of Buried Steel Pipe (July 2001).
-) The welds are checked in accordance with API RP 1102 for Steel Pipelines Crossing Railways and Highways.
-) The detailed results for the critical wheel loads are in Appendix A, B and C.



5.0 LIVE LOADS

The maximum single axle load for design recommended by API RP 1102, *Steel Pipeline Crossing Railroads and Highways*, is 24kips (106.8kN or 10886kg) and the maximum tandem axial load for design is 40kips (177.9kN or 18144kg). These values are both higher than the single axle load (9100kg) and the tandem axial load (17000kg) as specified on the Federal-Provincial-Territorial Memorandum of Understanding on Interprovincial Weights and Dimensions in Canada. Therefore, API RP1102 recommended loads were selected for the evaluation.

6.0 RESULTS

The evaluation considers the cyclic stresses in the welds, through-wall bending stresses, critical bending, ovality of pipe, as well as the code stresses per CSA Z662 (2015 and 2019).

With the API recommended load limits, the following table summarizes the evaluation results. The highest stress level is 51% of the CSA Z662 allowable limit in operation case.

Axle Load		Cyclic Circumferential Stress Ratio	Through Bending Stress Ratio	Critical Ring Buckling Ratio	Ovality	Max CSA Z662 Stress Ratio
Single, kg	Tandem, kg					
10886	18144	42%	26.2%	3.4%	0.21%	51.0%

The design meets the requirement for superloads provided that the load per axle does not exceeded the Highway Legal Axle Load allowance.



7.0 CLOSURE

The limitations of this report, as discussed in the Report Limitations, in Appendix D following the text of this report, constitute an integral part of the report. Appendix E provides Wood's generalized approach to the utility design near roadways, including the selection of invert elevations, addressing utility conflicts and provisions for future expansion of the roadway.

We trust this report is complete within the terms of our reference. However, should there be any questions or if any point requires further clarification kindly contact our office at your convenience.

Sincerely,

**Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited**

Prepared By:



Wojciech Bujak, M.Eng. P.Eng.
Senior Pipeline Lead Engineer

Reviewed by:



Anthony Pusic, P.Eng.
Geotechnical Engineer



Ty Garde, M.Eng., P.Eng.
Principal Geotechnical Engineer





APPENDIX A

CAESAR II STRESS SUMMARY

CAESAR II 2017 Ver.9.00.00.5900, (Build 160721) Date: MAY 13, 2020 Time: 9:26
Job:: BH-16-TYPE1 SOILB
Licensed To:: SPLM: Edit company name in <system>\company.txt

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Job:: BH-16-TYPE1 SOILB

Licensed To:: SPLM: Edit company name in <system>\company.txt

LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS

- 1 (OPE) W+T1+P1
- 2 (OPE) W+T2+P1
- 3 (OPE) W+T1+P1+U1
- 4 (SUS) W+P1
- 5 (OCC) W+P1+U1
- 6 (EXP) L6=L1-L4
- 7 (EXP) L7=L2-L4

CAESAR II 2017 Ver.9.00.00.5900, (Build 160721) Date: MAY 13, 2020 Time: 9:26
 Job:: BH-16-TYPE1 SOILB
 Licensed To:: SPLM: Edit company name in <system>\company.txt

STRESS SUMMARY REPORT: Highest Stresses Mini Statement
 Various Load Cases

LOAD CASE DEFINITION KEY

- CASE 1 (OPE) W+T1+P1
- CASE 2 (OPE) W+T2+P1
- CASE 3 (OPE) W+T1+P1+U1
- CASE 4 (SUS) W+P1
- CASE 5 (OCC) W+P1+U1
- CASE 6 (EXP) L6=L1-L4
- CASE 7 (EXP) L7=L2-L4

Piping Code: Z662 = CANADIAN Z662 -2015, June 2015

CODE STRESS CHECK PASSED : LOADCASE 1 (OPE) W+T1+P1

Highest Stresses: (KPa) LOADCASE 1 (OPE) W+T1+P1
 Ratio (%): 46.9 @Node 818
 OPE Stress: 168197.2 Allowable Stress: 359000.0
 Axial Stress: 100149.6 @Node 533
 Bending Stress: 0.0 @Node 11
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 57023.8 @Node 11
 Max Stress Intensity: 158949.0 @Node 590

CODE STRESS CHECK PASSED : LOADCASE 2 (OPE) W+T2+P1

Highest Stresses: (KPa) LOADCASE 2 (OPE) W+T2+P1
 Ratio (%): 17.2 @Node 46
 OPE Stress: 61701.8 Allowable Stress: 359000.0
 Axial Stress: 23580.7 @Node 2999
 Bending Stress: 0.0 @Node 11
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 57023.8 @Node 11
 Max Stress Intensity: 62249.5 @Node 11

CODE STRESS CHECK PASSED : LOADCASE 3 (OPE) W+T1+P1+U1

Highest Stresses: (KPa) LOADCASE 3 (OPE) W+T1+P1+U1
 Ratio (%): 51.0 @Node 894
 OPE Stress: 183209.5 Allowable Stress: 359000.0
 Axial Stress: 100149.6 @Node 533
 Bending Stress: 15012.4 @Node 894
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 57023.8 @Node 11
 Max Stress Intensity: 173105.0 @Node 894

CODE STRESS CHECK PASSED : LOADCASE 4 (SUS) W+P1

Highest Stresses: (KPa) LOADCASE 4 (SUS) W+P1
 Ratio (%): 15.9 @Node 11
 Code Stress: 28511.9 Allowable Stress: 179500.0
 Axial Stress: 27674.7 @Node 11

CAESAR II 2017 Ver.9.00.00.5900, (Build 160721) Date: MAY 13, 2020 Time: 9:26
 Job:: BH-16-TYPE1 SOILB
 Licensed To:: SPLM: Edit company name in <system>\company.txt

STRESS SUMMARY REPORT: Highest Stresses Mini Statement
 Various Load Cases

Bending Stress: 0.0 @Node 11
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 57023.8 @Node 11
 Max Stress Intensity: 62249.5 @Node 11

CODE STRESS CHECK PASSED : LOADCASE 5 (OCC) W+P1+U1

Highest Stresses: (KPa) LOADCASE 5 (OCC) W+P1+U1
 Ratio (%): 24.2 @Node 894
 Code Stress: 43524.3 Allowable Stress: 179500.0
 Axial Stress: 27674.7 @Node 11
 Bending Stress: 15012.4 @Node 894
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 57023.8 @Node 11
 Max Stress Intensity: 62249.5 @Node 11

CODE STRESS CHECK PASSED : LOADCASE 6 (EXP) L6=L1-L4

Highest Stresses: (KPa) LOADCASE 6 (EXP) L6=L1-L4
 Ratio (%): 0.0 @Node 11
 Code Stress: 0.0 Allowable Stress: 258480.0
 Axial Stress: 127824.3 @Node 495
 Bending Stress: 0.0 @Node 11
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 0.0 @Node 11
 Max Stress Intensity: 127824.3 @Node 495

CODE STRESS CHECK PASSED : LOADCASE 7 (EXP) L7=L2-L4

Highest Stresses: (KPa) LOADCASE 7 (EXP) L7=L2-L4
 Ratio (%): 0.0 @Node 11
 Code Stress: 0.0 Allowable Stress: 258480.0
 Axial Stress: 21328.9 @Node 39
 Bending Stress: 0.0 @Node 11
 Torsion Stress: 0.0 @Node 11
 Hoop Stress: 0.0 @Node 11
 Max Stress Intensity: 21328.9 @Node 39



APPENDIX B

VEHICLE LIVE LOAD CALCULATION

Design For Buried Steel Pipeline (Non Pressurized)				
Pipe Ovalization Stress Calculation for Concentrated Load				
			Rev	A
			Date	13-May-20
Item description	Symbol	input values	Unit	Reference
Pipe Characteristic				
Yield Strength of Pipe Material	Sy=	359000	kPa	
Pipe outside diameter	D=	6.625	in =	168.3 mm
Pipe radius	R=	3.3125	in	
Pipe wall thickness	t _w =	0.189	in =	4.800 mm
Deflection lag factor	D _f =	1.5		ALA, 4.2.1
Bedding constant	K=	0.1		ALA, 4.2.1
Modulus of elasticity of pipe	E=	29000000	psi	
	H/D=	5.94		
Safety Factor	FS	2.5		ALA, Sect. 4.2.4
Site Characteristic				
Burried depth	H=	3.28	ft=	1.000 m
Modulus of soil recation	E'=	500	psi	API 1102, Table A-1
Soil unit weight	Y=	127.32	lb/ft ³	see soil charract assumptn
Water table height above pipe	h _w =	0.00	in	
Water buoyancy factor	R _w =	1		ALA, 4.2.4
Loads on Pipe				
earth pressure on the pipe				
P _v =Y*H (static load)	P _v =	2.90	psi=	20.00 kPa
unit earth load on pipe	FL=	230.61	lb/ft=	343 kg/m
Concentrated surface load	=	12000	lb=	5443 kgf
applied live pressure on pipe				
Impactor Factor	F'=	1.00		ALA, Table 4.1-2
offset distance	d=	0.00	ft	
P _p =F'*(3*Ps)/((2*PI*H^2)*(1+(d/H)^2)^2.5)	P _p =	3.70	psi=	25.49 kPa
Uniform Load on Pipe	U=	4289	N/m=	437 kg/m
Total applied pressure on pipe				
B' coefficient of elastic support				
B'=1 / (1+4*EXP(-0.065*H*12/D))	B'=	0.269		
moment inertia of pipe				
I= (t _w)^3/12	I=	0.000562	in^3	
Critical ring buckling pressure				
P _c = 1/FS*SQRT(32*R _w *B'*E'*E*/D^3)	P _c =	196.51	psi=	1355 kPa
Total applied pressure on pipe				
P=P _v + P _p (due to total compressive load)	P=	6.60	psi=	45 kPa
		Pass		ALA, Appendix A
Ovality of the pipe				
Δy/D = D ₁ *K*P/((E*I)/R^3) + 0.061*E'		0.21%	<	3.00%
		Pass		API 1102
Through- wall bending stress				
σ= 4*E*(Δy/D)*(t _w /D)	σ=	6833	psi	Sy/2
		47111	kPa	< 179500
		Pass		ALA, Appendix A



APPENDIX C

FATIGUE FAILURE ON GIRTH WELDS



Project Enbridge Windsor NPS6 Gas Line Replacement		
Location Lakeshore	Date 5/4/2020	

API 1102 - Gas Pipeline Crossing Highway

PIPE AND OPERATIONAL DATA:

Operating Pressure [MPa]	3.45
Location Class:	3
Operating Temperature [°C]	38
Pipe Outside Diameter [mm]	168.30
Pipe Wall Thickness [mm]	4.800
Pipe Grade: X52	
Specified Minimum Yield Stress	359
Design Factor	0.50
Longitudinal Joint Factor	1.000
Temperature Derating Factor	1.000
Pipe Class: API 5L Seamless	
Young's Modulus for Steel	207,000
Poisson's Ratio for Steel	0.3
Coefficient of Thermal Expansion [per°C]	0.0000117

SITE AND INSTALLATION DATA:

Soil Type:	Soft to medium clays and silts with high plasticities	
E' - Modulus of Soil Reaction [MPa]	1.4	
Er - Resilient Modulus [MPa]	34.5	
Average Unit Weight of Soil [kN/m³]	20.0	
Pipe Depth [m]	1.00	
Bored Diameter [mm]	168.30	
Installation Temperature [°C]	-20.0	
Design Wheel Load from Single Axle [kN]	53.38	
Design Wheel Load from Tandem Axles [kN]	44.48	
Pavement Type:	None	
Impact Factor Method:	ASCE - Highway	
Safety Factor Applied:	API 1102 Procedure	

RESULTS

Hoop Stress [MPa]	60.4	Maximum Circumferential Stress [MPa]	81.2
Allowable Hoop Stress [MPa]	179.5	Maximum Longitudinal Stress [MPa]	-106.6
Stiffness Factor for Earth Load Circumferential Stress	1,638	Maximum Radial Stress [MPa]	-3.4
Burial Factor for Earth Load Circumferential Stress	1.17	Total Effective Stress [MPa]	162.9
Excavation Factor for Earth Load Circumferential Stress	0.83	Allowable Effective Stress [MPa]	179.5
Circumferential Stress from Earth Load [MPa]	5.3		
Impact Factor	1.50		
Highway Stiffness Factor for Cyclic Circumferential	14.10		
Highway Geometry Factor for Cyclic Circumferential	1.47		
Cyclic Circumferential Stress [MPa]	17.1		
Highway Stiffness Factor for Cyclic Longitudinal Stress	12.20		
Highway Geometry Factor for Cyclic Longitudinal Stress	1.45		
Cyclic Longitudinal Stress [MPa]	14.6		

Stress [MPa]	Calculated	Allowable	PASS/FAIL
Hoop	60.4	179.5	PASS
Effective	162.9	179.5	PASS
Girth Welds	17.1	41.4	PASS
Long. Welds	14.6	72.4	PASS

Notes:

Reference: API RP 1102 "Steel Pipelines Crossing Railroads and Highways"

Prepared By Leo Yang	Approved By	Revision: 13.0.1
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APPENDIX D

LIMITATIONS



Limitations to Geotechnical Reports

1. The work performed in the preparation of this report and the conclusions presented herein are subject to the following:
 - a) The contract between Wood and the Client, including any subsequent written amendment or Change Order duly signed by the parties (hereinafter together referred as the "Contract");
 - b) Any and all time, budgetary, access and/or site disturbance, risk management preferences, constraints or restrictions as described in the contract, in this report, or in any subsequent communication sent by Wood to the Client in connection to the Contract; and
 - c) The limitations stated herein.
2. **Standard of care:** Wood has prepared this report in a manner consistent with the level of skill and are ordinarily exercised by reputable members of Wood's profession, practicing in the same or similar locality at the time of performance, and subject to the time limits and physical constraints applicable to the scope of work, and terms and conditions for this assignment. No other warranty, guaranty, or representation, expressed or implied, is made or intended in this report, or in any other communication (oral or written) related to this project. The same are specifically disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.
3. **Limited locations:** The information contained in this report is restricted to the site and structures evaluated by Wood and to the topics specifically discussed in it, and is not applicable to any other aspects, areas or locations.
4. **Information utilized:** The information, conclusions and estimates contained in this report are based exclusively on: i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions and qualifications/limitations set forth in this report.
5. **Accuracy of information:** No attempt has been made to verify the accuracy of any information provided by the Client or third parties, except as specifically stated in this report (hereinafter "Supplied Data"). Wood cannot be held responsible for any loss or damage, of either contractual or extra-contractual nature, resulting from conclusions that are based upon reliance on the Supplied Data.
6. **Report interpretation:** This report must be read and interpreted in its entirety, as some sections could be inaccurately interpreted when taken individually or out-of-context. The contents of this report are based upon the conditions known and information provided as of the date of preparation. The text of the final version of this report supersedes any other previous versions produced by Wood.
7. **No legal representations:** Wood makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.
8. **Decrease in property value:** Wood shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
9. **No third party reliance:** This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or Contract. Any use or reproduction which any third party makes of the report, in whole or in part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood does not represent or warrant the accuracy, completeness, merchantability, fitness for purpose or usefulness of this document, or any information contained in this document, for use or consideration by any third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on this report or anything set out therein. including without limitation, any indirect, special, incidental, punitive or consequential loss, liability or damage of any kind.
10. **Assumptions:** Where design recommendations are given in this report, they apply only if the project contemplated by the Client is constructed substantially in accordance with the details stated in this report. It is the sole responsibility of the Client to provide to Wood changes made in the project, including but not limited to, details in the design, conditions, engineering or construction that could in any manner whatsoever impact the validity of the recommendations made in the report. Wood shall be entitled to additional compensation from Client to review and assess the effect of such changes to the project.
11. **Time dependence:** If the project contemplated by the Client is not undertaken within a period of 18 months following the submission of this report, or within the time frame understood by Wood to be contemplated by the Client at the commencement of Wood's assignment, and/or, if any changes are made, for example, to the elevation, design or nature of any development on the site, its size and configuration, the location of any development on the site and its orientation, the use of the site, performance criteria and the location of any physical infrastructure, the conclusions and recommendations presented herein should not be considered valid unless the impact of the said changes is evaluated by Wood, and the conclusions of the report are amended or are validated in writing accordingly.

Advancements in the practice of geotechnical engineering, engineering geology and hydrogeology and changes in applicable regulations, standards, codes or criteria could impact the contents of the report, in which case, a supplementary report may be required. The requirements for such a review remain the sole responsibility of the Client or their agents.

Wood will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.
12. **Limitations of visual inspections:** Where conclusions and recommendations are given based on a visual inspection conducted by Wood, they relate only to the natural or man-made structures, slopes, etc. inspected at the time the site visit was performed. These



conclusions cannot and are not extended to include those portions of the site or structures, which were not reasonably available, in Wood's opinion, for direct observation.

13. **Limitations of site investigations:** Site exploration identifies specific subsurface conditions only at those points from which samples have been taken and only at the time of the site investigation. Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions.

The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite this investigation, conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

Final sub-surface/bore/profile logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final bore/profile logs are included in geotechnical engineering reports.

Bedrock, soil properties and groundwater conditions can be significantly altered by environmental remediation and/or construction activities such as the use of heavy equipment or machinery, excavation, blasting, pile-driving or draining or other activities conducted either directly on site or on adjacent terrain. These properties can also be indirectly affected by exposure to unfavorable natural events or weather conditions, including freezing, drought, precipitation and snowmelt.

During construction, excavation is frequently undertaken which exposes the actual subsurface and groundwater conditions between and beyond the test locations, which may differ from those encountered at the test locations. It is recommended practice that Wood be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered at the test locations, that construction work has no negative impact on the geotechnical aspects of the design, to adjust recommendations in accordance with conditions as additional site information is gained and to deal quickly with geotechnical considerations if they arise.

Interpretations and recommendations presented herein may not be valid if an adequate level of review or inspection by Wood is not provided during construction.

14. **Factors that may affect construction methods, costs and scheduling:** The performance of rock and soil materials during construction is greatly influenced by the means and methods of construction. Where comments are made relating to possible methods of construction, construction costs, construction techniques, sequencing, equipment or scheduling, they are intended only for the guidance of the project design professionals, and those responsible for construction monitoring. The number of test holes may not be sufficient to determine the local underground conditions between test locations that may affect construction costs, construction techniques, sequencing, equipment, scheduling, operational planning, etc.

Any contractors bidding on or undertaking the works should draw their own conclusions as to how the subsurface and groundwater conditions may affect their work, based on their own investigations and interpretations of the factual soil data, groundwater observations, and other factual information.

15. **Groundwater and Dewatering:** Wood will accept no responsibility for the effects of drainage and/or dewatering measures if Wood has not been specifically consulted and involved in the design and monitoring of the drainage and/or dewatering system.
16. **Environmental and Hazardous Materials Aspects:** Unless otherwise stated, the information contained in this report in no way reflects on the environmental aspects of this project, since this aspect is beyond the Scope of Work and the Contract. Unless expressly included in the Scope of Work, this report specifically excludes the identification or interpretation of environmental conditions such as contamination, hazardous materials, wild life conditions, rare plants or archeology conditions that may affect use or design at the site. This report specifically excludes the investigation, detection, prevention or assessment of conditions that can contribute to moisture, mould or other microbial contaminant growth and/or other moisture related deterioration, such as corrosion, decay, rot in buildings or their surroundings. Any statements in this report or on the boring logs regarding odours, colours, and unusual or suspicious items or conditions are strictly for informational purposes.
17. **Sample Disposal:** Wood will dispose of all uncontaminated soil and rock samples after 30 days following the release of the final geotechnical report. Should the Client request that the samples be retained for a longer time, the Client will be billed for such storage at an agreed upon rate. Contaminated samples of soil, rock or groundwater are the property of the Client, and the Client will be responsible for the proper disposal of these samples, unless previously arranged for with Wood or a third party.

**Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited**



APPENDIX E

APPLICATION OF TAC GUIDELINES FOR UNDERGROUND UTILITY INSTALLATIONS CROSSING HIGHWAY RIGHTS- OF-WAY



Memo

To: Scott Walker
Manager Engineering Pipeline Design
Enbridge

From: David Sinke, P.Eng.
Principal Transportation Engineer

Date: May 19, 2020

File:

cc: Ty Garde
Principal Foundation Engineer
Wood

Re: **Application of TAC Guidelines for Underground Utility Installations Crossing Highway Rights-of-way**

Further to your inquiry, we have reviewed with our transportation design team the applicability of the above referenced standard to our municipal clients based on our experience since publication of the standard in March 2013. In particular, you inquired about the applicability of the depth of bury standards in Figure 4 and Table 1.

In our experience, municipalities we have dealt with have not, to date, referenced the above standards. For new or replacement plant installations, municipalities have deferred to the utility company's standard depth of bury. The exception to this practice has been at a location of an actual or anticipated future conflict, where addition depth of bury has been required.

Further, it is often the case that the bury depth of utilities constructed within the undeveloped portion of a road allowance will *increase* following the placement of the pavement structure (granular subbase, base and asphalt) associated with road widening, which can result in an increased bury depth of 500 mm or more, depending on the road profile, drainage and pavement design. Consequently, a depth of bury of 1.0 m within a pre-existing road right of way could be expected to result in a depth of bury in the order of 1.5 m or more following widening of the roadway.

Our involvement has been in consulting with multiple utility companies in the course of planning road widening and relocation. Our services within the Regions of Halton, Peel, and Niagara, and the Cities of Hamilton and Brantford, for example, have included review and approval of utility relocation plans on behalf of these municipalities.

We trust that this information has been helpful.

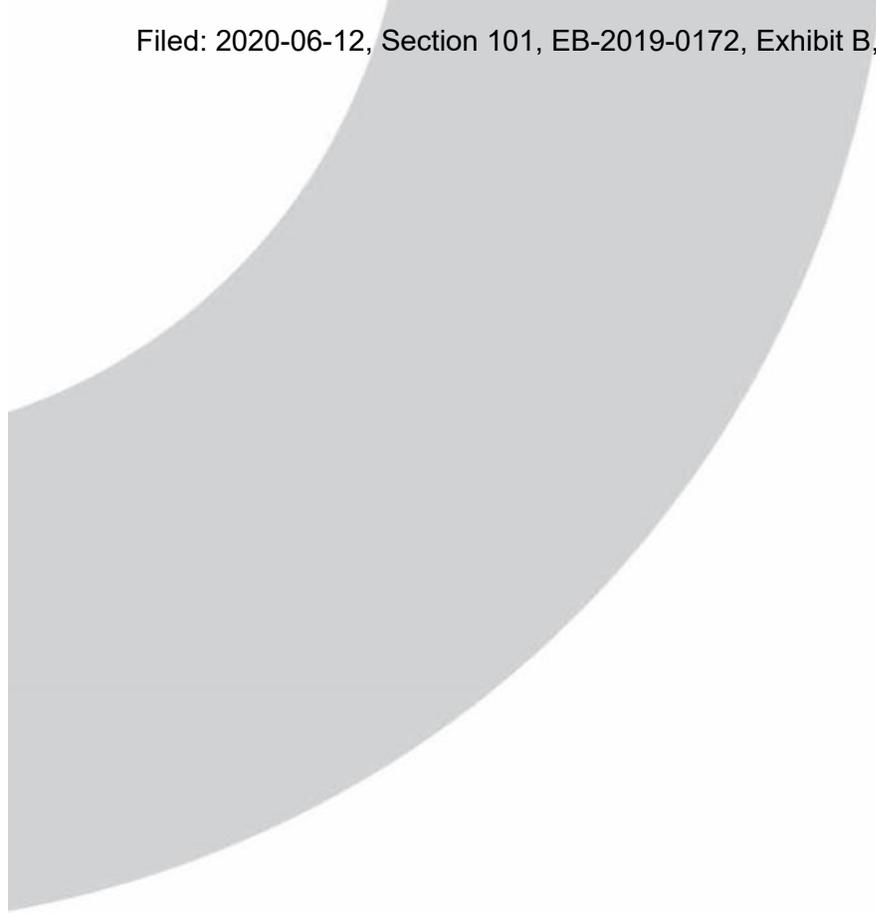
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wood.



May 7, 2020

The Corporation of the County of Essex
360 Fairview Avenue West
Essex, Ontario
N8M 1Y6

Attention: Ms. Jane Mustac, P. Eng, County Engineer
Ms. Krystal Kalbol, P.Eng., Manager, Transportation Planning & Development

**RE: REVIEW OF ENBRIDGE SUBMISSION FOR NEW GAS LINE ON
COUNTY ROAD 46
Our Project No.: 20-163**

Ms. Mustac, Ms. Kalbol,

Subsequent to the request of your office we have undertaken a review of the Enbridge Pipeline vehicle loading analysis dated May 1, 2020 in addition to Ms. Kalbol's memo of April 27, 2020. The following will outline the results of our review.

1. Background

It is our understanding from the above noted documents (2) that Enbridge is preparing to replace 29 kilometers of high-pressure gas line with the County of Essex's right of way. This work will occur on County Road 46 within the Municipalities of the Town of Tecumseh and the Town of Lakeshore.

The April 27 memo notes the recommendation of the Transportation Association of Canada (TAC) guidelines for such works with specific reference to the minimum encased and non-encased depth of bury. Given the pressure we have confirmed that the following memo's values are consistent with our investigation results:

- Non-Encased – 1.5m below paved surfaces but not less than 1m below ground elevation
- Encased – 1.2m below paved surfaces but not less than 0.9m below ground elevation

Enbridge's documents (calculations) suggest a buried depth of 1m and included calculations per CSA Z662-15 *Oil and Gas Pipeline Systems*.

Both parties note the proposed construction will be located outside the current main roadway driving path but will come within 2m of the existing road edge. However, it is our understanding that the Country Road 46 will experience road widening over the course of the pipelines life placing the proposed service within the drive path. Moreover, the existing shoulder is considered a travelled portion based on use of this region for maintenance activities and other motorist access needs.

2. Our Assessment

Our assessment included a review of the documents received and the TAC recommendations as they form an established standard for works within the right of way. We also assessed the results of the Enbridge analysis against loading analysis for buried pipes and conduits (consistent with the Canadian Highway Bridge Code) and fundamentals for buried structures.

3. Observations

The following observations were made specific to our assessment:

Calculation Specific

- The Enbridge calculations provided for a 10% wheel load imbalance and an impact factor of 1.5. Furthermore, their analysis calculated the resulting hoop stresses under a truck with an axial load of up to 198,000lbs (880kN), which is ten times greater than their reported standard load.
- The Enbridge calculations were based on the vehicle crossing over (perpendicular) to the service with a wheel to wheel center of 157" (4m).
- The higher end of the load analysis presented by Enbridge yields results in excess of that following the prescribed loading criterion set forth by the Bridge Code's CL-625ONT vehicle or any evaluation vehicle defined in CAN/CSA S6.
- The Enbridge analysis assumed a modulus of soil reaction of 250psi (1.724 MPa). Such a value would be consistent for a fine-grained soil with a liquid limit of less than 50. However, such values should be field verified by a qualified Geotechnical Engineer. Note, if the liquid limit was greater than 50 would zero (Bureau of Reclamation). Failure to confirm this value in situ would be considered contrary to good Engineering practices; moreover, should a lower value exist the capacity of the pipe could be in question.
- The density of the soil carried by Enbridge was 120 pcf which is reasonable for the regional clay soil conditions significantly changing the analysis results.
- Consideration, with respect to soil response, does not include areas that have been disturbed and are formed with non-native soil to form the road, driveways and road shoulders over the years, to name a few instances of disturbance.
- The analysis completed by Enbridge's Engineer was to Z662-15; however, there is a more current version of this standard at Z662-19.

Review of Relevant Standards and Guidelines

Transportation Association of Canada

- Section 4.11 of the TAC Guidelines for geometric design (TAC 2017) specifically speaks to the placement of utilities in the right-of-way, included in this list, found in Section 4.11.1 – *Technical Foundation* is “Gas Lines”. In this same section they note that the location of utilities is dependent on “several factors” inclusive of:
 - Designation of the road
 - Maintenance requirements
 - Public safety, and future stages improvements for the road.

(TAC 2017)

- Given the proposed long-term expansion of the right-of-way as per 4.12 of TAC 2017 best practices would call to “*Determine the initial requirements and select the dimensions so as to allow for future expansion*”, an action currently being under taken by the County as the designated Road Authority.
- TAC’s guideline for Underground Utilities Installation (March 2013) states in the forward:

“... the responsibility of road authorities includes operating the highway rights-of-way in a manner that ensures the safety, traffic-carrying ability and physical integrity of their installations. The presence of a utility within the right-of-way can affect these characteristics, so it is necessary for road authorities to reasonably regulate the presence of utilities.”

Such statements, place emphasis of the responsibility of the Road Authority (County) to ensure compliance with the recommendations set forward by industry, such as the TAC guidelines.

- The function of the TAC guidelines is to “*assist the various road authorities in establishing and administering uniform criteria for the accommodation of utilities crossing highway (and freeway) rights-of-way*” (TAC March 2013 – Underground Utilities Installation). As a member of the Association the County must as a measure of good practice assess, and as appropriate, apply the recommendations and guidelines of this organization.
- The “intended audience” for the TAC – Underground Utilities installation (TAC March 2013) includes “*Consulting engineers practicing in the highway/utility field*” however, such assessment was not observed from a review of the Enbridge submission suggesting this guideline was not referenced prior to submission.
- Per Clause 4.1.8 of TAC March 2013 the recommend values are presented in Table 1 of document, but this clause further states that:

“The minimum utility cover depths specified by a road authority may be greater when installed within freeway rights-of-way. The road authority may approve other protection designed by the utility in lieu of the minimum cover depth specified.”

By requesting compliance with Table 1 of the present document the County fails to create a condition of undo hardship on Enbridge, albeit, the County would be within its rights, as the Road Authority, to implement and mandate a standard requiring greater depths of bury then those in Table 1.

- Provided Enbridge proceeds in accordance with Z662-19 and applies the 1.2m depth (discussion to follow under Z662-19), and following from TAC March 2013, the County could accept the 1.2m depth per Table 1 provided the main was encased. Such encasement would further protect the line from loading criterion and other hazards faced by underground utilities within the right-of-way.

CAN/CSA Z662-19 National Standard of Canada – Oil and Gas Pipeline Systems

- Following the latest Z662-19, within Table 4.9 – Cover and clearance, the applicable guidelines governing Enbridge specifically note a minimum depth of bury, “*below travelled surface (road)*” of 1.2m; a value which is more than that currently proposed by Enbridge.
- Specific to Z662-19 Clause 1.4 the statement is made that “*This standard is intended to establish essential requirements and minimum standards for the design, construction....*” Emphasis should be placed on the declaration of minimum, thus in the presence of other guidelines specific to the zone of construction the most stringent should be considered in the interest of best engineering practice and public safety.
- Clause 4.11.1 of Z662-19 notes that “*cover requirements for buried pipelines shall not be less than the values given in Table 4.9*” contrary to the proposal of Enbridge.

4. Recommendations

The following recommendations are based on our review and assessment:

Calculation Specific

- The ten times analysis performed by Enbridge was conservative seeing a maximum concentrated wheel load of 16.5 (1.5 x 1.1 x 10) times their base value. Such conservative approaches far exceed those prescribed in other standards.
- The analysis by Enbridge does support that the proposed material is able to carry the applied loads under hoop stress.
- Given that hoop stresses are the only analysis performed care should be given during construction to ensure that the bedding of the pipe is free of any large or stiff elements that may cause beam actions resulting in longitudinal and shearing stresses which, when combined with the hoop stress, (ie Van Mises Stress Theory) could result in a principal stress far in excess of that of the pipes capacity.
- There should be some geotechnical verification of the soil assumptions made, specifically the modulus of soil reaction.
- Care should be taken in confirming adequacy of the pipe in non-clay soils albeit the modulus of soil reaction and overall soil response would tend to improve in a granular system.

Guidelines Review Discussion

The following discussion will set the design calculations aside and considering the applicable industry recommendations. Following the TAC Guidelines, outlined previously, such recommendations are formed based on the input of the industry and as such form the same value to practicing Engineers and Road Authorities as a given CSA (Canadian Standards Association) document. Consideration should also be given to the mission of the Transportation Association of Canada which is “*to promote the provision of safe, secure, efficient, effective and environmentally and financially sustainable transportation services in support of Canada’s social and economic goals*” (TAC Guidelines Dec 2011). The focus of the mission being in part “safe” and as such the recommendations are set to provide the best possible solutions for such safety. Moreover, TAC is a widely accepted authority in the industry and as such its standards and guidelines form the basis of good right of way management with the realm of engineering and roadway management.

Given the above, and the consideration that the proposed pipeline will lay within the driving surface within the life span of the proposed new construction the minimum depth measured from drive surface (or anticipated drive surface) should be 1.5m versus the proposed 1.0m depth if compliance with the TAC guidelines is to be consistently applied by the County within its right of ways.

Specific to Z662-19 Enbridge appears through the current proposal to have failed to meet the minimum standards set forth in the latest document. Moreover, as noted in observations the current standard provides only the minimum cover requirements and as such makes no consideration for assessment of other appropriate standards and guidelines. As such and in the presence of both Z662-19 and the current TAC standards the greater requirement of the two would be considered the most appropriate value.

With regard to liability, should in the unfortunate situation an event occur which creates a threat or risk to the public, specific to the proposed gas line, failure to adhere to the TAC recommendations could result in the County being in part liable for failure to follow best practices. Such legal discussions should obviously be had with the County legal team; however, failure to follow guidelines does create a situation of increased risk and liability.

Speaking to the previous point care by the County should also be taken to not deviating from the TAC standards as it is a standard adhered to by the County itself on all other projects inclusive its own. Failure to consistently follow an established standard with the County, and in general most every Road Authority, also increases liability.

5. Summary and Conclusions

Following from the above, the calculations submitted by Enbridge do confirm structural capacity based on the assumptions made; however, from the second portion of the discussion, failure to address the risk imposed by deviating from a standard regularly applied by the County and other similar Authorities will incur increased liability in the short and long term conditions. Moreover, the proposed construction appears to be in contravention of the current standards governing the actions of Enbridge itself.

The situation specific to County Road 46 expansion within the pipeline's life span is further support to follow the current guidelines and maintain a depth of cover that represents the most conservative approach in the interest of public safety, specifically 1.5m as this would also be supportive of the statements made in Z662-19 and the TAC guidelines.

Following from the above, and in the interest of trying to validate the most appropriate action in the current condition one only need to assess the reverse condition. Under the current standards and guidelines the following depths of bury are recommended, TAC -1.5m and Z662-19 -1.2m; should the case have been 1.5m requirement by Z662 and TAC permitted a shallower bury of 1.2m Enbridge would have been remiss to construct their plant at the lesser depth of 1.2m and would not have been alleviated from their professional responsibility or the legal obligations by doing so. As such, in the interest of best engineering practices, and good right-of-way management, the County and Enbridge itself, must assess the condition not in isolation but against all appropriate guidelines to ensure the best end results. Blindly ignoring the recommendations of an origination such as the Transportation Association of Canada, and its guidelines, is tantamount to negligence on the part of any party doing so. The provisions previously noted in the recommendation discussion specifically noted that the 1.2m is a minimum prescribed in Z662-19 and not a mandated maximum. The function of the various standards and guidelines making declarations of minimum is the committee's means of ensuring that a responsible professional will follow their professional, ethical and legal obligations to ensure the public trust and protection by the application of all best practices.

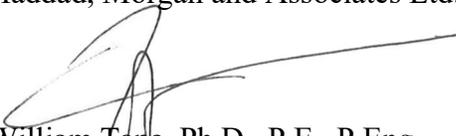
Based on our review and in the interest of shielding the County from liability while maintaining a consistent application of policy, and in the interest of good engineering and right-of-way management practices, we formal recommend that Enbridge be directed to adhere to the requirements set forth by your office as the Road Authority; as such compliance with the TAC guidelines should occur without further discussion.

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May 7, 2020

6. Closing

We trust that the above meets your needs at this time. Should you have any questions or comments please do not hesitate to contact our office.

Yours Truly
Haddad, Morgan and Associates Ltd.



William Tape, Ph.D., P.E., P.Eng.
Senior Engineer



May 19, 2020

The Corporation of the County of Essex
360 Fairview Avenue West
Essex, Ontario
N8M 1Y6

Attention: Ms. Jane Mustac, P. Eng, County Engineer
Ms. Krystal Kalbol, P.Eng., Manager, Transportation Planning & Development

**RE: REVIEW OF ENBRIDGE RESPONSE FOR NEW GAS LINE ON
COUNTY ROAD 46**
Our Project No.: 20-163

Ms. Mustac, Ms. Kalbol,

Subsequent to the response received by your office from Enbridge, specific to our office's May 7, 2020 letter, please find our further comments.

As the focus of the comments from Enbridge appear to rest of the applicability of any standard other than Z662 we offer the following addition references in support of our previous comments. The focus of TAC (Transportation Association of Canada) is to aid in the development of standardized guidelines for the application of a workable and safe public right of way under the careful control of the designated Road Authority.

It is key in this process to remember that the County, as well as other Road Authorities, follows the TAC standards as a standard practice. Thus, failure to adhere to it because of another organization's report or opinion does not negate liability. Statements made in the Enbridge response specific to there being no risk to the County are arguable statements and cannot be based fully on fact.

To the next accretion made by Enbridge that the absence of past issues should deem the current argument moot we also disagree. The absence of past experiences does not meet a reasonable test of absence of potential issues. In fact, while not completed in Canada one only needs to reviewing The National Cooperative Highway Research Program Report 309 published in July 1988, that speaks to 11 uncased and 13 encased failures of pipelines in 23 reporting districts. While the function of the lines varied from water to propane gas it was noted that age, cathodic protect and installation issues were dominating factors. In each of these cases it is likely that the authority of the time felt such conditions were unlikely due to absence of past issues.

The next point we would like to add comes from our continued research on this matter specifically The Utility Policy Manual of the Ministry of Transportation and Infrastructure of British Columbia 2019. In this detailed manual Table 17.1 requires a depth of cover for pipelines of a minimum of 1.2m under pavements and shoulders. By definition under would

require the 1.2m to be measured from the defined subgrade such can be appreciated to be anywhere from 500mm to 800mm below the surface elevation. Should the 1.2m be measured from the surface side of the pavement structure consideration also needs to be provided for re-grading of the road during construction and thus a buffer of not less than 300mm would be adopted to ensure drainage requirements are adequately addressed. This document and its contents would suggest that the TAC standard of 1.5m is generously in favour of the Utility provider. Moreover, the document itself come from a recognized Road Authority who is aligning by this requirement with TAC in terms of increased depths of bury on underground utilities.

Enbridge's response does speak to the absence of adoption of CSA Z662-19 by TSSA to date. Such a failure to modified the current standards by TSSA does not mean that it will not occur in the near future nor does it mean the current standard is flawed. Standards act as industries best knowledge and as such when information comes forth mandating a change the standards are adjusted; thus, good practice would be to follow the more stringent in the interest of all parties.

The current argument being made suggests that it is incumbent on the County to justify all standards it follows. However, it appears unreasonable for a Utility to mandate the need for the County to prove a standard or recommendation by others. It is within the right of a Road Authority to apply an industry standard or recommendation within its jurisdiction. Such actions by the County and its agents would, by doing so, be in the best interest of the rate payers and public at large. Moreover, it is important to consider that the County is taking all necessary steps in identify the proposed location relative to the expanded future travelled portions of the right of way and ensuring that relocations are not needed at a later date. Such management of the right of way is appropriate and consistent with the guidance of TAC. Therefore, we once again point to the TAC recommendation for a 1.5m depth of cover to account for the future expansion works. Such actions are in the best interest of proper right of way management.

To the comments made, by Enbridge, with regard to TSSA and their requirement of 0.75m; this is contrary to the accretion that Enbridge is to follow Z662 which per Table 4.9 notes that below a travelled surface (road) any pipeline would require a minimum cover of 1.2m. While in the current condition the placement of the pipe may be outside the travelled surface, Enbridge is, as of this time, fully aware of the intent to widen the roadway changing the current dynamics. Moreover, if we apply clause 4.12.3.1, even in the absence of such widening this depth requirement would be deemed mandatory as it is within 7m of the travelled surface of the road per subsection (c) of 4.12.3.1.

The position of Enbridge also appears to rest on their analysis of the mechanical response of the pipe. One must appreciate that the analysis as performed were based on very specific assumptions, such as soil type and response. Such an analysis fails in the presence of a non-homogeneous state or variation in the soil-structure interaction. Consideration in this analysis failed to account for the disturbed condition commonly found within the right of ways due to past works and intersecting driveways, intersections, and drainage works.

To further add to our last submission and following additional points are offered. Referring again to TAC – Guidelines for Underground Utility Installations Crossing Highway Rights of way (TAC 2013):

Per the Abstract:

“The responsibility of road authorities includes operating the highway rights of way in a manner that ensures the safety, traffic carrying ability and physical integrity of their installation. The presence of a utility within the right of way can affect these characteristics so it is necessary for road authorities to reasonably regulate the presence of utilities”

As from the above it is not just within the County’s right but rather in their mandate to set standards that may affect the regulated zones. As such given the County applies TAC recommendations as a standard it is reasonable to expect those Utilities wishing to be within the ROW (cross through it, inclusive of crossing along it) to adhere to these guidelines. The County cannot be reasonably asked to justify every standard on a project by project basis otherwise no work within the ROW could effectively proceed.

Also from the Abstract: *“The purpose of this general guideline is to assist the various road authorities in establishing and administering reasonably uniform criteria for the accommodation of utilities crossing highway rights of way. Ideally, existing utility accommodation guidelines should be updated in light of these guidelines as appropriate”*

Such a statement speaks directly to the County’s responsibility to adhere to the most updated version of recommendations being made.

In further support of the County position consideration may also be given to section 3.22 of the TAC 2013 document which states:

“3.2.2 Present and Future Impacts Consideration

The potential impact on the highway and its use should be considered in the design and location of utility installations within the highway rights-of-way. Likewise, the impact of a new or reconstructed highway on existing utility installations should be considered in an attempt to avoid utility relocations. On new installations or adjustments of existing utility facilities, provisions should be made for known or planned expansion of the utilities. They should be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground facilities are installed at some future date.”

By advising Enbridge to lower the pipe in support of future road expansion the County has responsibly performed all needed due diligence and continue to do so in response to Enbridge’s assertions.

In attempt to reiterate our May 7 comment Section 4.1.8 of TAC 2013 is repeated here for clarity:

4.1.8 Underground Utility Cover

The minimum utility cover depths should be as specified hereafter (see Table 1 and Figure 4) for each utility installation type. The provisions should apply for new utility installations, additions to or alterations of existing installations, adjustments or relocations of utilities incidental to highway construction and to existing utility installations within highway (and freeway) rights-of-way. Utility installations should conform to all conditions described in columns A, B, C and D of Table 1. The minimum utility cover depths specified by a road authority may be greater when installed within freeway rights-of-way. The road authority may approve other protection designed by the utility in lieu of the minimum cover depth specified.

This statement is in further support of the County's position and by applying these depths the County is maintaining compliance with an industry standard and with its own policies.

Not to belabor the point one may also look to the TAC Management of Utilities in and Adjacent to the Public Right-of-way: Survey of Practices (TAC 2008) of which the Ontario Ministry of Transportation (the Governing Road Authority in Ontario) was a part. The following points can be pulled directly from TAC 2008)

In the executive summary it states:

In Canada, road authorities are charged with ensuring the safety and convenience of road users. It is in the public interest to accommodate others, notably utility companies, within the right-of-way whenever practical. Management of utilities in the right-of-way is the responsibility of the road authority and it has become increasingly complex in recent years as growth continues at a rapid pace in most regions.

From this statement it fully supports that the direction of the County as the Road Authority is the responsibility of the County and they are not freed from their responsibility to do so by the demands of any Utility. Moreover, adding to the above statement the comment regarding "it has become increasingly complex in recent years" further supports the County's position of the 1.5m TAC depth recommendation as you seek to standardize all utilities in the ROW to avoid future conflicts and issues.

In the deliberation of all submissions offered in this document and those before consideration should be given to the following additional facts:

1. There are several private accesses and public intersections which will cross over the proposed pipeline
2. The proposed construction of the pipeline should be done with consideration for any potential required grading changes and pavement structures without compromise due to insufficient depth.

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3. Following from point 2 the proposed 1.5m depth would provide the abilities to modify cover without concern during the road expansion and associated regrading process.
4. Should the 1m be used the County may have to compromise on its soil-structural system and or drainage plan for the roadway via modified grading, which could result in encroachment into private lands to compensate. In addition, the County would have to accept the liability of proceed with an act it knew to be contrary to the best practices and its own guidelines.

Closing

We trust that the above meets your needs at this time. Should you have any questions or comments please do not hesitate to contact our office.

Yours Truly
Haddad, Morgan and Associates Ltd.

A handwritten signature in black ink, appearing to read 'William Tape', with a long horizontal line extending to the right.

William Tape, Ph.D., P.E., P.Eng.
Engineer

Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way





Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way

March 2013

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Note

Much of this document has been prepared based on *A Guide for Accommodating Utilities Within Highway Right-of-Way*, 2005, published by the American Association of State Highway and Transportation Officials, Washington, D.C.

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Abstract		Keywords
<p>Utility companies provide essential services to the public. They often install their facilities within the rights-of-way of public roads. If the utilities were not allowed to use the rights-of-way, they could be required to purchase their own land, which would drive up the overall cost to the utility company. This could significantly increase the cost to the public.</p> <p>However, the responsibility of road authorities includes operating the highway rights-of-way in a manner that ensures the safety, traffic-carrying ability and physical integrity of their installations. The presence of a utility within the right-of-way can affect these characteristics, so it is necessary for road authorities to reasonably regulate the presence of utilities.</p> <p>The purpose of this general guideline is to assist the various road authorities in establishing and administering reasonably uniform criteria for the accommodation of utilities crossing highway (and freeway) rights-of-way. Ideally, existing utility accommodation guidelines should be updated in light of these guidelines, as appropriate.</p> <p>These guidelines have been written for both the road industry and the utility industry. Although they can be used by anyone in order to obtain an overview of the complex series of highway/utility interactions, it is specifically aimed at the following types of audiences:</p> <ul style="list-style-type: none"> ➤ Managers in both the public and private sectors; ➤ Consulting engineers practicing in the highway/utility field; and ➤ Individuals just entering the highway/utility field. 		<p>Planning of Transport Infrastructure</p> <ul style="list-style-type: none"> • Administration • Cable • Carriageway • Corridor (Transp) • Crossing the Road • Electricity • Fuel • Maintenance • Pipe • Risk Assessment • Safety • Subterranean
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Foreword

Utility companies provide essential services to the public. They often install their facilities within the rights-of-way of public roads. If the utilities were not allowed to use the rights-of-way, they could be required to purchase their own land, which would drive up the overall cost to the utility company. This could significantly increase the cost to the public.

However, the responsibility of road authorities includes operating the highway rights-of-way in a manner that ensures the safety, traffic-carrying ability and physical integrity of their installations. The presence of a utility within the right-of-way can affect these characteristics, so it is necessary for road authorities to reasonably regulate the presence of utilities.

OBJECTIVE OF THE GUIDELINES

The purpose of these general guidelines is to assist the various road authorities in establishing and administering reasonably uniform criteria for the accommodation of utilities crossing highway (and freeway) rights-of-way. Ideally, existing utility accommodation guidelines should be updated in light of these guidelines, as appropriate.

These guidelines do not constitute a policy, a standard, a specification or a regulation. It simply proposes criteria, and road authorities have the option of applying other criteria.

INTENDED AUDIENCE

These guidelines have been written for both the road industry and the utility industry. Although they can be used by anyone in order to obtain an overview of the complex series of highway/utility interactions, it is specifically aimed at the following types of audiences:

- Managers in both the public and private sectors;
- Consulting engineers practicing in the highway/utility field; and
- Individuals just entering the highway/utility field.



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**Guidelines for Underground Utility Installations
Crossing Highway Rights-of-Way**



1. INTRODUCTION

Transportation, communications and energy networks are growing in complexity. Such networks include highways, railways and waterways at the surface; subways, pipelines and cables below the surface; communication lines and electrical lines above the surface; and wireless communications systems. The possibility of two or more networks occupying a common right-of-way or intersecting increases as the networks grow. As a result, problems arise due to the construction, maintenance and operations of one network affecting the others.

Each road authority has the responsibility to maintain highway rights-of-way under its jurisdiction and to preserve the operational safety, integrity and function of road infrastructure. Since the manner in which utilities cross or otherwise occupy highway right-of-way can materially affect the safe operation, maintenance and appearance of the highway, it is necessary that such use and occupancy be authorized and reasonably regulated. Road authorities have various degrees of power to regulate the use of utilities within highway rights-of-way generally through their statute to designate and to control the use made of right-of-way acquired for public road purposes. Their authority depends upon federal laws and regulations; and provincial laws and regulations that differ between provinces. Also, a province may have local laws and regulations differing from those applicable throughout the province. Aside from the necessary differences imposed by provincial and local laws, regulations, industry codes, climate and geography, consistency in the engineering requirements should be employed by road authorities to regulate the use of highway rights-of-way by utilities.

Utilities have various degrees of authority to install their lines and facilities on the right-of-way of public roads. Like road authorities, their rights depend upon federal or provincial laws and regulations, which differ between provinces. Utilities also depend upon local laws and ordinances.

It can be in the public interest for utilities to be accommodated on highway rights-of-way when such use and occupancy do not adversely affect highway safety, construction, maintenance or operations. In this respect, guidelines outlining safe and rational practices for accommodating utilities within highway rights-of-way are of valuable assistance to the road authorities. The guidelines herein are provided in the interest of developing and preserving safe highway operations and roadsides.

These guidelines make no reference to the legal right of utilities to use or occupy highway rights-of-way or to the financial responsibility involved in the adjustment or relocation of utilities on such rights-of-way.



It is the intent of these general guidelines to assist the various road authorities in establishing and administering reasonably uniform utility accommodation guidelines and standards. However, even if policies, guidelines, standards, specifications and regulations may vary from one province to another, utilities should be installed in accordance with each road authority's accommodation guidelines. Minimizing possible interference and impairment to the highway and its structures, minimizing adverse visual impacts and minimizing maintenance are covered in these guidelines. Wherever appropriate, existing utility accommodation guidelines and standards should be updated in light of these guidelines.



2. *APPLICABILITY*

These guidelines apply to all public and private underground utilities, including, but not limited to, electric power, communications (e.g. cable television), water, gas, petroleum products, sewer and similar facilities that are to be located, adjusted or relocated within the rights-of-way under the jurisdiction of road authorities.

These general guidelines are provided for consideration and use by road authorities in regulating the use and occupancy of highway (and freeway) rights-of-way by utilities. They are limited to matters, which are the responsibility of road authorities for preserving the safe operation, maintenance, construction and integrity of the highway.

Individual road authorities may choose to apply different rules to utilities for servicing installations that are required for operating the highway.



**Guidelines for Underground Utility Installations
Crossing Highway Rights-of-Way**

3. UTILITIES WITHIN HIGHWAY RIGHTS-OF-WAY

3.1 SAFETY

3.1.1 Highway Operations

Highway safety is important when accommodating utilities within highway rights-of-way. Utility accommodation should not adversely affect highway constructability, operations and maintenance.

3.1.2 Clear Zone

The design, location and manner in which utilities use and occupy highway rights-of-way should conform to the guidelines or standards of the road authority to provide and maintain a clear zone.

3.1.3 Road Users and Utility Workers

All permits for utility work should include provisions for the safety and protection of the road users, as well as provide a safe workspace for the utility workers.

3.1.4 Emergency

The road authority and the utility should provide procedures for emergency maintenance operations within highway rights-of-way.

3.2 DESIGN

3.2.1 Joint Highway and Utility Planning

Highway and utility installations, by tradition, practice and, in some instances, laws, frequently co-exist within the same corridors. Therefore, it is essential that these public service installations be compatibly designed and operated. Joint highway and utility planning and development efforts are encouraged.

3.2.2 Present and Future Impacts Consideration

The potential impact on the highway and its use should be considered in the design and location of utility installations within the highway rights-of-way. Likewise, the impact of a new or reconstructed highway on existing utility installations should be considered in an attempt to avoid utility relocations.

On new installations or adjustments of existing utility facilities, provisions should be made for known or planned expansion of the utilities. They should be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground facilities are installed at some future date.



3.2.3 Highway and Utility Responsibilities

The utility should be responsible to ensure that their installations are properly designed, installed, operated and maintained including depth, clearances and separation between facilities, and the work is in accordance with the road authority's utility accommodation guidelines and standards.

The road authority should be responsible for review and approval of the utility's proposed installation in accordance with the road authority's utility accommodation guidelines and standards.

3.2.4 Survey Information

Underground utilities should be accurately located where the exact location of underground utility installation is required. The survey information should be developed early in the design process so that the designer can show on the plans the accurate location of underground utilities that could cause injuries and property damage. Mapping requirements for the recording and depiction of exposed underground utility installations and related accessories should conform to CAN/CSA-S250 "Mapping of underground utility infrastructure".

3.2.5 Highway Integrity

Utilities should be designed to preserve and protect the structural integrity, aesthetic quality, safety, maintenance and operation of the highway during construction and operation of the utility.

3.3 LOCATION

3.3.1 Later Adjustment and Interference

New utility installations should be located to minimize the need for later adjustment to accommodate future highway improvements and to permit servicing such installations with minimum interference to highway traffic.

3.3.2 Highway Crossings Alignment

Utility crossings of the highway should be as near perpendicular to the highway alignment as practical, but no less than seventy (70) degrees, except in special circumstances.

3.4 PRESERVATION AND RESTORATION

3.4.1 Erosion and Sediment Control

Appropriate erosion and sediment control devices should be placed before work starts. The surface area disturbed by utility installations or relocations should be kept to a minimum.

3.4.2 Restoration

Restoration methods should be in accordance with the road authority's specifications and special provisions in utility use and occupancy permits.

3.4.3 Drainage

Care should be taken in utility installations to avoid disturbing existing highway or private drainage facilities.

3.4.4 Trees

The road authority's utility accommodation guidelines and standards, and permission to spray, cut, trim or remove trees, should be incorporated into the use and occupancy permit. When the removal of a tree is authorized, the stump should either be cut to the ground or be removed, and the hole properly backfilled once the tree has been removed. All debris, refuse and waste should be removed from the site. With the road authority's approval, removed trees may be chipped and/or shredded and used as mulch for site restoration.

3.4.5 Traffic Control

Traffic controls for utility construction and maintenance operations should conform to the road authority's requirements. Any utility construction or maintenance operation should be planned with full regard to safety, and interference with highway traffic should be kept to an absolute minimum. On heavily traveled highways, utility construction or maintenance operations interfering with traffic should not be allowed during periods of peak traffic flow.

3.4.6 Utility Maintenance

Maintenance activities within the right-of-way should be considered when installing utility facilities and appropriate markers or other warning devices. The use and occupancy permit, or where applicable the road authority's utility accommodation agreements, guidelines and standards, should identify the maintenance operations that will be permitted and indicate situations where prior notification to the road authority is required.



3.4.7 Records

Records should be maintained by the utility that describe the facility, usage, size, configuration, material, location and vertical clearance (or depth of cover) at time of installation and any special features such as encasement. Upon completion of construction, the utility should provide accurate as-built plans to the road authority, as requested. This information should be in a reproducible form available to other utilities and road authorities. As-built records should conform to CAN/CSA-S250 "Mapping of underground utility infrastructure". Mapping records should be measured and levels of accuracy should be specified by the road authority.

3.4.8 Existing Utilities

Where highway construction or alterations are considered, utilities should be involved early in the design process. This will permit joint and parallel activities to be coordinated throughout the life of the highway project. Early involvement may facilitate completion of utility relocations prior to the start of project construction. Where utilities exist within the right-of-way of a highway to be widened or improved and a utility relocation is likely, consideration should be given to again accommodate those existing utilities within the highway right-of-way.

3.4.9 Abandoned Utility Facilities

The utility should notify the road authority in writing of the intention to abandon its facilities in place. Such abandoned facilities within the right-of-way should remain the responsibility of the utility. The road authority may give reasonable notice to require the removal of abandoned utility facilities and restoration of the right-of-way, or the filling of any such facilities by an approved method, when necessary to avoid interference with the operation, maintenance or reconstruction of the highway. Any facilities that the utility requests to abandon that contain hazardous materials should not be permitted to remain in the right-of-way and should be removed at the utility's expense. Any utility facilities that are proposed to be abandoned and removed by the utility should be disposed of consistent with industry standards and provincial and local laws.

4. UNDERGROUND UTILITY INSTALLATIONS CROSSING HIGHWAY RIGHTS-OF-WAY

4.1 GENERAL

All gas and liquid pipelines, water and sewer pipes and underground electric power distribution and communication lines crossing highway rights-of-way should be installed alone, in joint use or in proximity to each other or other facilities according to the higher requirements for the design, construction, operation and maintenance stipulated in the present general guidelines, in CAN/CSA-C22.3 No 7 "Underground Systems" and CAN/CSA-Z662 "Oil and Gas Pipeline Systems" Standards, and in *National Energy Board Act and Regulations*.

4.1.1 Materials

All underground utility installations should be of durable materials, designed for long service life expectancy and be relatively free from routine servicing and maintenance.

4.1.2 Highway Crossings Location

Underground utility crossings should be avoided in deep cuts, near footings of bridges and retaining walls, at highway cross drains where flow of water, drift, or streambed load may be obstructed, in wet or rocky terrain where it is difficult to attain minimum cover and through paved or unpaved slopes under structures.

4.1.3 Separation from Highway Facilities

Underground utility installations should be separated from highway facilities to avoid damage during construction and to provide for reasonable success in locating utilities with electronic devices. Separation of the utilities from highway facilities or other utility facilities may require the acquisition of additional property by the utility.

4.1.4 Utility Markers

All non-metallic underground installations should be accompanied by a trace wire, metallic tape or other method to effectively locate and mark the underground installations. Whenever feasible, such methods should include devices incorporated into the facility. The method used to locate the exact location of the non-exposed underground utility should be in accordance with the road authority's utility accommodation guidelines and standards.

All new underground installations and replacements of existing installations, where practicable, should be installed with a warning tape located above the installation. The minimum separation between the facility and the warning tape should be 300 mm. The warning tape should be durable, designed to withstand extended underground exposure and be imprinted with an appropriate warning or message. The colour of the warning tape should be in accordance with the uniform colour



code proposed by the *Canadian Common Ground Alliance (CCGA)* for the colour assigned to utility surface markings.

The utility should place, as appropriate, permanent markers identifying the location of underground utility crossings. Markers should be installed in such a manner as to not interfere with highway safety and maintenance operations. Preferably, the markers should be located at the right-of-way line if that location will provide adequate warning. The telephone numbers to request marking the utility location prior to excavation and for emergency response should appear on the permanent marker.

When it is likely that highway construction or maintenance activities could involve existing underground utilities, it is desirable to locate and identify these utility installations well in advance of the commencement of the work as an aid to work crews. The location of each underground utility installation should be identified by the utility with stakes, paint or other temporary on-the-surface markings coded with an identifying colour consistent with the uniform colour code proposed by the *Canadian Common Ground Alliance (CCGA)*.

CCGA UNIFORM COLOUR CODE	
WhiteProposed Excavation
PinkTemporary Survey Markings
RedElectric Power Lines, Cables, Conduit and Lighting Cables
YellowGas, Oil, Steam, Petroleum or Gaseous Materials
OrangeCommunication, Alarm or Signal Lines, Cables or Conduit
BluePotable Water
PurpleReclaimed Water, Irrigation and Slurry Lines
GreenSewers and Drain Lines

4.1.5 Call-Before-You-Dig System

No underground utility installation should be permitted within the highway rights-of-way unless the utility subscribes to the services of a call-before-you-dig system serving two or more utilities in the area. Where such service is not available or not required by the road authority, the utility should be required to: (a) provide copies of as-built records including horizontal and vertical controls to the road authority; (b) update these records annually or whenever a change occurs; (c) provide a single, reliable, 24-hour telephone number to be used for locating and temporarily marking requests for emergency and routine activities by the road authority or by any entity planning to work within the highway rights-of-way.

4.1.6 Accessories Location

Cabinets, pedestals, vents and other above ground utility accessories installed as part of the underground utility installations should be located at or near the right-of-way line.

Manholes and other points of access to underground utility installations should be located outside the highway right-of-way, or at an absolute minimum, outside the clear zone from the edges of traveled ways. Manholes and other points of access should not be located within the highway median.

Vents, drains, markers, manholes, shafts, shut-offs, cross-connect boxes, pedestals, pad-mounted devices and similar accessories should not be located where they would interfere with the accessible facilities for the disabled.

Accessories protruding more than 100 mm above the ground line should be located outside the clear zone from the edges of traveled ways and as close to the right-of-way line as practical. If no feasible alternative exists, accessories within the clear zone should meet breakaway criteria or be shielded by a traffic barrier.

Utility accesses and valve covers should not be located in the roadway of rural highways. In urban and suburban areas there may be no feasible alternative to locating utility accesses and valve covers in the roadway, in which case they should not be located in a wheel path, if possible. Coordination among utilities is essential where utility accesses and valve covers are to occupy highway rights-of-way.

4.1.7 Uncased Pipeline Protection

For some conditions, pipelines crossing highway rights-of-way may be installed without encasement. The following controls are suggested for providing protection to these uncased pipelines (see Figure 1).



- Uncased pipelines should conform to the material and design requirements of utility industry and governmental standards. In addition, the pipelines should be designed to support the load of the highway plus superimposed loads thereon when the pipeline is operated under all ranges of pressure from maximum internal to zero pressure. Such pipelines should employ a higher factor of safety in the design, construction and testing than would normally be required for cased pipelines.
- Suitable bridging, concrete slabs or other appropriate measures should be used to protect existing uncased pipelines which by reason of shallow cover or location make them vulnerable to damage from highway construction or maintenance operations (see Figure 2). Such existing uncased pipelines may remain in place without further protection measures if they are of adequate depth and do not conflict with the highway construction or maintenance operations, provided both road authority and utility are satisfied that the pipelines are, and will remain, structurally sound and operationally safe.
- Uncased welded steel pipelines which carry flammable, corrosive, expansive, energized or unstable materials, particularly if carried at high pressure or potential, may be permitted, provided additional protective measures are taken in lieu of encasement. Such measures would employ a higher factor of safety in the location, design, construction and testing of the uncased-carrier pipe, including such features as increased depth of cover, thicker wall pipe, radiograph testing of welds, hydrostatic testing, coating and wrapping, and cathodic protection.

4.1.8 Underground Utility Cover

The minimum utility cover depths should be as specified hereafter (see Table 1 and Figure 4) for each utility installation type. The provisions should apply for new utility installations, additions to or alterations of existing installations, adjustments or relocations of utilities incidental to highway construction and to existing utility installations within highway (and freeway) rights-of-way. Utility installations should conform to all conditions described in columns A, B, C and D of Table 1. The minimum utility cover depths specified by a road authority may be greater when installed within freeway rights-of-way. The road authority may approve other protection designed by the utility in lieu of the minimum cover depth specified.

4.2 UNDERGROUND UTILITY CROSSINGS CONSTRUCTION

Generally, open trenching across paved surfaces is not permitted in areas where the highway section involved has a pavement structure that was constructed or reconstructed within a period of time determined by the road authority or when the road authority determines that traffic and safety considerations take precedence. Jacking and/or boring may be required in these areas unless solid ledge or boulders are known to exist.

Generally, no open excavation is permitted within freeway rights-of-way unless specifically authorized by the road authority.

When the trench method is employed to install a utility crossing highway right-of-way, pavement restoration can be complicated by the details involved with the restoration and need for a detailed Traffic Control Plan. If open trenching is permitted by the road authority, the utility should provide a quality of works guarantee covering a period of time determined by the road authority.

4.2.1 Trenchless Technology Construction and Controls

a) Construction

In general, underground utility facilities crossing highway rights-of-way should be installed by jacking or boring (wet boring should not be allowed) or by other trenchless technology methods as approved by the road authority. Minimum cover of jacking and boring installations should be 3 m under highways (and freeways) unless approved by the road authority.

When installed by jacking or boring, encasement of the pipeline may be required. All jacking or boring pits (temporary access points) should be located outside the freeway rights-of-way, and outside highway roadways, as far from the edge of the traveled ways as possible and outside the clear zone, unless approved by the road authority. All pits should be located and constructed so as not to compromise the integrity of highway structure footings or traffic operations. The road authority may require the use of support structures to achieve the proper degree of protection.

Backfilling of boring pits should be compacted as specified by the road authority.

Other trenchless technologies which may be utilized for installing utility facilities under a highway without disturbing the surface include: driving, piercing, dry boring, horizontal directional drilling, auger and slurry boring, pipe jacking and tunneling, impact moling and ramming and pipe bursting. These techniques should follow the manufacturer's requirements and specifications. The road authority may require additional special guarantees or specifications for utility installations utilizing these trenchless methods.

**b) Controls**

Where unstable soil conditions exist, boring or tunneling operations should be conducted in such a manner as not to be detrimental to the roadside being crossed. Soil coring indicating the type of subsurface material and verifying the absence of rock may be required by the road authority.

If an obstruction (such as rock) is hit during construction and the bore is to be abandoned, the void should be grout filled immediately. Abandoned casings should also be backfilled with grout as well.

The use of water under pressure (jetting) or puddling should not be permitted to facilitate boring, pushing or jacking operations. Horizontal directional drilling using approved drilling fluids, such as bentonite, may be used in accordance with *Horizontal Directional Drilling Good Practices Guidelines* released by North American Society for Trenchless Technology. No directional boring work should be allowed until approved by the road authority.

All directional drilling methods utilized should include a locatable conduit system, with identification markers on each side of the highway right-of-way.

4.2.2 Open Trench Construction

Open trench construction within pavement structure limits should only be allowed when approved by the road authority and in no case should be permitted on freeways. Approvals for open trenching not performed in conjunction with highway improvement projects should normally be limited to low volume highways, urbanized non-freeway highways or where soil or right-of-way conditions justify such an installation as determined by the road authority. In conjunction with construction or reconstruction projects, the road authority may allow open trench construction as coordinated with progress schedules of referenced projects.

Where trenching within the right-of-way is permitted, proper backfill compaction and materials should be required. Compaction should equal that of the surrounding soil and restoration of the area's vegetation should be required. Erosion control measures as determined by the road authority should be required.

Where open trenching across an existing highway is permitted, backfill and compaction requirements should be specified by the road authority. All pavement trenching edges should be saw cuts.

Pavement restoration should be designed to prevent both front wheels of vehicles from impacting the patch at the same time and pavement restoration edges should be at an angle different than the normal snowplow angle to avoid plow conflict.

4.3 PIPELINE CROSSINGS – SPECIFIC CONSIDERATIONS

4.3.1 General

a) Encasement

In general, underground pipelines crossing highway rights-of-way warrant encasement to:

- facilitate the carrier pipe removal and/or replacement;
- prevent a spill or mitigate its effects on the highway;
- protect the pipeline from external loads and/or accidental dig-ups, access the utility; or
- prevent corrosion.

Encasement should be as specified for each type of pipeline discussed herein. Pipeline encasement should be mandatory for bridge approaches, freeways and interchange ramps crossings.

Casings should consist of a pipe or other separate structure around and outside the carrier pipe and should be designed to support the dead loads of the highway and superimposed loads thereon, including that of construction machinery. The strength of the casing should, as a minimum, equal the structural capacity of drainage culverts in the area and should be composed of durable materials designed to meet the conditions to which it may be subjected.

Casing should be sealed at the ends to prevent debris and moisture from entering the annular space between the casing and carrier pipe (see Figure 3).

Optional for Gas or Liquid Petroleum Pipelines

It is difficult to provide required cathodic protection for gas or liquid petroleum pipelines inside a casing. Pipeline protective coatings are frequently damaged during the insertion of the carrier pipe into casing pipes. Because of this, utilization of a sleeve should be applied judiciously by the utility and the road authority on an individual basis.

These pipelines may be installed without encasement under non-freeway highways if the design of the pipeline provides:

- increased wall thickness and/or higher strength pipe materials and/or greater cover; and
- adequate coating and wrapping and cathodic protection.



b) Crossings Location

Vertical and horizontal clearances between a pipeline and a structure, highway or other utility installation should be sufficient to permit maintenance of both the pipeline and the other facility without interference.

The locations of all pipelines should be reviewed by the road authority to ensure that the proposed utility installation will not interfere with existing or currently planned highway facilities or with highway maintenance and operation processes.

Highway drainage pipes and structures should be protected during pipeline installation and maintenance. Utilization of existing drainage pipes as sleeves for pipelines should not be permitted.

c) Product Transmission

All applications for pipeline installation permits should specify which products are transported and the maximum working, test and design pressures of the carrier and casing (if a casing is required).

Prior to any change to the transported products or increase in the working pressure from that specified in the original permit, the utility should notify the road authority and obtain approval. The applicable codes and standards should be specified in the request.

d) Highway Drainage Protection

Where it is necessary for pipelines to cross existing easement drainage flows outside of the right-of-way, the same minimum cover should be maintained as when crossing drainage ditches within the highway right-of-way. Existing surface and subsurface drainage flows should not be obstructed or altered. In cases where soil conditions are such that erosion might occur or where it is not feasible to obtain specified depths, it should be the responsibility of the utility to take such other measures as needed for safety and to protect the highway and the pipeline. Where grades on the pipelines must be maintained, such as gravity flow sewer pipes, each case should be resolved on an individual basis and is subject to the road authority's approval.

4.3.2 High Pressure Gas or Liquid Petroleum Pipelines (Over 680 kPa)

a) Encasement

Where encasement is to be employed such encasement should be provided under center medians and within the limits of pavement structure to a point beyond the ditch line for cut sections, 1.5 m beyond the toe of slope for fill sections or 1.5 m beyond the face of curb of all urban section roadways including roadsides and 8 m beyond any overpass or other structure where the line passes under it. Exceptions for encasement within a portion of the median may be approved when excessive median width or significant changes in the roadway cross-section make a continuous installation

impractical (see Figure 3). All pipelines should be encased under a bridge approach slab or if they pass closer than 8 m from a structure footing.

Existing pipelines under rural highways within construction projects may be permitted to remain in place without encasement or extension of encasement if they are protected by a reinforced concrete slab or equivalent protection, or if they are located not less than minimum cover depths specified for existing pipelines (see Table 1). The concrete slab should be designed by a Professional Engineer.

b) Vents

One or more vents should be provided for each casing or series of casings. For casings longer than 45 m, vents should be provided at both ends. On shorter casings a vent should be located at the high end with a marker placed at the low end. Vents should be placed at the right-of-way line immediately above the pipeline, situated so as not to interfere with highway maintenance or be concealed by vegetation. Ownership of the pipelines should be shown on the vents.

c) Drains

Drains for liquid petroleum pipelines should not be permitted to outfall into roadway drainage ditches, natural watercourses or highway rights-of-way.

d) Plastic Pipes

Plastic pipes should not be allowed for High Pressure Pipelines.

4.3.3 Medium and Low Pressure Gas Pipelines (Under 680 kPa)

a) Encasement

Encasement of low and medium pressure gas pipelines should comply with the requirements for *High Pressure Gas and Liquid Petroleum Pipelines*. Pipelines placed without encasement should be plastic or welded steel construction protected by approved coatings or cathodic protective measures.

b) Vents, Drains

Vents and drains should comply with the requirements for *High Pressure Gas and Liquid Petroleum Pipelines*.

c) Plastic Pipes

Plastic pipes may be used provided the internal pressure will not exceed road authority's standards, or the manufactures recommendations. The maximum size of plastic pipes should not exceed 300 mm. Where a plastic pipe is installed, a durable metal wire or magnetic tape should be concurrently installed just above the pipe, or other means should be provided for detection.



4.3.4 Water Pipes

a) Encasement

All water pipes under bridge approach slabs, under or within 8 m of the footing of any structure should be encased. Any freeway crossing should be encased within and beyond the right-of-way, or at a minimum 1.5 m beyond slope intercept of the original ground in fill sections or the slope ditch intercept in a cut section.

Continuous welded ductile iron water pipes of 300 mm diameter or less need not be encased under other existing non-freeway highways, provided the pipe is jacked or bored. For water pipes installed by open cut, or installed concurrently with a highway improvement project, encasement should not be required if suitable extra heavy pipe is used.

b) Shutoff Valves

Shutoff valves should be located beyond the limits of a structure, where a water pipe is accommodated and on both sides of a structure footing.

c) Drains

Water pipe encasement or drains may be permitted to outfall into roadside ditches at locations approved by the road authority.

d) Plastic Pipes

Plastic pipes may be used. Crossings should be encased. Where plastic pipe is installed a durable metal wire should be concurrently installed or other means should be provided for detection.

4.3.5 Sanitary Sewer Pipes

a) Encasement

Encasement requirements as stipulated for *Water Pipes* should apply for all pressurized sewer pipes and any existing gravity pipe which does not comply with material or cover requirements.

b) Manholes

Manholes serving sewer pipes up to 600 mm in diameter should have a minimum inside diameter of 1.2 m. For any increase in line size or number of pipes, the inside diameter of the manhole may be required to be increased a like amount. Manholes for large interceptor sewers should be specially designed, keeping the overall dimensions to a minimum. The outside diameter of the manhole chimney at the ground level should not exceed 900 mm. Any manholes allowed within the pavement should be set flush with the pavement and should not be in the vehicular wheel path.

c) Drains

Sanitary sewer pipe encasement drains should not outfall into highway drainage ditches, natural watercourses or the right-of-way.

d) Plastic Pipes

Where non metallic pipe is installed, a durable metal wire should be installed concurrently or other means should be provided for detection purposes.

**4.4 UNDERGROUND ELECTRIC POWER DISTRIBUTION LINE (< 69 kV)
CROSSINGS – SPECIFIC CONSIDERATIONS**

a) Encasement

All underground electric power distribution lines within the highway right-of-way should be in conduit.

b) Location of Highway Crossings

Underground electric power distribution lines should be located at approximate right angles to the highway to the extent feasible and practical. Reasonable latitude may be exercised regarding the crossing angle of existing lines that are otherwise qualified to remain in place.

c) Accessories

Underground electric power distribution lines that include above ground transformers or other utility accessories should be located at or near the right-of-way line, outside the clear zone and maintenance operation area. For those proposed installations that can not comply with the above requirements the road authority may, on a case-by-case basis, approve the installation. The utility should document that the installation does not present a safety hazard to vehicular travel and that normal highway maintenance operations are not impeded.

d) Manholes

Manholes should be limited to those necessary for installation and maintenance of underground lines. On non-freeway highways existing manholes may be permitted to remain in place to service existing lines. The elevation of manhole rims and covers should be set at finished grade. Except within urban type areas, new manholes should not be permitted within the traveled way or shoulder of a highway.

To conserve space within the right-of-way for highway and other utility facilities, manhole vault dimensions should be no larger than is necessary to hold the equipment involved and for safety standards to be assured for maintenance personnel. The outside width should not exceed 2.1 m, with



the length held to a reasonable minimum. The outside dimensions of a manhole chimney should not exceed the minimum required to support the manhole frame and cover. Manhole covers (for personnel access) should be installed flush with finished grade and should not be in the vehicular wheel path. The top of the roof of the manhole vault should be set to meet the minimum cover specified.

Exceptions may be authorized provided that justification is supplied to the road authority and it is found acceptable.

**4.5 UNDERGROUND COMMUNICATION LINE CROSSINGS -
SPECIFIC CONSIDERATIONS**

a) Encasement

Underground communication lines and cable television lines crossing highways should not require conduit except where, in the judgment of the road authority, such conduit is necessary for the protection of the highway facility. Conduit or other suitable protection should be required for any communication installations (a) with less than minimum cover, (b) within 8 m of the footings of bridges or other highway structures or (c) under the approach slabs of structures.

Conduit should be designed to support the load of the highway and superimposed loads thereon, including that of construction machinery.

b) Location of Highway Crossings

Underground communication lines and cable television lines should be located at approximate right angles to the highway to the extent feasible and practicable. Reasonable latitude may be exercised regarding the crossing angle of existing lines that are otherwise qualified to remain in place.

c) Accessories

Above ground pedestals, buildings or other utility accessories installed as a part of an underground communication line should be located at or near the right-of-way line, outside the clear zone and maintenance operation area. The road authority should approve the site.

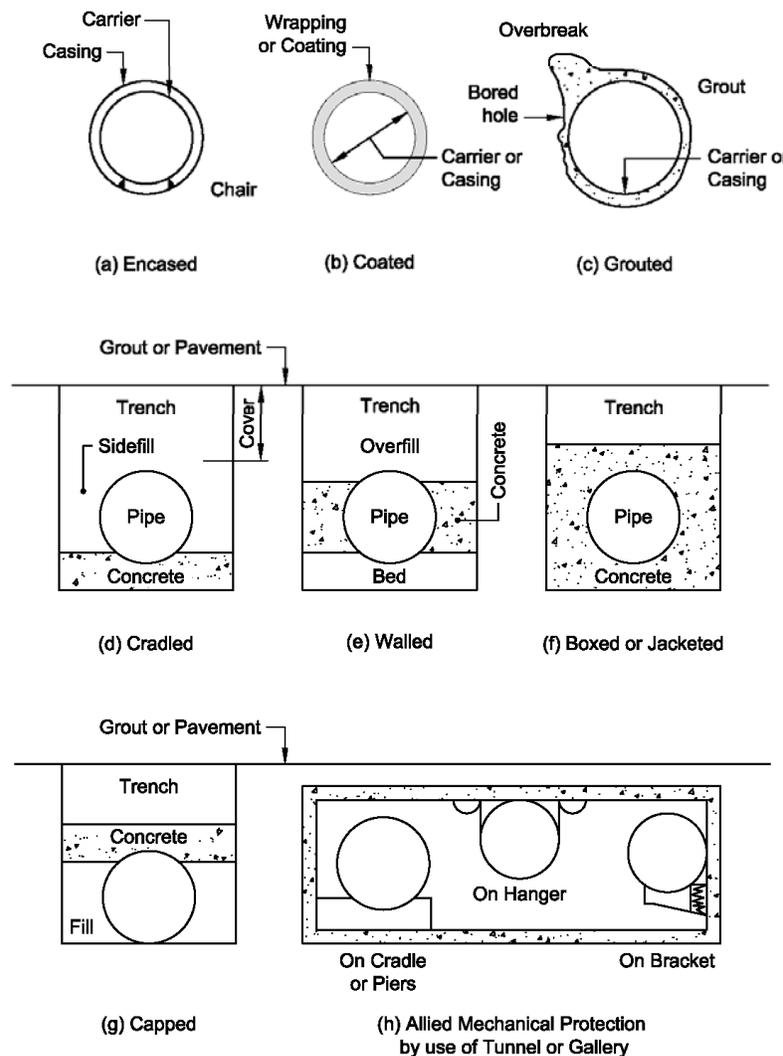
d) Manholes

Manholes should be limited to those necessary for installation and maintenance of underground lines. On non-freeway highways, existing manholes may be permitted to remain in place to service existing lines. The elevation of manhole rims and covers should be set at finished grade. Except within urban type areas, new manholes may not be permitted within the traveled way or shoulder of a highway.

To conserve space within the right-of-way for highway and other utility facilities, manhole dimensions should be no larger than is necessary to hold the equipment involved and for safety standards to be assured for maintenance personnel. The outside width should not exceed 2.1 m, with the length to be held to a reasonable minimum. The outside dimensions of the manhole chimney should not exceed the minimum required to support the manhole frame and cover. Manhole covers (for personnel access) should be installed flush with finished grade. The top of the roof of the manhole vault should be set to meet the minimum cover specified.

Exceptions may be authorized provided that justification is supplied to the road authority and is found acceptable.

FIGURE 1 – Pipelines Protection



Note: Transitioning of trench shoulders required in frost susceptible soil.



FIGURE 2 – Existing Pipelines Protection

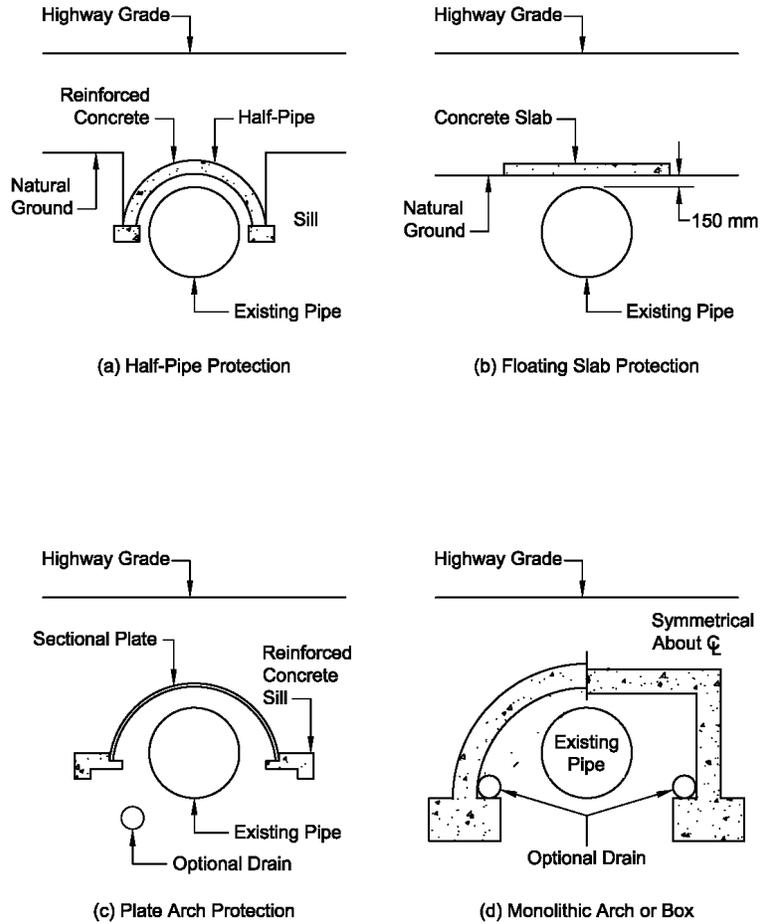
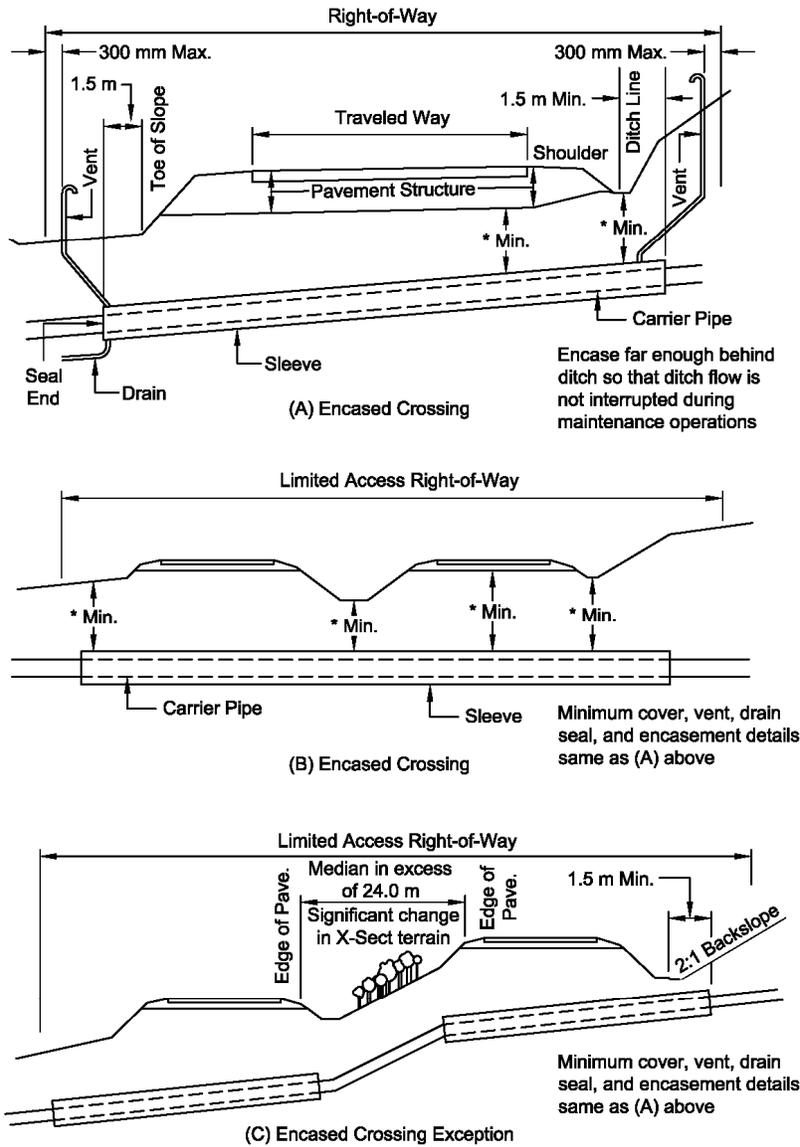


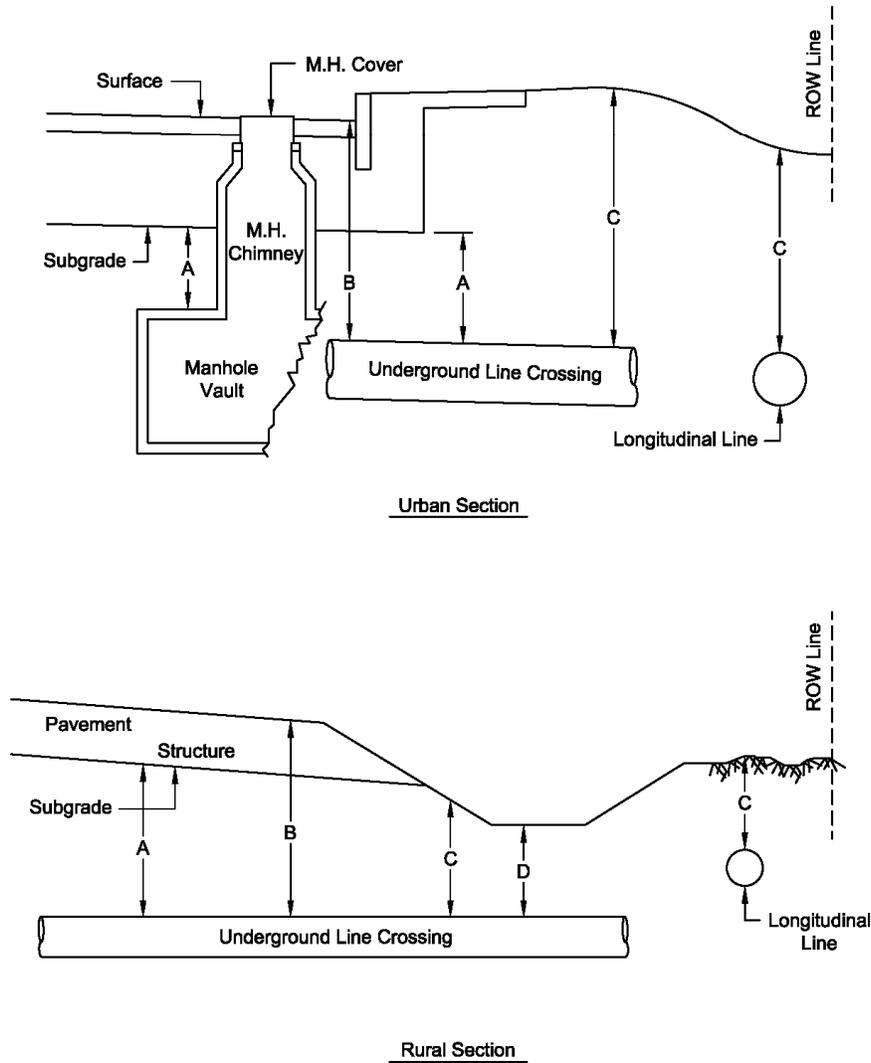
FIGURE 3 – Encased Pipeline Crossings



For the bifurcated roadway above, encasement is not required across the natural terrain. However, encasement is continuous across a typical divided roadway. (see (B) above)



FIGURE 4 – Minimum Cover DEPTH for Underground Installations





**TABLE 1 -- Minimum Cover DEPTH FOR Underground Installations
 Crossing Highways (and Freeways)**

Utility Facility Type		A	B	C	D
		Below pavement structure (subgrade) mm	Below pavement surface mm	Below ground elevation mm	Below ditch line elevation mm
High Pressure Gas or Liquid Petroleum Pipelines (> 680 kPa)	unencased existant	450	1 200	900	900
	unencased new	450 or ½∅	1 500	1 000	1 200
	encased existant	300	1 000	750	750
	encased new	450 or ½∅	1 200	900	1 200
Medium and Low Pressure Gas or Liquid Petroleum Pipelines (< 680 kPa)	unencased existant	450	1 000	600	750
	unencased new	450 or ½∅	1 200	600 <i>750 plastic</i>	900
	encased existant	300	1 000	600	750
	encased new	450 or ½∅	1 200	600	900
Water and Sewer Pipes	existant	450	1 200	1 000	1 000
	new	450 or ½∅	1 800	1 500	1 200
Electric Power	existant	300	1 000	750	750



Distribution Lines (all in conduit)	new	450	1 500	900	1 200
	existant	300	1 000	750	750
Communication Lines	new	450	1 200	750	900

(∅ : pipe diameter)

GLOSSARY

Backfill - Material used to replace or the act of replacing material removed during construction; also may denote material placed or the act of placing material adjacent to structures.

Boring - The operation by which large carriers or casings are jacked through oversize bores. The bores are carved progressively ahead of the leading edge of the advancing pipe as soil is mucked back through the pipe.

Carrier - A pipe directly enclosing a transmitted fluid (liquid, gas or slurry). Also an electric or communication cable, wire or line.

Casing - A larger pipe, conduit or duct enclosing a carrier.

Clear Zone - The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope and/or a clear run-out area. The desired width is dependent upon the traffic volumes and speeds, and on the roadside geometry.

Coating - Material applied to or wrapped around a pipe.

Conduit - An enclosed tubular casing, singularly or multiple, for the protection of wires, cables or lines, usually jacketed and often extended from utility access hole to utility access hole.

Control of Access - The condition where the right of owners or occupants of abutting land or other persons to access, light, air or view in connection with a highway is fully or partially controlled by road authority.

Coring - The operation by which a small casing is drilled into firm soil. As the pipe advances, the core material is removed by sluicing during or after the drilling.

**Guidelines for Underground Utility Installations
Crossing Highway Rights-of-Way**



Cover - Depth to top of pipe, conduit, casing, cable or similar line or utility tunnel below the earth or roadway surface.

Drain - An accessory to discharge liquid contaminants from casings.

Driving - The operation by which a small pipe is driven through compressible soils by a steady thrust, hammering or vibrating. A casing or corrosion-resistant covering should be used.

Duct - An enclosed tubular casing for protecting wires, lines or cables, often flexible or semi-rigid.

Encasement - Structural element surrounding a carrier or casing.

Freeway - A controlled-access, divided highway with grade separations at intersections.

Grout - A fluid mixture of cement and water or of cement, sand and water used to fill joints and voids. Also called slurry.

Highway - A major public road, especially one connecting municipalities and cities, for the transportation of people, materials, goods and services, but primarily for high speed vehicular travel, including the entire area within the right-of-way. For the understanding of the present guidelines, highways include freeways.

Jacket - A concrete encasement placed around a carrier or casing.

Manhole (Utility Access Hole) - An opening in an underground system which workers may enter for the purpose of making installations, removals, inspections, repairs, connections and tests.

Median - The portion of a divided highway separating the traveled ways for traffic in opposite directions.

Pavement Structure - The combination of subbase, base course and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed.

Permit - The written agreement by which a road authority approves the use and occupancy of highway rights-of-way by utility facilities or private lines. Also called Occupancy Agreement and/or Encroachment.

Pipe - A formed hollow cylinder for the conveyance of liquids or gases. Cylinders formed from plate material in the course of the fabrication of auxiliary equipment are not pipe as defined here.

Pressure - The relative internal pressure in a pipe.

Private Lines - Privately owned facilities, which convey or transmit the commodities outlined in the definition of utility facilities, but are devoted exclusively for private use.



Right-of-Way - A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

Road authority - The ministry, agency, commission, board or official of any provincial or political subdivision thereof charged by its law with the responsibility for highway administration.

Roadside - A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

Roadway - The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways.

Slab - A slab between a utility line and a structure or pavement, that does not contact either.

Sleeve - A short casing through pier or abutment of highway structure

Slurry - A thin mixture of liquid, especially water, and any of several finely divided substances, such as cement or clay particles. Also called grout.

Traffic Barrier - A device used to prevent a vehicle from striking a more severe obstacle or feature located on the roadside or in the median, or to prevent crossover median accidents

Traffic Control Plan - A plan for handling traffic through a specific highway or road work zone or project.

Traveled Way - The portion of the roadway for the movement of through traffic.

Trench - Narrow open excavation.

Trenchless - Installed without breaking the ground or pavement surface for such operations as jacking, tunneling or boring.

Utility Access Hole (Manhole) - An opening in an underground system which workers may enter for the purpose of making installations, removals, inspections, repairs, connections and tests.

Utility Facility - A privately, publicly or cooperatively owned line, pipe or system for producing, transmitting or distributing communications, cable, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway drainage or any other similar commodity, including any fire or police signal system or street lighting system, which directly or indirectly serves the public.

Vent - An accessory to discharge lighter than air contaminants from a casing.

MAIN REFERENCES

- (1) AASHTO. *A Guide for Accommodating Utilities Within Highway Right-of-Way*. American Association of State Highway and Transportation Officials. Washington, DC, 2005.
- (2) BC MTH. *Utility Policy Manual*. British Columbia Ministry of Transportation and Highways, Highway Planning Branch. Victoria, BC, 1995.
- (3) MTO. *Ontario Provincial Standard Specifications*. Ministry of Transportation of Ontario, Corridor Management and Property Section. Toronto, ON, 2011.
- (4) MTQ. *Ouvrages routiers - Norme sur les services publics*. Ministère des Transports du Québec, Service de l'exploitation. Québec, QC, 2011.
- (5) NHDOT. *Utility Accommodation Manual*. New Hampshire Department of Transportation, Bureau of Highway Design. Concord, NH, February 2010.
- (6) CTDOT. *Utility Accommodation Manual*. Connecticut Department of Transportation, Utilities Section. Newington, CT, February 2009.
- (7) CGA. *Best Practices 8.0*. Common Ground Alliance. Alexandria, VA, March 2011.

LEAVE TO CONSTRUCT APPLICATION

1. On August 9, 2020, Enbridge Gas applied under section 90(1) of the *Ontario Energy Board Act, 1998* (“the Act”) for leave to construct a natural gas pipeline and ancillary facilities replacing approximately 64 kms of the Windsor pipeline (“Windsor Line”) in the Municipality of Chatham-Kent, the Towns of Lakeshore and Tecumseh and the County of Essex (the Project). Enbridge Gas also applied under section 97 of the Act for approval of the form of land agreements (temporary land use and permanent easement) it offered to landowners in order to use their land for routing or construction of the Project. A map showing the general location of the Project is provided at Exhibit B, Tab 1, Schedule 1, Attachment 1.
2. Energy Probe Research Foundation (“Energy Probe”) and the Federation of Rental-Housing Providers of Ontario (“FRPO”) were the only parties that applied for Intervenor status. Essex County, while provided notice of the LTC Application, chose not to participate. The main concerns of Energy Probe and FRPO were the justification and capacity of the proposed facilities. No significant concern was expressed regarding the location of the Pipeline.
3. On April 1, 2020, the Ontario Energy Board (“OEB or the Board”) issued its Decision¹ for this proceeding approving the construction of a hybrid option of the pipeline which are detailed in Section 5 of the Decision. Furthermore, the leave to construct for the Project was granted subject to the Conditions of Approval attached as Schedule B to the Decision and Order. The OEB also approved the form of land

¹ EB-2019-0172, Decision and Order, dated April 1, 2020

agreements that Enbridge Gas offered to affected landowners. The OEB decision is provided at Appendix A to this exhibit.

4. In providing its Decision, the Board noted and accepted Enbridge Gas' commitment to adhering to the mitigation measures provided in the Environmental Report. The Environmental Report expressly stated that the depth of cover of the pipeline would be approximately 1 metre.
5. The project, as described, noted potential removal of the existing NPS 10 pipeline only for areas where requested by private landowners. Removal of the pipeline in these locations eliminates the need to continue to retain land rights and is the subject of the specific negotiations with such landowners.
6. As noted in the Application, Condition 4 of the Decision and Order requires Enbridge Gas to secure must secure prior written approval prior to making any changes.
 4. **Enbridge Gas shall advise the OEB of any proposed change in the project, including but not limited to changes in: OEB-approved construction or restoration procedures, the proposed route, construction schedule and cost, the necessary environmental assessments and approvals, and all other approvals, permits, licences, certificates and rights required to construct the proposed facilities. Except in an emergency, Enbridge Gas shall not make any such change without prior notice to and written approval of the OEB. In the event of an emergency, the OEB shall be informed immediately after the fact.**
7. Enbridge Gas views the following as "changes" within the meaning of Condition 4:
 - a. Execution of a Road User Agreement rather than typical municipal consent;
 - b. Additional depth of cover for approximately 22 kms; and
 - c. Removal of the NPS 10 steel main for approximately 21 kms.

8. These changes represent departures from the process provided in the 1957 Agreement, Enbridge Gas's standard policies and procedures, typical industry practice and the contents of the Environmental Report.



DECISION AND ORDER

EB-2019-0172

ENBRIDGE GAS INC.

Application for approval to construct a natural gas pipeline and associated facilities in the Municipality of Chatham-Kent and the Towns of Lakeshore and Tecumseh

**BEFORE: Michael Janigan
Presiding Member**

**Robert Dodds
Vice Chair and Member**

April 1, 2020



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1 INTRODUCTION AND SUMMARY

This is the Decision and Order of the Ontario Energy Board (OEB) regarding an application filed by Enbridge Gas Inc. (Enbridge Gas) on August 9, 2019.

Enbridge Gas applied under section 90(1) of the *Ontario Energy Board Act, 1998* (Act) for approval to construct a natural gas pipeline and ancillary facilities replacing approximately 64 kilometres of the Windsor pipeline in the Municipality of Chatham-Kent and the Towns of Lakeshore and Tecumseh (the Project). Enbridge Gas also applied under section 97 of the Act for approval of the forms of agreement it will offer to landowners to use their land for routing or construction of the proposed pipeline.

Enbridge Gas stated that the Project is needed to address multiple pipeline integrity concerns that it has identified in order to ensure the safety and reliability of the Windsor pipeline. Construction of the Project is scheduled to begin in May 2020 and is expected to be in-service in November 2020.

A map of the Project is attached as Schedule A to this Decision and Order.

The OEB examined all aspects of Enbridge Gas' leave to construct application and while it is satisfied that the replacement of the pipeline is in the public interest, the OEB only approves the construction of the hybrid option, the reasons for which are detailed in Section 5 below. Furthermore, leave to construct the Project is granted subject to the conditions of approval attached as Schedule B to this Decision and Order (Conditions of Approval). The OEB also approves the proposed form of agreement that Enbridge Gas will offer to affected landowners.

2 THE PROCESS

Enbridge Gas filed the leave to construct application on August 9, 2019.

The OEB issued a Notice of Hearing on September 13, 2019. Energy Probe Research Foundation (Energy Probe) and Federation of Rental-housing Providers of Ontario (FRPO) applied for, and were granted, intervenor status and cost eligibility.

On October 11, 2019, the OEB issued Procedural Order No. 1, indicating that it was proceeding by way of written hearing and making provision for interrogatories, interrogatory responses and submissions. Interrogatories were filed by OEB staff on October 17, 2019 and by Energy Probe, and FRPO on October 21, 2019. Enbridge Gas filed its responses to interrogatories on November 1, 2019.

On November 11, 2019, FRPO filed a letter requesting additional discovery on the application by means of a technical conference. The OEB issued Procedural Order No. 2 on November 13, 2019, which sought submissions from parties on the merits of FRPO's request, and suspended the dates set out in Procedural Order No. 1 for submissions on the application. FRPO's request was supported by Energy Probe and OEB staff.

On November 22, 2019, the OEB issued Procedural Order No. 3 ordering a transcribed technical conference, which was held on December 5, 2019. Enbridge Gas filed responses to undertakings on December 18, 2019. On December 23, 2019, the OEB issued Procedural Order No. 4 making provision for written submissions.

On January 4, 2020, FRPO filed a letter requesting an oral hearing. FRPO stated that the evidence filed by Enbridge Gas regarding the sizing of the pipeline and the costs of alternatives was confusing and that it would be in the public interest to hold an oral hearing to clarify the record. Enbridge Gas responded to FRPO's request on January 8, 2020 stating that an oral hearing was not necessary and that there is a full record to enable the OEB to determine if the application is in the public interest. FRPO filed another letter on January 10, 2020 reiterating its request for an oral hearing.

On January 13, 2020, the OEB issued a letter stating that it would not proceed by way of an oral hearing and required Enbridge Gas to file an Argument-in-Chief (AIC) addressing the need and prudence for the size of the pipeline sought to be built with reference to the appropriate sections of the evidence.

The OEB issued Procedural Order No. 5 on January 15, 2020 setting out a revised schedule for the filing of written submissions. On January 27, 2020, Enbridge Gas filed its AIC. OEB staff, FRPO, and Energy Probe filed submissions on February 10, 2020 followed by a reply submission from Enbridge Gas on February 24, 2020.

3 THE PUBLIC INTEREST TEST

This proceeding concerns an application by Enbridge Gas under section 90(1) of the Act seeking an order for leave to construct a natural gas pipeline.

Section 96(1) of the Act provides that the OEB shall make an order granting leave to construct if the OEB finds that the “construction, expansion or reinforcement of the proposed work is in the public interest”. When determining whether a project is in the public interest, the OEB typically examines the need for the project, project alternatives, project cost and economics, environmental impacts, land matters, and Indigenous consultation.

4 NEED FOR THE PROJECT

The Windsor Line is a large diameter high-pressure distribution pipeline that receives gas from the Enbridge Gas Panhandle Transmission System and provides natural gas service to residents and businesses from Port Alma, in the Municipality of Chatham-Kent to the City of Windsor, located in the County of Essex. A significant portion of the Windsor Line was installed in the 1930s, 1940s and 1950s.

Enbridge Gas stated that surveys and inspections of the Windsor Line that are undertaken annually have identified multiple integrity issues which, if not addressed, are expected to impact both the safety and security of supply of the pipeline. These include a history of leakage with significant costs to repair, portions of the older vintage pipe that are not weldable, sections of the pipeline that cannot be isolated because of inoperable mainline valves, and sections that have poor depth of cover with less than 0.6 metre.¹

In responses to questions from parties, Enbridge Gas confirmed that there are currently 24 active leaks and 3 inoperable mainline valves and also provided information showing that leaks had increased from 20 in 2017 to 34 in 2019. Enbridge Gas stated that the most recent depth of cover survey identified approximately 19 kilometres of pipe at a depth of cover of less than 0.6 metre, with 23 locations with exposed pipe.²

Enbridge Gas estimated that maintenance costs of the line could range from \$381,000 in 2020 rising to \$857,000 in 2022. Enbridge Gas also stated that it expects incremental costs ranging from \$10 to \$18 million from 2020 to 2022 to address depth of cover issues.³

Enbridge Gas submitted that as there are currently three inoperable mainline valves and if the pipeline had to be isolated, this would result in significant customer outages.⁴ There are 399 residential and commercial customers directly served off the section of pipeline that Enbridge Gas proposes to replace.

Enbridge Gas submitted that the Windsor Line was deemed a high operational risk in April 2017.⁵ The Project was identified in Enbridge Gas' Utility System Plan and Asset Management Plan filed in Enbridge Gas' 2019 rate application.⁶

¹ Application, Exhibit B, Tab 1, Schedule 1, p.2

² Exhibit I, OEB Staff 2 and Exhibit JT1.19

³ Exhibit JT1.18

⁴ Response to OEB Staff Interrogatory, Exhibit I, Staff 2, p.2

⁵ Exhibit I, OEB Staff 2

⁶ Exhibit I, OEB Staff 6

Energy Probe submitted that there is inadequate evidence provided by Enbridge Gas that the OEB can rely upon regarding the various integrity concerns that necessitates the replacement of the pipeline. Energy Probe argued that there is no integrity report provided by an independent expert that verifies the integrity issues claimed by Enbridge Gas. In Energy Probe's view, the evidence provided is of a summary nature. Energy Probe also argued that Enbridge Gas was unable or unwilling to provide clarifying evidence as to the extent and nature of the identified integrity issues (leaks, depth of cover issues, inoperable valves, and vintage pipe that is not weldable) during the technical conference. Energy Probe submitted that without this evidence, it is not possible to draw a reasonable conclusion regarding the urgency for the replacement of the pipeline.⁷ FRPO supported the submissions of Energy Probe on integrity issues.

OEB staff submitted that based on the evidence filed by Enbridge Gas, the need for the replacement is supported by the integrity concerns identified and the age of the pipeline.

In its reply submissions, Enbridge Gas reiterated that if the multiple integrity issues identified are not addressed, they are expected to impact both the safety and security of supply of the pipeline. Enbridge Gas submitted that a large proportion was installed from the 1930s to the 1950s and that there are sections that are between 70 and 90 years, emphasizing that Enbridge Gas witnesses at the Technical Conference had expressed that the Windsor line is near end of life. Enbridge Gas submitted that the OEB in its leave to construct decision on the Sudbury Line Replacement Project had acknowledged that age was a consideration that justified the need for the project in addition to multiple integrity concerns.

Findings

On balance, the OEB finds that the need for the replacement project is supported by the integrity concerns identified and the age of the pipeline. The OEB would have been better assisted in making this conclusion if Enbridge Gas had offered more comprehensive supporting evidence as to the extent of the integrity issues and the ability of those issues to be rectified without necessitating the replacement. Safety and security of supply concerns are of paramount importance in determining need for the Project particularly given the age of the existing Windsor Line. However, the OEB has a responsibility to ensure that the proposed ratepayer-funded capital expenditure of \$106.8 million is based on clear, well-supported and objective evidence. While the OEB does find that the Project is required and in the public interest, it generally expects a more thorough presentation of Project need given the funding requested.

⁷ Energy Probe Argument, p.5

5 PROPOSED FACILITIES AND ALTERNATIVES

Alternatives Assessed

Enbridge Gas plans to replace the existing pipeline, comprised of NPS 10 and NPS 8 pipe and currently operating at a maximum operating pressure (MOP) of 1380 kPa with a NPS 6 pipeline operating at a MOP of 3450 kPa at a cost of \$92.7M (excluding overheads).

Enbridge Gas stated that the Project was chosen as it offers the lowest cost while also providing the required capacity to serve the current and forecasted system demands. Enbridge Gas used a ten year customer attachment forecast of demands on the pipeline to identify reinforcement facilities required to support forecasted growth.⁸

Enbridge Gas reviewed several different pipeline operating pressures when considering alternatives for the Project. Enbridge Gas also reviewed options of installing a NPS 6, NPS 8 or a NPS 10 replacement pipeline.

The first MOP considered for the Project was to replace the existing 1380 kPa pipeline with a new pipeline also operating at 1380 kPa. Enbridge determined that a NPS 6 was the minimum size required for a replacement project operating at a 1380 kPa MOP. However, this option costs \$92M and was rejected as it would only provide enough capacity to satisfy the current system demands, leaving little remaining capacity to support the forecasted system growth.

Enbridge Gas considered a NPS 8 replacement option costing \$103M, but this option would only provide enough capacity to support approximately five years of forecasted growth. A NPS 10 option was also considered. This option offers capacity to support significant system-wide growth. However, this option was rejected due to the significant cost (\$108.4M) when compared to the Project.

Enbridge Gas also examined the options of using NPS 8 and NPS 10 pipeline to replace the existing pipeline, operating at 3450 kPa. The NPS 8 and NPS 10 provide more capacity than the proposed pipeline, however Enbridge Gas stated that the forecast could not justify the increased costs (\$104M for the NPS 8 and \$109.3M for the NPS 10) associated with generating the incremental capacity.

⁸ Exhibit C, Tab 3, Sch 1, p.11

Other alternatives that were considered and rejected in early analysis included the installation of a 1900kPa MOP, 6040 kPa MOP, and 420kPa MOP pipelines. Enbridge Gas determined that if the Windsor Line is to be replaced at a higher MOP, a 3450kPa MOP would provide the most capacity with minimal cost increases.

In its review of alternatives, Enbridge Gas considered replacing both a longer section of the line as well as a shorter section of the line. Enbridge Gas determined that replacement of the entire Windsor Line was not currently required, as the portion of the pipeline that is not proposed to be replaced at this time has not presented the same integrity concerns as the rest of the line and costs significantly more (\$110M). With respect to replacing a shorter section (48 kms) of the Windsor line, Enbridge Gas stated that this would leave a 16km section of 1950's vintage pipe still in service which has significant integrity concerns.

Enbridge Gas evaluated options of joining previously independent distribution pipelines as well as obtaining supply from non-Enbridge pipelines but determined that there were no nearby distribution pipelines with adequate reliable capacity to serve the system demands.

Finally, Enbridge Gas considered geo-targeted demand side management (DSM) but stated that as the proposed pipeline is integrity driven, DSM cannot defer or eliminate the project need. Enbridge Gas also evaluated whether DSM would be viable to reduce the size of the proposed project; however, it was found that an NPS 4 project could not serve the existing system demand, even with geo-targeted DSM being implemented.

FRPO questioned whether Enbridge Gas had considered the option of using a NPS 4 for some or all of proposed pipeline construction. In its response, Enbridge Gas dismissed the use of a NPS 4 exclusively as this would not serve the existing demand requirements on design day. With respect to a hybrid option (combination of NPS 4 and NPS 6), Enbridge Gas stated that 40% of the proposed line requires the capacity of NPS 6 and that a hybrid option would be unable to meet unforecasted demand.⁹

Enbridge Gas stated that the proposed pipeline was designed as a "like-for-like" replacement with the existing NPS 10 Windsor Line in terms of capacity. FRPO argued that a "like-for-like" replacement should not constitute a disciplined approach to investment as prudent sizing is accomplished by design, using the best information available on current and future needs.

⁹ Exhibit I, FRPO 15

FRPO asked Enbridge Gas to provide information on the capacity east of the Comber Transmission Station (Comber), (a midway point on the section of Windsor pipeline that is proposed to be replaced) under different sizing scenarios. Based on Enbridge Gas' response, FRPO argued that the use of a NPS 6 pipeline results in surplus capacity that is over 200 times the forecasted need at the end of ten years while the hybrid option results in additional capacity that is over 70 times the need at the end of ten years and questioned the need for the NPS 6 pipeline. FRPO questioned how much speculative capacity should be allowed to be installed and argued that Enbridge Gas should be held to a standard of prudent investment.¹⁰

OEB staff submitted that the proposed design appears to be designed to meet demand that is above the ten-year demand forecast. OEB staff further submitted that while it is reasonable to consider future growth potential in a reinforcement project, it is important that evidence on potential load additions to justify additional capacity be provided to enable the OEB to assess the need of a proposed project. Energy Probe submitted that the evidence and submissions of Enbridge Gas on alternative pipe sizes was inadequate and supported FRPO's submissions.

Enbridge Gas stated that un-forecasted demand arises from large agricultural and greenhouse customers whose locations and demands are difficult to predict.

OEB staff submitted that it is not clear when or if Enbridge Gas will be required to meet all or any of these potential demands.

In its reply submission, Enbridge Gas clarified that it has received five separate customer inquiries in the Port Alma and surrounding areas for demands for over 8,000 m³/hour east of Comber.¹¹ Enbridge Gas acknowledged that not all these potential loads may proceed; however, it noted that many of these requests were received in the last two years and are expected to continue in the future. Enbridge Gas also stated that demands in these quantities will likely require reinforcement sooner if the hybrid option is pursued than if all NPS 6 is installed.¹²

Enbridge Gas indicated that the hybrid option will reduce the pressure and flows available on the pipeline, reducing its ability to provide a backfeed to other systems for both operational and emergency scenarios in the area.¹³ FRPO argued that the Windsor line has interconnections which could provide feed that could potentially meet un-

¹⁰ Technical Conference Transcript, pp 17-20, FRPO January 4, 2020 letter and Final Argument, p.3

¹¹ Exhibit JT 1.15 and Reply Submission

¹² Exhibit KT1.5 and Argument-in-Chief, p.10

¹³ Reply Submission, p. 7 and Exhibit KT1.6

forecasted load and that now, the OEB does not have evidence to understand the capabilities of alternatives to meet the un-forecasted load.

In its reply submissions, Enbridge Gas submitted that one benefit that was not accepted by OEB staff and FRPO is that the NPS 6 pipeline provides the same capacity as the existing pipeline. Enbridge Gas argued that in addition to maintaining a “like-for-like” comparison from a capacity perspective, the advantage of using the NPS 6 pipeline is the ability to meet the increasing un-forecasted demand that Enbridge Gas has been receiving from greenhouse customers within the general area of the Project. Enbridge Gas also stated that it had expressed in its interrogatory responses and in its Argument-in-Chief that the hybrid option would not be able to meet this un-forecasted demand.

With respect to the un-forecasted demand, Enbridge Gas stated that as it continues to receive these customer requests, the hybrid option is not the best alternative to serving these customer requests. Enbridge Gas also stated that if the un-forecasted demand is added, the NPS 4 may not be able to meet the future demands that the NPS 6 could provide.

Enbridge Gas submitted that the NPS 6 is the more prudent option because it supports the economic growth in the Windsor-Essex area, provides more flexibility for emergency response, and it will allow Enbridge Gas to meet the increasing demands sought by the greenhouse industry. Enbridge Gas also submitted that from a design perspective it is more efficient to proceed with the NPS 6 today, particularly when considered against the incremental costs for creating the surplus capacity of an NPS 6 vs the hybrid option.

Cost of proposed facilities and hybrid alternative

FRPO and OEB staff requested a cost estimate for the hybrid alternative at different stages of the discovery process. Prior to the technical conference, OEB staff requested a cost estimate of the hybrid option. In its response, Enbridge Gas did not provide a cost estimate but stated that the hybrid option is estimated to be \$0.8M less than the NPS 6 option.¹⁴ However, in undertaking responses to FRPO, Enbridge Gas stated that the cost of the proposed Project is estimated to be \$77.4M while the hybrid option is estimated to be \$76.1M, or a difference of \$1.3M.¹⁵

FRPO requested information on costs, including unit cost per km, for OEB approved projects ranging from NPS 2 to NPS 6 over the past 10 years. Enbridge Gas provided

¹⁴ Exhibit KT 1.6

¹⁵ Exhibit JT1.14

costs for three previous pipeline projects, which FRPO argued demonstrates that the unit cost for a NPS 4 was less than one-third of the cost of a NPS 6 and which also showed the contractor cost per unit length for a NPS 4 as being less than half of the unit cost for NPS 6.¹⁶

In its AIC, Enbridge Gas submitted that comparison with these past projects is not appropriate as they are small pipeline projects such as new general infill expansion enhancement to existing pipelines while the proposed replacement is a much larger project.

OEB staff submitted that while the costs of the hybrid option should be less than the NPS 6, the cost differential between the hybrid option and the proposed NPS 6 appears to be understated. OEB staff recommended that in the absence of better clarity from Enbridge Gas in its reply submission that the OEB approve the hybrid option.

FRPO submitted that Enbridge Gas has not met its onus to demonstrate that NPS 6 is the appropriate size for the eastern leg of the Windsor line replacement and urged the OEB not to approve the application as presented until the applicant can provide more compelling evidence.

In its reply submissions, Enbridge Gas stated that the Windsor Line replacement is far more complex than the previous pipeline projects provided by Enbridge Gas for comparison purposes. Enbridge Gas submitted that comparison based on a simple per kilometre cost ratio is not appropriate. There are multiple factors that differentiate this Project from the previous projects which influence the cost. There are a number of conditions that are present in this Project that would not be reflected in the construction costs of the comparator projects. These include:

- 19 new station installations with 5 abandonments with bypass or stop and tap activities for NPS 10;
- NPS 4 and NPS 2;3 complex river crossings within wetland designated areas West of Comber Transmission;
- An extensive list of landowner purchase agreements and temporary land use agreements; abandonment of sections of NPS 10 main;
- both in place and full removal of natural gas delivery is required through both NPS 10 and NPS 6 for all residents throughout construction.

Enbridge Gas argued that in its decision on the Sudbury Replacement Project, the OEB granted the approval because the new replacement line provided incremental capacity

¹⁶ FRPO submission, p.7

at a modest cost (i.e. the difference between NPS 10 and NPS 12 was \$1.5 million) and also submitted that in this proceeding, in order to meet the un-forecasted demands (i.e. greenhouse and agricultural customers) in the Windsor-Essex area the NPS 6 design is more efficient than the hybrid option.

Enbridge Gas asserted that for a small incremental cost of \$0.8M, the NPS 6 creates surplus capacity that would avoid or delay potential future reinforcements and accommodate the growing demand in the area.

Findings

The OEB approves construction of the hybrid option combining the use of NPS 4 and NPS 6 pipeline sizes estimated to cost \$76.1 M, some \$1.3M less than the cost of the completion of the Project using only the NPS 6 pipeline capacity.

The OEB acknowledges the potential benefits of planning to meet un-forecast demand by the construction of NPS 6 line throughout the length of the Project but the evidence of Enbridge Gas on the record concerning this demand, which was not set out in its original application, is somewhat speculative. The OEB acknowledges that Enbridge Gas may choose of its own volition to construct a NPS 6 line throughout but the incremental increase in cost over the hybrid option will not be eligible for inclusion in rate base until the need for NPS 6 actually arises.

The existence of inquiries from potential customers provides some, but not conclusive evidence of the need to accommodate future demand. It would have also been helpful for Enbridge Gas to have addressed in its original application the need for the Project to ensure back feed capacity and avoid pressure reductions – needs that were raised by Enbridge Gas later in the proceeding.

In weighing the merits of the arguments of Enbridge Gas, OEB staff and intervening parties, the OEB finds a lack of sufficient evidentiary support for the Project using the Enbridge Gas pipeline size option instead of the less expensive hybrid.

6 PROJECT COST AND ECONOMICS

Enbridge stated that total estimated cost of the Project is \$106.8M. This comprises \$77.4M for the main pipeline, \$15.3M for ancillary facilities (stations and services), and \$14.1M in indirect overhead costs.

Enbridge Gas stated that a Discounted Cash Flow report was not completed as the Project is underpinned by the integrity requirements and will not create a significant change in capacity available on the Windsor Line.

OEB staff submitted that the rationale for not conducting an economic analysis is acceptable and notes that the OEB has accepted the rationale in previous applications for leave to construct replacement projects where the need was driven by integrity requirements.¹⁷

Enbridge Gas expects the Project will meet the criteria for rate recovery through the OEB's Incremental Capital Module (ICM) mechanism. The ICM request for the Project will form part of Enbridge Gas' 2020 rate application.

Findings

The OEB approves a total estimated cost of the Project of \$105.5 M. This comprises \$76.1M for the main pipeline, \$15.3M for ancillary facilities (stations and services), and \$14.1M in indirect overhead costs.

The OEB accepts the rationale from Enbridge Gas for not conducting an economic analysis. The OEB has accepted the rationale in previous applications for leave to construct replacement projects where the need was driven by integrity requirements.

¹⁷ EB-2018-0108, Decision and Order, p.6 and EB-2017-0118, Decision and Order, p.6

7 ENVIRONMENTAL MATTERS

Enbridge Gas retained Stantec Consulting Ltd. (Stantec) to complete an environmental assessment of the proposed pipeline.

Enbridge Gas followed the OEB's *Environmental Guidelines for the Location, Construction, and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition, 2016* (Guidelines) for the environmental assessment. This was documented in an Environmental Report (ER) prepared by Stantec examining the potential effects of the Project on the environmental and socio-economic features of the area. According to the ER, Stantec does not anticipate any permanent or adverse environmental impacts from the construction and operation of the Project, provided the mitigation measures recommended in the ER are followed.

Enbridge Gas has committed to complying with all mitigation measures recommended in the ER.¹⁸

Enbridge Gas submitted copies of the ER to the Ontario Pipeline Coordinating Committee (OPCC) for review and comment on July 22, 2019. Enbridge Gas provided a summary of the OPCC review comments, noting a couple of outstanding matters relating to comments from the Essex Region Conservation Authority (ERCA).¹⁹ Enbridge Gas stated that it has contacted the Essex Region Risk Management Official/Inspector as recommended by the ERCA to discuss the Project and appropriate risk management measures and will also work with the ERCA on a permit application for identified water crossings.

Enbridge Gas confirmed that a Stage 1 Archaeological Assessment (AA) report was submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) on March 11, 2019 and that the MHSTCI issued a compliant letter on April 12, 2019. Enbridge Gas stated that a Stage 2 AA began in June 2019 and a Stage 2 AA report was submitted to the MHSTCI in December 2019. On January 9, 2020, Enbridge Gas received a letter of acceptance from the MHSTCI regarding the Stage 2 AA.²⁰ On March 26, 2020, Enbridge Gas provided an update on the Stage 2 AA stating that a number of additional properties located within the Project area were identified for assessment following the submission of the December 2019 Stage 2 AA report. These additional properties will be assessed in Spring 2020 and an additional Stage 2 AA report will be submitted to MHSTCI for review and acceptance. Enbridge Gas stated

¹⁸ Application, Exhibit B, Tab 1, Schedule 6, p.3

¹⁹ OEB Staff Interrogatory 8

²⁰ OEB Staff Interrogatory 9 and Enbridge letter of March 26, 2020

that it will not conduct works within these areas until MHSTCI acceptance letters are received.

Enbridge Gas stated that it will continue to work with agencies as well as municipalities throughout the Project area to secure any necessary permits and authorizations prior to construction.

OEB staff submitted that it has no concerns with the environmental aspects of the Project, given that Enbridge Gas is committed to implementing the mitigation measures set out in the ER. OEB staff also submitted that Enbridge Gas agrees with the draft conditions of approval proposed by OEB staff, including those that require Enbridge Gas to certify that it has obtained all approvals, permits, licences, and certificates required to construct, operate and maintain the proposed Project.²¹

Findings

The OEB finds that Enbridge Gas has complied with the OEB's Guidelines for the environmental assessment and notes that Enbridge Gas is committed to implementing the mitigation measures set out in the ER.

The OEB also notes that Enbridge Gas agrees with the draft conditions of approval proposed by OEB staff, including those that require Enbridge Gas to certify that it has obtained all approvals, permits, licenses, and certificates required to construct, operate and maintain the proposed Project.

²¹ OEB Staff Interrogatory 12

8 INDIGENOUS CONSULTATION

In accordance with the OEB's Guidelines, on April 13, 2018, Enbridge Gas contacted the Ministry of Energy, Northern Development and Mines (MENDM) with respect to the Crown's duty to consult, providing the MENDM with a description of the Project.

The MENDM sent a letter to Enbridge Gas on September 10, 2018 delegating the procedural aspects of the Crown's duty to consult for the Project to Enbridge Gas.

On August 9, 2019, Enbridge Gas provided the MENDM with its Indigenous Consultation Report for the Project and requested that the MENDM determine if the procedural aspects of the duty to consult have been sufficiently addressed.

As part of its application, Enbridge Gas filed a summary of Enbridge Gas' indigenous consultation activities for the Project.²²

On January 22, 2020, Enbridge Gas updated its evidence with a letter from the MENDM that stated that the MENDM is of the opinion that the procedural aspects of consultation undertaken by Enbridge Gas with respect to the Project are satisfactory.

Findings

The OEB finds that the procedural aspects of consultation undertaken by Enbridge Gas with respect to the Project are satisfactory.

²² Application, Exhibit C, Tab 8, Schedules 1,2

9 LAND MATTERS

Enbridge Gas indicated that the Project will follow the same route as the existing pipeline and will be located entirely within existing municipal road allowances.

Enbridge Gas proposes to purchase land for five new station sites. In addition, Enbridge Gas will require Temporary Land Use rights on 28 properties adjacent to municipal road allowances to facilitate construction activities. Enbridge Gas stated that negotiations are ongoing with landowners and it expects to have all necessary land rights in place before construction begins.

Enbridge Gas seeks approval of the form of Temporary Land Use Agreement, which has been approved by the OEB in previous pipeline projects.²³

OEB staff submitted that it has no concerns with respect to Enbridge Gas' proposed land use. OEB staff submitted that the OEB should approve the proposed form of Temporary Land Use Agreement.

Findings

The OEB approves the proposed form of Temporary Land Use Agreement.

²³ Application, Exhibit C, Tab 7, Schedule 3

10 CONDITIONS OF APPROVAL

Section 23 of the OEB Act permits the OEB, when making an order, to impose conditions of approval as it considers appropriate.

OEB staff proposed a number of conditions of approval for the Project based on conditions approved by the OEB for similar projects.

Enbridge Gas accepted the proposed conditions of approval with the exception that the minimum 10 day OEB notice period prior to construction be lifted (i.e., construction can commence at any time leave to construct has been granted).²⁴

Findings

The OEB notes that the standard conditions of approval require compliance with all recommendations of the Environmental Protection Act, the Environmental Report and the Ontario Pipeline Coordinating Committee. Accordingly, the OEB accepts the Enbridge Gas request that the minimum 10 day OEB notice period prior to construction be lifted (i.e., construction can commence at any time leave to construct has been granted). The OEB finds that compliance of Enbridge Gas with the conditions of approval will ensure that the requirements of other approvals, permits, licenses, and certificates are fully addressed.

The approved conditions of approval are attached as Schedule B to this Decision and Order.

²⁴ Reply Submission, p. 2

11 ORDER

THE ONTARIO ENERGY BOARD ORDERS THAT:

1. Enbridge Gas Inc. is granted leave, pursuant to section 90(1) of the OEB Act, to construct approximately 64 kilometers of natural gas pipeline and associated facilities to replace a section of the Windsor pipeline located in the Municipality of Chatham-Kent and the Towns of Lakeshore and Tecumseh, using the hybrid option.
2. The OEB approves the proposed form of temporary land use agreement that Enbridge Gas Inc. has offered or will offer to each owner of land affected by the approved pipeline route for the Project.
3. Leave to construct is subject to Enbridge Gas Inc. complying with the conditions of approval set out in Schedule B.
4. Eligible intervenors shall file with the OEB and forward to Enbridge Gas Inc. their respective cost claims in accordance with the OEB's *Practice Direction on Cost Awards* on or before April 15, 2020.
5. Enbridge Gas Inc. shall file with the OEB and forward to intervenors any objections to the claimed costs of the intervenors on or before April 29, 2020.
6. If Enbridge Gas Inc. objects to any intervenor costs, those intervenors shall file with the OEB and forward to Enbridge Gas Inc. their responses, if any, to the objections to cost claims on or before May 13, 2020.
7. Enbridge Gas Inc. shall pay the OEB's costs incidental to this proceeding upon receipt of the OEB's invoice.

DATED at Toronto April 1, 2020

ONTARIO ENERGY BOARD

Original Signed By

Christine E. Long
Registrar and Board Secretary

SCHEDULE A
DECISION AND ORDER
ENBRIDGE GAS INC.
EB-2019-0172
APRIL 1, 2020



SCHEDULE B
DECISION AND ORDER
ENBRIDGE GAS INC.
EB-2019-0172
APRIL 1, 2020

CONDITIONS OF APPROVAL
Application under Section 90(1) of the OEB Act
Enbridge Gas Inc.
EB-2019-0172

1. Enbridge Gas Inc. (Enbridge Gas) shall construct the facilities and restore the land in accordance with the OEB's Decision and Order in EB-2019-0172 and these Conditions of Approval.

2. (a) Authorization for leave to construct shall terminate 12 months after the decision is issued, unless construction has commenced prior to that date.

(b) Enbridge Gas shall give the OEB notice in writing of the following:
 - i. The planned in-service date, at least 10 days prior to the date the facilities go into service
 - ii. The date on which construction was completed, no later than 10 days following the completion of construction
 - iii. The in-service date, no later than 10 days after the facilities go into service

3. Enbridge Gas shall implement all the recommendations of the Environmental Report filed in EB-2019-0172, and all the recommendations and directives identified by the Ontario Pipeline Coordinating Committee review.

4. Enbridge Gas shall advise the OEB of any proposed change in the project, including but not limited to changes in: OEB-approved construction or restoration procedures, the proposed route, construction schedule and cost, the necessary environmental assessments and approvals, and all other approvals, permits, licences, certificates and rights required to construct the proposed facilities. Except in an emergency, Enbridge Gas shall not make any such change without prior notice to and written approval of the OEB. In the event of an emergency, the OEB shall be informed immediately after the fact.

5. Concurrent with the final monitoring report referred to in Condition 6(b), Enbridge Gas shall file a Post Construction Financial Report, which shall provide a variance analysis of project cost, schedule and scope compared to the estimates filed in this

proceeding, including the extent to which the project contingency was utilized. Enbridge Gas shall also file a copy of the Post Construction Financial Report in the proceeding where the actual capital costs of the project are proposed to be included in rate base or any proceeding where Enbridge Gas proposes to start collecting revenues associated with the project, whichever is earlier.

6. Both during and after construction, Enbridge Gas shall monitor the impacts of construction, and shall file with the OEB one paper copy and one electronic (searchable PDF) version of each of the following reports:
 - (a) A post construction report, within three months of the in-service date, which shall:
 - i. Provide a certification, by a senior executive of the company of Enbridge Gas' adherence to Condition 1
 - ii. Describe any impacts and outstanding concerns identified during construction
 - iii. Describe the actions taken or planned to be taken to prevent or mitigate any identified impacts of construction
 - iv. Include a log of all complaints received by Enbridge Gas, including the date/time the complaint was received, a description of the complaint, any actions taken to address the complaint, the rationale for taking such actions
 - v. Provide a certification, by a senior executive of the company, that the company has obtained all other approvals, permits, licences, and certificates required to construct, operate and maintain the proposed project
 - (b) A final monitoring report, no later than fifteen months after the in-service date, or, where the deadline falls between December 1 and May 31, the following June 1, which shall:
 - i. Provide certification, by a senior executive of the company, of Enbridge Gas' adherence to Condition 3
 - ii. Describe the condition of any rehabilitated land

- iii. Describe the effectiveness of any such actions taken to prevent or mitigate any identified impacts of construction
 - iv. Include the results of analyses and monitoring programs and any recommendations arising therefrom. Include a log of all complaints received by Enbridge Gas, including the date/time the complaint was received, a description of the complaint, any actions taken to address the complaint, the rationale for taking such actions
7. Enbridge Gas shall designate one of its employees as project manager who will be responsible for the fulfillment of these conditions, and shall provide the employee's name and contact information to the OEB and to all the appropriate landowners, and shall clearly post the project manager's contact information in a prominent place at the construction site.

The OEB's designated representative for the purpose of these Conditions of Approval shall be the OEB's Manager of Natural Gas Applications (or the Manager of any OEB successor department that oversees natural gas leave to construct applications).

ROAD USER AGREEMENT

1.0 1957 Franchise Agreement Essex County

1. Under the terms of the governing 1957 Agreement Essex County granted to Enbridge Gas the right to install, construct, maintain and abandon pipelines under any highway under its jurisdiction.
2. The qualification to this right granted to Enbridge Gas, was that the location of the pipelines shall be at locations approved by Essex County and that any pipeline shall be constructed in a manner that does not obstruct or interfere with the use of the highway.
3. Under the terms of the 1957 Agreement, Enbridge Gas also had the obligations to:
 - a. Repair any damage done to the highway as a result of the installation or maintenance of the pipeline;
 - b. Be solely responsible for all costs for the relocation of the pipeline in the event the pipeline had to be relocated as a result of any construction, repair, widening to the highway or any municipal drain, culvert, ditch or bridge,
 - c. Indemnify Essex for all losses or damages incurred by Essex as a result of the construction or operation of the pipeline.
4. Departing from past practice, Essex County advised that the terms and conditions regarding the construction of the pipeline would be formalized in a RUA and would

act as the permit outlining the location of the pipeline and any construction activities which would require the consent of Essex County.

5. The RUA would be approved by Essex Council and adopted by by-law. Enbridge Gas notes the Franchise Agreement specifically delegated the ability to approve the location of a proposed pipeline to the Road Superintendent or other officer. Requiring approval of Essex Council is contrary to the express provision of the 1957 Agreement. This RUA would appear to be an attempt to modify the 1957 Franchise Agreement without regard to the Municipal Franchises Act or this Board's Model Franchise Agreement.

1.1 Timeline of Road User Agreement

6. Enbridge Gas began discussions with Essex County during the spring of 2019. At that time, the primary focus of County Council appeared to be for Enbridge Gas to ensure the future capacity of any pipeline would support growth opportunities.
7. In summer of 2019 Essex County advised Enbridge Gas that it was preparing the RUA and would provide a draft to Enbridge Gas for its review and consideration. Essex County continued to stress to Enbridge Gas that no pipeline construction activities could be undertaken by Enbridge Gas until such time that the RUA was signed and approved by Essex Council.
8. Essex County advised that they do not have a standard form of RUA as each one is specific to the activities upon the highway being requested.

9. Essex County further advised that it was their experience that once the initial draft of the RUA is prepared there is usually a negotiation period of 3-6 weeks to negotiate and finalize the form of the RUA, then the signed RUA would be presented to Essex County council at a regularly scheduled council meeting for approval and adoption by by-law.

10. Enbridge Gas advised Essex County of the need to commence construction on the pipeline within Essex County highways by April 2020 in order to ensure that the pipeline construction was completed by November 1, 2020.

11. Enbridge Gas made numerous requests from Essex County for a draft of the applicable RUA.

12. Despite repeated assurances from Essex County that the RUA was being prepared, and the fact that Essex County was well aware of the construction timeline for this project, Essex County did not provide a copy of the RUA until April 22, 2020.

13. Essex County advised that the RUA would have to be approved at a regularly scheduled bi-weekly council meeting, (every other Wednesday evening) with the next meeting scheduled for May 6, 2020.

14. Essex County advised that the RUA would have to be fully executed by both parties by no later than the Wednesday (April 29, 2020) prior to the council meeting to allow time for the enabling by-law to be drafted.

15. As Enbridge Gas and Essex County could not reach agreement on the terms of the RUA, presentation to County Council was deferred.

16. Despite having no signed agreement, and being aware that significant issues remained outstanding, at the May 20, 2020 regular meeting of Council, County Staff provided a report (“Staff Report”) and form of Road User Agreement to County Council for approval. The County did not advise Enbridge Gas that they would be taking the RUA to County Council. Endorsement for the form of agreement by County Council was obtained at that meeting.

1.2 The RUA Evolution

17. The initial draft of the RUA drafted by Essex County was written as a replacement agreement for the 1957 Agreement, and to govern several matters outside the construction of the Pipeline. Such items included:

- a. Limiting the term of pipeline to be installed in the highway to 25 years, with no obligation upon Essex County to grant an extension nor acknowledgement of the Ontario Energy Board’s jurisdiction;
- b. Requirement that if the pipeline would not be in continuous use for any period of greater than 24 months the pipeline will be deemed abandoned and must be removed by Enbridge Gas;
- c. Use of the highway for the installation of pipeline conditional upon the removal of the old pipeline this project is replacing (“Abandonment Plan”);
- d. Requirement for an Abandonment Plan to be approved by the County Engineer;

- e. Essex County imposed time limits for the removal of the old pipeline, including provisions for the county to remove the pipeline on its own, or through a contractor at the sole expense of Enbridge Gas;
- f. Essex County Engineer to have final approval of the construction methodology to install the pipeline;
- g. The county would be permitted to retain a Consulting Engineer to inspect and oversee all aspects of both the installation and abandonment of the old pipeline at the sole cost of Enbridge Gas, the cost of which is without limitation;
- h. Essex County to have the sole decision regarding the pipeline depth for all locations of the pipeline within highways under its jurisdiction;
- i. Back-fill to be imported, where Enbridge Gas would not be able to use existing fill within highway;
- j. Requirement for all backfill and open trenches to be re-filled and compacted every night to allow for full use of both travelled, shoulder and grass portions of the highway;
- k. Traffic Control Plans to be approved by the county, where Enbridge Gas is to comply with all requirements and policies of Essex County with respect to traffic control regardless of any conflict with Ministry of Transportation requirements. The County of Essex would have the final determination of the Traffic Control Plan for all aspects of the Project;
- l. Requirement that Enbridge Gas upgrade or improve the highway if the county in its sole discretion determines that an upgrade or improvement work is necessary to accommodate the pipeline. Decision of the need to upgrade the highway is solely with the Essex County Engineer;

- m. After the installation of the pipeline, a requirement for Enbridge Gas to notify Essex of any emergency situation and to complete any repairs as determined by the Essex County Engineer, in their sole discretion including the right for the engineer to undertake any pipeline repairs at the sole cost of Enbridge Gas;
 - n. Payment of various unsubstantiated and unsupported fees, including an annual fee of \$5,000, to be increased after the fifth year, for the ongoing annual administrative costs incurred by the County of Essex;
 - o. A requirement for Enbridge Gas to provide an exclusive on-call locating service to the county. This appeared to be an attempt by Essex County to by-pass the Ontario One-Call system for gas pipeline locates for all highways under the jurisdiction of Essex County.
18. Enbridge Gas engaged in discussions with Essex County to attempt to negotiate reasonable alternatives to these requests.
19. Enbridge Gas responded with a version of a Road User Agreement that it was willing to execute. Essex County rejected this requirement.
20. During discussions about the location of the pipeline, Essex County had requested a depth of cover of at least 1.5 metres over the entire length of County Road 46. Enbridge Gas indicated that this was not standard and absent a conflict, there was no engineering reason for the additional depth of cover or for incurring the additional cost.

21. Essex County was of the view that the location should accommodate a potential road widening of County Road 46 west of Manning Road for approximately 5.9 kms. Enbridge Gas moved the running line such that it was more than 6 metres from the edge of the traveled portion of the roadway to avoid a future conflict in this area.
22. Essex County wanted the pipeline buried at least 1.5 metres if it was installed within 6 metres of the edge of the travelled portion of the roadway.
23. Enbridge Gas took the unusual step of providing its own analysis and the analysis of a third party engineering firm, Wood PLC, to demonstrate the ability of the pipeline to handle the potential stresses at a 1 metre depth.
24. In addition to the engineering and code issues regarding this demand from the county this location also results in a potential conflict and concern from the Town of Lakeshore with respect to the location of their water mains as the revised location would move the Pipeline close to the watermains.
25. Notwithstanding Enbridge Gas's concerns with the depth of the pipeline and engineering evidence to support its position, Essex County staff advised Enbridge Gas during a meeting on May 11, 2020 that it was never the intention of Essex County to deviate from its stated depth requirements of 1.5 metres (as discussed in Exhibit B, Tab 1, Schedule 5).
26. Despite knowing Enbridge Gas's objection to the additional depth, and other requirements, Essex Staff proceeded to present the unsigned RUA to Essex County council, on May 20, 2020 with the requirement that the depth of the pipeline must be

at least 1.5 metres if constructed within six meters from the paved edge of the highway. A copy of the Staff Report and form of Road User Agreement may be found at Appendix A and Appendix B respectively to this Exhibit.

27. Essex Staff obtained endorsement from County Council to enter into the RUA notwithstanding its awareness of Enbridge Gas' objections to this version of the RUA.

28. This latest version of the RUA contains many requirements that in effect modify the 1957 Agreement, are not applicable to the Pipeline, are not acceptable to Enbridge Gas and would require Enbridge Gas to obtain direction and approval from the Board pursuant to Condition 4 of the Board's Decision and Order dated April 1, 2020.

1.3 Town of Lakeshore Concerns

29. In addition to obtaining the consent from Essex County, Enbridge Gas also required consents from the Town of Lakeshore, as the pipeline design would be within close proximity to watermains owned and maintained by the Town of Lakeshore.

30. As a condition of their consent for the installation of the pipeline, the Town of Lakeshore required a minimum horizontal separation of 1.5 meters between its watermains and the pipeline, for safety and integrity reasons. Enbridge Gas understands the watermains were installed several decades ago and are vulnerable to leaks or breakage with the construction of another utility at the same depth.

31. Under Essex County's requirements, this separation will very likely not be achievable. The Town of Lakeshore has advised that its watermains along County Road 46 are also buried at a depth of 1.5 metres and to maintain a 1.5 metre horizontal separation between the gas line and the waterline may result in the pipeline being constructed too close to the travelled portion of the highway and in a location not approved by Essex County.

32. In addition, current construction of the pipeline along other portions of the approved route have revealed that locates from the Town of Lakeshore for its watermain are not accurate and have resulted in Enbridge Gas having to revise its pipeline construction location on-site with representatives of the Town of Lakeshore.

33. The Town of Lakeshore has also advised Enbridge Gas of its concerns regarding the proposed pipeline depth of 1.5 metres and the impact that would have on the safety and integrity of the existing watermain.



Administrative Report

Office of the Director of Infrastructure Services

To: Warden McNamara and Members of County Council

**From: Jane Mustac, P. Eng.
Director of Infrastructure Services/County Engineer**

Date: Wednesday, May 20, 2020

Subject: Road User Agreement – Enbridge

Report #: 2020-0520-IS-R019-JM

Purpose

The purpose of this report is to provide County Council with information and recommendations related to entering into a Road User Agreement with Enbridge Gas Inc.

Background

As of January 1, 2019, Union Gas and Enbridge Gas Distribution have amalgamated into one utility with the legal name Enbridge Gas Inc. (Enbridge Gas). Enbridge Gas completed inspections of an existing pipeline along County Road 46 and identified multiple integrity and depth of cover issues that could pose safety and security of supply concerns if not addressed. A significant portion of the existing line was installed in the 1930s & 1940s.

Due to these integrity concerns, Enbridge Gas proposed to replace approximately 64km of the existing 8-10-inch Windsor Natural gas pipeline (1380kPa), with a high pressure 6-inch replacement (3450 kPa) starting near the intersection of County Road 46 and Concession Road 8 (located in the Town of Tecumseh), extending easterly towards Chatham-Kent to the existing Enbridge Gas Port Alma Transmission station. Enbridge Gas has confirmed that the decrease in diameter and the increase in maximum operating pressure will not provide any significant change in the capacity of the proposed pipeline at this time and is considered a "like for like" replacement.

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The proposed project includes a complete removal of the existing pipeline immediately upon the completion of the proposed project construction and related customer tie-ins to maintain continued delivery of natural gas service to customers. It is expected that the abandoned pipeline (10") will be removed as there are several other existing/proposed utilities for the corridor, and further that any impacted soil resulting from the gas pipeline would also need to be removed and replaced with native material.

An environmental study was completed and investigated data on the physical, biophysical and socio-economic environmental concerns along the proposed and existing pipeline route(s) and provided a recommended program of supplemental studies, mitigation and protective measures to be undertaken as part of the construction activities. As such, there is a potential risk that some additional studies and/or activities that may be required (i.e. The Stage 1 AA has determined that the majority of the proposed pipeline route retains potential for the identification and documentation of pre-contact Aboriginal, post contact Aboriginal, and Euro-Canadian archaeological resources) and/or unexpected finds related to heritage resources or unknown contaminated soils that may significantly impact the schedule and works for the project.

Timelines for review of the Project

May 2019

A presentation by Enbridge Gas was given to County Council on May 15, 2019 to introduce the Windsor Line project at a high level and gain Council support for their application to the Ontario Energy Board (OEB). County Council expressed concern that County Administration was not engaged in the project to date and also wanted reassurance that the new proposed project would be designed to accommodate future growth in the area. The direction from County Council was for Enbridge to work with County Administration to review the proposed project in terms of future capacity and alignment.

A preconsultation meeting with Enbridge and Administration was held on May 24, 2019. Enbridge proposed the 6" pipeline be constructed within the County Road 46 right of way. At this meeting, Administration was informed that 80% of the existing pipeline was within private easement adjacent to the County Road, in the boulevard area. The County recommended that the new pipeline should be replaced at the existing location, as it was approximately 9m away from the edge of pavement and will not restrict the roadway.

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June 2019

On June 27, 2019, Enbridge submitted drawings that identified the entire 6" pipeline within the County Road allowance, adjacent to the existing edge of pavement, within the travelled portion of the right-of-way.

On June 28, Administration shared County Council's discontent that the proposed pipeline being replaced is a 'like for like' and did not consider future growth and expansion within Essex County. Administration also expressed concerns with the proximity of the pipeline identified in the drawing package since it did not remain within the existing private easement alignment as discussed.

July 2019

Administration communicated with Enbridge on July 3, 2019 restating the outstanding issues with the proposed project and requested updated information to reflect previous discussions.

August 2019

On August 13, 2019, County Staff and the Town of Lakeshore attended a site meeting requested by Enbridge to review areas of congestion and confirm separation from the Town's watermain. The County further expressed concern with the proximity of the pipeline in the travelled portion of the right-of-way and requested an alignment change to relocate the pipe as far as possible from the edge of pavement during the site meeting.

October 2019

An updated drawing package was received by Enbridge on October 2, 2019 in advance of meeting. A subsequent meeting was held with Enbridge staff on October 3, 2019 to discuss outstanding issues: 1) the growth projections used to size the pipe; and 2) the alignment of the pipeline within the County Road right-of-way. New information surfaced and Enbridge identified a discrepancy in the amount of the existing pipeline within private easement and confirmed that only 20%, not 80% of the pipeline was in private easement. None of the issues were resolved at that meeting.

November 2019

Enbridge provided comment on November 7, 2019 further explaining the rationale utilized to determine future growth. Although the growth projections did not anticipate future development in accordance with the Town and/or County official plans, Administration accepted the response and indicated that would form part of the report to County Council.

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December 2019

A follow-up meeting was held with Enbridge on December 12, 2019 (with the Town of Lakeshore) and discussed the County's concerns regarding the pipe location and the shallow depth proposed. In the meeting, it was identified that lane closure would be required along CR 46 from May to October (approx. 300 days) in order to construct the pipeline. The County expressed concerns on limiting traffic to one lane on CR 46 for that long of a duration due to the nature of the corridor. The Enbridge team proposed innovative construction activities that would reduce the number of days for lane closures and Administration requested a Traffic Control Plan be submitted for review to further understand the impact/duration.

February 2020

On February 6, 2020 County staff met with Enbridge (and the Contractor) to discuss the concerns with the provided Traffic Control Plan and associated lane closures. It was identified that regardless of location on alignment that the roadway was still required to utilize a lane (i.e. pipe stringing) and that Enbridge reviewed the proposal and decreased number of days of lane closures, however, depth and alignment of the pipe still were not agreed upon. Due to the proximity of the pipeline, a minimum depth of 1.5 m was reiterated, or the option to re-align to the boulevard area remains preferred. Updated drawings were received from Enbridge on February 28, 2020 that did not satisfy Administration.

March 2020

Administration, with the assistance of the County Solicitor, initiated a draft Road User Agreement that describes terms and conditions accompanying the municipal consent for the project. Matters related to Grant conditions, terms, construction methods, traffic management, preliminary/final highway reporting requirements and payment obligations are included in this agreement.

April 2020

On April 8, 2020 Administration restated concerns with respect to depth and proximity to the edge of pavement. Enbridge organized a conference call with senior administration seeking direction on next steps for project approval.

At this meeting, County staff was advised that Enbridge received OEB Notice of Decision with approval to construct a natural gas pipeline. Enbridge expressed a desire to initiate construction on May 7th, 2020.

County staff continued to express concern with the alignment and depth of the pipe and identified that Transportation Association of Canada (TAC), *Guidelines for Underground Utility Installation Crossing Highway Rights-of-Way* is one document that provides guidance on minimum conditions.

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Road User Agreement – Enbridge

Oversized loads are a reality for this corridor and Administration accepted the proposal by Enbridge to complete a loading analysis report to support the strength of the pipe which can handle the loads expected on the highway and protect the integrity of the roadway and must be qualified by a professional engineer.

Administration received updated alignment drawings on April 23, 2020 with a notation describing a proposed 1.0m depth and no significant change to horizontal alignment with the understanding that this can only be approved with the justification support from a Qualified Professional Engineer.

May 2020

Enbridge report received and shared with a professional engineering firm for an opinion on whether a deviation from the TAC Guidelines is defensible and if Administration should consider a shallower depth within the travelled portion. The review identified that the pipeline was defined adequately in accordance with its governing legislation (Canadian Standards Association CSA-Z2661-15) however falls short on reviewing the impact and protection to the roadway.

Discussion

The location of the new high-pressure distribution system starts near the intersection of County Road 46 and Concession Road 8 (located in the Town of Tecumseh) and extends easterly towards Chatham-Kent to the existing Enbridge Gas Port Alma Transmission station for a total of 30 kms affecting County Road right of ways. CR 46 is a major arterial road that functions similar to a provincial highway that not only accommodate car and truck traffic, but also serves as a reliable corridor for oversized loads, agricultural equipment, etc. A map showing the project alignment is included as **Appendix A**.

Administration has been actively working with the project team from Enbridge. Enbridge Gas provided Administration with detailed information pertaining to the proposed pipeline for review on several occasions.

County staff have spent significant time and effort to review and included, but not limited to, the following activities:

- Attend project meetings to discuss the project
- Review and provide comments on design drawings and plan
- Attend site to verify field work & exploration
- Review proposed construction schedules and methods
- Review road user agreement terms and conditions
- Review traffic management plans
- Review permitting requirements

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Additional activities that would still be required by County staff include:

- Review Preliminary/Final Highway Condition report
- Attend site to inspect and monitor work completed within the right-of-way during duration of project
- Coordinate use of the highway for other users (oversized loads, agricultural activities, etc.) during the construction period
- Review the removal program for the decommissioned pipe
- Obtain post construction asset drawings
- Confirm condition of highway is restored

Alignment of the Pipe

The existing pipeline, if located approximately 9m outside the existing edge of pavement and is to some extent installed in the municipal right of way with approximately 20% in private easements.

The review of the proposed pipeline included considerations pertaining to all aspects of project including the legislative and policy context, planning, project development, utility placement, and working in the road under a Draft Road User Agreement included as **Appendix B**. This agreement is applicable to the construction activities of the new pipe only and the County would rely on the 1957 Franchise Agreement, included as **Appendix C** for any further removals, relocations, or other conditions as required.

It is recognized that there may be valid reasons why a utility provider may want a second alignment rather than digging up its original alignment, however with numerous interests competing for both short and long-term use of these rights-of-way, and maintaining the safety and operations of the corridor is paramount, it is crucially important that a balance exist where its intended use, present and future, is protected.

This key corridor functions as a Class 2 arterial road, is a major truck route and accommodates an Average Annual Daily Traffic (AADT) count of up to 12,000 vehicles per day (vpd) with 5% consisting of heavy truck traffic. The traffic volume along this corridor has been increasing at a rate of up to approximately 15% annually over the last couple of years and growth is expected to continue.

Based on the role and function of the roadway, the platform that is considered utilized and protected as the travelled portion can encompass up to 6.0 meters from the existing edge of pavement for safety purposes, to meet roadway maintenance requirements, to accommodate oversize and/or overload permits and to allow for future expansion of the shoulder and/or travelled lanes. It is known that County

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Road 46 would require a road widening of the existing road ROW as the travel growth needs of the community require, including expansion of intersections. The existing and planned future right-of-way should be protected as a "Travelled portion" and lands outside of the area, would be identified as "Boulevard portion".

Guidelines are utilized by Road Authorities and are intended to describe processes required by regulatory, administrative or ethical considerations associated with specific professional services provided by engineers. There are several sections in the TAC manual that specifically provides guidance on utilities that cross and/or occupy a highway and some specific references include the following:

- Section 3.3.1 entitled **Later Adjustment and Interference** identifies that "new utility installations should be located to minimize the need for later adjustment to accommodate future highway improvements and to permit servicing such installations with minimum interference to highway traffic".
- Section 4.1.8 entitled **Underground Utility Cover** stresses that "the minimum utility cover depths should be as specified hereafter (see Table 1 and Figure 4 in **Appendix D**) for each utility installation type. Utility installations should conform to all conditions described in columns A, B, C and D of Table 1. The minimum utility cover depths specified by a road authority may be greater when installed within freeway rights-of-way".

Table 1 - Minimum Cover Depth for Underground Installations Crossing Highways (and Freeways) provides directives that the minimum depth for an un-encased new high-pressure gas or liquid petroleum pipelines (>680 kPa) below pavement surface is 1500 mm (1.5m) and that the minimum depth below ground elevation in a boulevard area is 1000 mm (1.0m). The depth can be reduced with encasement to 1200mm (1.2m) below pavement surface. This 1.2m depth is also supported by the updated CSA guidelines Z2662-19 that identifies a 1.2m depth to surface cover under a roadway.

Utilities can be accommodated on highway rights-of-way when such use and occupancy do not adversely affect highway safety, construction, maintenance or operations. In this respect, guidelines outlining safe and rational practices for accommodating utilities within highway rights-of-way are of valuable assistance to the road authorities to protect the safety, integrity, maintenance standards and future improvements within key corridors.

In an effort to determine if specific site conditions do not require these guidelines to be met, compromises may be made based on sound and reasonable engineering judgement. In this regard, Enbridge completed a structural loading report to verify the pipe is strong enough to sustain the expected oversized loads on the highway but was silent on its impact to the roadway. County Administration retained a

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Road User Agreement – Enbridge

qualified Consulting Firm to complete a third-party review and both reports are included in **Appendix E**.

The conclusion of the third-part review confirmed the calculations submitted by Enbridge do confirm structural capacity based on the assumptions made; however, from the second portion of the discussion, failed to address the risk imposed by deviating from a standard regularly applied by the County and other similar Authorities for protecting a roadway.

The recommendation of the review concludes with:

"Based on our review and in the interest of shielding the County from liability while maintaining a consistent application of policy, and in the interest of good engineering and right-of-way management practices, we formal recommend that Enbridge be directed to adhere to the requirements set forth by your office as the Road Authority; as such compliance with the TAC guidelines should occur without further discussion"

Enbridge has shared that they do not support the opinion of the third party.

At this time, Administration is not satisfied that the proposed alignment and depth of the Enbridge pipeline could be constructed without an adverse effect to the roadway and can't recommend the proposal as presented. Administration is prepared to enter into a Road User Agreement (as detailed in **Appendix B**) with Enbridge if, all conditions can be met, including those specifically regarding the alignment and depth included below:

- With a minimum depth of cover of 1.0 meters where the horizontal distance from the edge of pavement is in excess of 6.0 meters; or
- With a minimum depth of cover of 1.5 meters where the horizontal distance from the edge of pavement is located at and/or closer than 6.0 meters.

Financial Implications

Administration has incurred significant staffing costs in reviewing the Enbridge pipeline project and also deemed it necessary to engage professional engineering and legal services as a result of the proposed location of the pipeline.

Recommendation

That Council adopt By-law 2020-23, authorizing the execution of the Road User Agreement with Enbridge - Windsor Pipeline Project on CR 46 by the Warden and Clerk, at such time that County Administration, with the assistance of the County

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Road User Agreement – Enbridge

Solicitor, is satisfied that the terms and conditions of the Road User Agreement can be met.

Respectfully Submitted

Jane Mustac

Originally Signed by

Jane Mustac, P.Eng, Director of Infrastructure Services/County Engineer

Concurred With,

Robert Maisonville

Originally Signed by

Robert Maisonville, Chief Administrative Officer

Appendix No.	Title of Appendix
A	Enbridge Windsor Pipeline – Project Route
B	Road User Agreement - Draft
C	1957 Franchise Agreement
D	TAC references
E	Third Party Review



ROAD USER AGREEMENT

THIS ROAD USER AGREEMENT made in duplicate this [___] day of May, 2020 (the "**Effective Date**")

B E T W E E N:

THE CORPORATION OF THE COUNTY OF ESSEX
(hereinafter referred to as the "County")

OF THE FIRST PART

- and -

ENBRIDGE GAS INC. (hereinafter referred to as the "**Gas Company**", and together with the County, the "**Parties**")

OF THE SECOND PART

WHEREAS the Gas Company is a corporation, amalgamated pursuant to the laws of the Province of Ontario;

AND WHEREAS the Gas Company, as successor to Union Gas Limited, currently operates and maintains pipelines and distributes Gas to the residents of the County pursuant to the terms of an existing Agreement, dated December 11, 1957 (the "**Union Gas Agreement**");

AND WHEREAS the Parties acknowledge and agree that the Union Gas Agreement remains in full force and effect, and that this Road User Agreement is made to permit construction of a pipeline governed by the Union Gas Agreement;

AND WHEREAS pursuant to the Union Gas Agreement the Gas Company wishes to occupy certain Highways owned by the County and to utilize the County's right of way to install a NPS 6 pipeline (the "**Installation**") and carry out additional Works on the Highways for the distribution of Gas to the residents of the County, including the Decommissioning of the Old Line (the "**Road Use**"), all as specified in Schedule "C" to this Agreement (the "**Project**");

AND WHEREAS the County has agreed to grant to the Gas Company the rights described in this Agreement upon the terms and conditions of this Agreement;

AND WHEREAS the Gas Company has agreed to implement and comply with the Schedules attached to this Agreement;

AND WHEREAS by By-law passed by the Council of the County (the "**By-law**"), the duly authorized individuals have been authorized and directed to execute this Agreement on behalf of the County;

AND WHEREAS the Effective date of this Agreement shall be the date this Agreement is executed by the County, which execution shall not occur until all Schedules have been finalized, approved by the County and attached to this Agreement, and the Agreement has been executed by the Gas Company;

NOW THEREFORE IN CONSIDERATION of the undertakings and covenants hereinafter expressed and upon the terms hereinafter set forth, and other valuable consideration, the receipt and sufficiency of which is hereto acknowledged, the County and the Gas Company mutually covenant and agree as follows:

1. RECITALS

1. The Parties warrant that the above recitals are true and that same form an integral part of this Agreement and are accordingly hereby incorporated into this Agreement by reference.

2. DEFINITIONS

1. In this Agreement:
 - (a) "**Applicable Laws**" means any an all applicable laws, statutes, codes, ordinances, principles of common and civil law and equity, rules, approvals, regulations, and municipal by-laws which are binding upon and applicable to the Project;
 - (b) "**Approved Plan**" means, as applicable, the approved layout of the pipeline (as may be amended from time to time) or the approved Plans (as may be amended from time to time) as approved by the County Engineer in accordance with the provisions of this Agreement;
 - (c) "**County Engineer**" means the most senior individual employed by the County with responsibilities for highways within the County or the person designated by such senior employee or such other person as may from time to time be designated by the Council of the County;
 - (d) "**Crossing(s)**" means any place where any component(s) of the pipeline cross, in whole or in part, any travelled portion of a Highway;
 - (e) "**Decommission(s)**", "**Decommissioned**", and/or "**Decommissioning**" when used in connection with parts of the gas system, mean any parts of the gas system taken out of active use and purged in accordance with the applicable CSA standards and in no way affects the use of the term 'abandoned' pipeline for the purposes of the *Assessment Act*;
 - (f) "**Environmental Plan**" means the environmental plan prepared by Stantec Consulting Limited for the Gas Company, dated July 16, 2019, as filed with

the Ontario Energy Board as part of the Gas Company's Windsor Pipeline Replacement Project;

- (g) "**Gas**" means natural gas, manufactured gas, synthetic natural gas, liquefied petroleum gas or propane-air gas, or a mixture of any of them, but does not include a liquefied petroleum gas that is distributed by means other than a pipeline;
- (h) "**Gas System**" means such mains, plants, pipes, conduits, services, valves, regulators, curb boxes, stations, drips or such other equipment as the Gas Company may require or deem desirable for the distribution, storage and transmission of gas in or through the County;
- (i) "**Highway(s)**" means all common and public highways, street, roadway, avenue, parkway, driveway, square, bridge, viaduct or trestle, any part of which is intended to be used for or is used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof and shall include not only the travelled portion of such highway, but also ditches, driveways, sidewalks, and sodded areas forming part of the road allowance now or at any time during the term hereof under the jurisdiction of the County, as more fully described in **Schedule "B"**. For greater clarity, the location and general site plan details of the Project, and the portions of the Highway affected by this Agreement are more particularly depicted on **Schedule "A-1"** to this Agreement, and those Highways affected by the Agreement are further particularly described in **Schedule "A-2"** to this Agreement;
- (j) "**Party**") means, singularly, either the County or the Gas Company and "**Parties**" means, collectively, both the County and the Gas Company;
- (k) "**Plan**" means any plan required to be provided by the Gas Company to the County pursuant to this Agreement;
- (l) "**Project**" has the meaning given to such term in the Recitals;
- (m) "**Distribution System**" means the pipeline to be installed by the Gas Company for the distribution of gas, including the high pressure pipeline and other related pipelines as depicted on **Schedule "C"** to this Agreement;
- (n) "**Distribution Pipeline Plan**" means the plan drawn to scale, showing the permitted routing for the Distribution System, as more particularly set out in **Schedule "B"** to this Agreement;
- (o) "**Tree Work**" means cutting, trimming, removing, and/or replacing trees or hedges growing on the Highway(s);
- (p) "**Work**" or "**Works**") means any work related to the Project to be undertaken by the Gas Company or its agents or contractors in connection

with the Highways, including, without limitation the Road Use, the Installation, and the Decommissioning; and

- (q) whenever the singular, masculine or feminine is used in this Agreement, it shall be considered as if the plural, feminine or masculine has been used where the context of the Agreement so requires.

3. SCHEDULES

1. The following Schedules (as may be amended from time to time by mutual agreement of the Parties) are attached hereto and form part of this Agreement:

Schedule "A" – Map depicting boundaries of Project

Schedule "B" – List of Highways upon which Distribution System located

Schedule "C" – Distribution Pipeline Plan comprised of:

Schedule "C-1" – List of Drawings

Schedule "C-2" – Drawings reference with full and approved drawings on file with the County

Schedule "D" – Schedule of Permits, Fees, and Charges

4. GRANT

1. The consent, permission, and authority of the County is hereby given and granted to the Gas Company, its employees, agents, and contractors:
 - (a) to enter upon the Highways under the jurisdiction of the County in accordance with the timelines provided for in Section 13 hereto, or as amended, to lay and construct the Distribution System under the road allowance of the Highways for the distribution of gas in connection with the Project as shown on the approved Distribution Pipeline Plan at Schedule "C" (with detailed plan on file with the County) to carry out the Works contemplated in this Agreement. The consent, permission, and authority hereby given extends only to the Highways-as shown in Schedule "A" and listed in Schedule "B", attached hereto, and the County shall not be obligated to provide any further right-of-way for the Distribution System, as part of the Project;
 - (b) to complete installation of the Distribution System, which shall be comprised of a single NPS 6 pipeline with maximum pressure of 3450 kPa,

and based on provincial guidelines, and the nature of the proposed pipeline, shall be installed at the below required depths:

- (i) a minimum depth of cover of 1.0 metre where the horizontal distance from the edge of the pavement is in excess of 6.0 metres (ground elevation);
 - (ii) subject to subparagraph (iii) below, a minimum depth of cover of 1.5 metres where the horizontal distance from the edge of the pavement is located at or closer than 6.0 metres (pavement surface);
 - (iii) where the Gas Company has prepared a study by a qualified professional engineer, to the satisfaction of the County Engineer, in her sole and absolute discretion, certifying that a variation in depth will not compromise the Highway(s) or the pipeline, and showing the load stress on the pipeline within 6.0 metres of the horizontal edge of the pavement is acceptable and safe, the minimum depth cover may be reduced to 1.0 metre; and
 - (iv) to do such other things as may be required by the terms of this Agreement and approved by the County to complete the Project.
2. The consent, permission, and authority hereby given and granted shall be subject to:
- (a) the rights and obligations of the County to construct, maintain, reconstruct, rehabilitate, and use at any and all times all Highways under the jurisdiction of the County;
 - (b) the right of free and legal use of all Highways by all persons entitled to use them;
 - (c) the rights of the owners of properties adjoining the Highways to enjoy full access to and from the Highways and of constructing crossings and approaches from their properties; and
 - (d) the rights and privileges that the County has granted or may grant to other persons (including, but not limited to, commuters, agricultural vehicles, overweight/oversized loads, and maintenance crews for maintenance of drainage ditches and roadway repairs) on the Highways;

all of which rights are expressly reserved.

3. Save as hereinafter provided, the consent, permission, and authority hereby given and granted to the Gas Company to enter upon the Highways shall at all times be subject to the prior approval of the County Engineer which shall be administered in accordance with the procedures set forth in this Agreement. All Work from time to time under this Agreement is subject to the prior approval of the County

Engineer, acting reasonably, who has full power and authority to give such directions and orders that the County Engineer considers in the best interest of the County, and the Gas Company will follow all directions and orders that the County Engineer provides that are issued in accordance with the provisions of this Agreement and Applicable Laws.

5. TERM

1. The rights hereby given and granted shall commence on the Effective Date and shall continue and be in force and effect until such time as the completion of the Work associated with the Project, when all phases of construction of the Project have been completed to the satisfaction of the County which is confirmed in writing by the County (the "**Term**").
2. The Parties acknowledge that the Union Gas Agreement shall continue to apply, but nothing in this Agreement shall prevent the Parties from negotiating a Franchise Agreement to replace the Union Gas Agreement.

6. APPROVAL PROCESS

1. Before commencing any Works under this Agreement, the Gas Company will deposit both a digital copy and a hard copy of the Distribution Pipeline Plan (including any amendments thereto) and its plan for the Decommissioning of the Old Line with the County Engineer for review pursuant to the terms of this Section 6.
2. The County Engineer shall review and consider the Distribution Pipeline Plan and any other Plans submitted by the Gas Company and, within a reasonable period of time following submission of such Plans, shall either approve or not approve the Work as presented in the applicable Plan. In the event the County Engineer does not approve the Distribution Pipeline Plan or any other Plan, the County Engineer shall issue written instructions to the Gas Company with any additional information or modifications which are reasonably required by the County Engineer with respect to the Distribution Pipeline Plan or any other Plan, including the imposition of any reasonable terms and conditions as the County Engineer considers in the best interest of the County in its capacity as custodian of the Highways. The Parties agree to work together in good faith to consider amendments to the Distribution Pipeline Plan or any other Plan which may be required by the County provided such amendments comply with Applicable Laws. The Gas Company shall not undertake Work of any kind until they are in receipt of the Approved Plan or an amended Approved Plan, as the case may be, and the issuing of the relevant permits.
3. Should there be any disagreement between the County and the Gas Company regarding the requirements of the Distribution Pipeline Plan or any other Plans

submitted by the Gas Company or required by the County, the opinion and requirement of the County Engineer, in her sole discretion, shall prevail.

4. The Gas Company is required to consult with the County Engineer in advance of commencing with the Project in order to determine what permits are required and agrees to apply for and obtain all permits from the County for the Project.
5. The Gas Company further agrees that prior to commencement of any Work pursuant to this Agreement, it shall obtain all permits and approvals which are required pursuant to any Applicable Laws, including, where necessary, the approval of any federal, provincial, and/or lower tier municipal government, any agency, and the County, and to satisfy the County that the Works will be completed to and meet the minimum standards of the County, in order to commence any of the Works.
6. Furthermore, it shall be the sole and absolute responsibility of the Gas Company to notify any other person or body of which it is aware or otherwise notified by the County, which is operating any equipment, installations, utilities, or other facilities, within the Highways where such Work is to be conducted, of the details of the anticipated Work so as to minimize the potential interference with or damage to such existing equipment, installation, utilities, and other facilities by the said Work, and so as to maintain the integrity and security thereof. Should any dispute arise between the Gas Company and any other user of the Highway(s) and the associate right-of-way, it is the sole responsibility of the Gas Company to resolve the dispute to the satisfaction of itself and any affected third party.

7. HIGHWAYS

1. Both the County and the Gas Company acknowledge that the Highways shown on **Schedule "A"** and listed on **Schedule "B"**, and only such Highways, are authorized for use by the Gas Company, its agents and/or contractors, for the Project.
2. If and to the extent the Gas Company wishes, after the commencement of the Project, to use any additional Highway(s) under the jurisdiction of the County for the Project not reflected on **Schedule "A"** and **Schedule "B"**, or to alter the alignment or depth of any pipe forming part of the Distribution System, the Gas Company shall request and obtain the prior approval of the County Engineer for the addition of the use of those additional Highway(s) for use with the Project, prior to completing any Work on those additional Highway(s), and shall enter into such amendments to this Agreement, as the County may require.
3. In the event it becomes necessary, during the Project, for the Gas Company to transport goods for use on the Project by way of oversized loads on any County Highway(s), the Gas Company shall obtain all of the necessary permits from the

County to do so, including posting any security required pursuant to such permits, and to comply with any reasonable conditions that may be required or imposed by the County at that time.

4. The Gas Company hereby agrees to comply with provision of all relevant By-laws of the County with respect to weight restrictions on the Highways, unless and until it receives the express written permission of the County Engineer to be exempted from the weight restrictions, with such permission and terms of such permission at the sole and absolute discretion of the County Engineer.

8. DECOMMISSIONING AND REMOVAL OF EXISTING UNION GAS LINE ALONG COUNTY ROAD 46

1. As part of seeking approval of the Approved Plan and the issuing of the relevant permits by the County, the Gas Company shall submit a plan, acceptable to the County Engineer, in her sole and absolute discretion, for the decommissioning and removal of the existing gas pipeline, and any appurtenances thereto, that was installed and maintained pursuant to the Union Gas Agreement and that are located on the Highways forming part of the Project (the "**Old Line**"). Except as otherwise provided below, the Old Line is to be completely decommissioned and removed, including the portions of the Old Line that cross driveways and portions of the Highway(s), including, but not limited to Crossings, subject to final approval of the plan, current uses of the affected Highway(s), and must obtain any necessary approvals from lower-tier municipalities for the said removal.
2. Notwithstanding the above, the County may, in its sole and absolute discretion, permit certain portions of the Old Line to be abandoned in place, if requested by the Gas Company with evidence to the satisfaction of the County, and provided that any approval to abandon in place remains subject to the sole and absolute discretion of the County and remains subject to all relevant approvals, including the method of abandonment.
3. The Gas Company expressly acknowledges and understands that the completion of the Decommissioning and removal of the Old Line is required by the County in consideration for entering into this Agreement and allowing the new proposed Distribution System to be installed.
4. The Gas Company further expressly acknowledges and agrees that should a dispute arise as to the timelines for the removal of the Old Line, the Gas Company shall abide by the conditions imposed by the relevant By-laws of the County as final, and, in any event shall complete the removal of the Old Line within twelve (12) months of the installation of the new Distribution System being completed.
5. The Project shall not be deemed to be complete until the Gas Company has completed the Decommissioning of the Old Line to the satisfaction of the County.

9. TREE CLEARING AND REPLACEMENT

1. In completing the Project, the Gas Company will comply with the Environmental Plan, including as it relates to Tree Work.
2. In the event that trees along the Highways are removed or damaged beyond repair by the Gas Company and thereby requiring removal (a "**Tree Removal**"), the Gas Company shall, at its own and sole expense, completely remove the tree(s), including any residual tree stumps to a level below grade and to restore and remediate the surface where the tree(s) were located to an even grade.
3. Further, for each Tree Removal, the Gas Company shall, at the option of the County, shall provide the County with a fee in accordance with **Schedule "D"** hereto.

10. METHOD OF CONSTRUCTION

1. The Gas Company shall install the Project by the method of construction identified in the Approved Plan as submitted to and approved by the County Engineer.
2. The County shall assign a consulting engineer, at the Gas Company's sole expense, to inspect the Work and monitor the Project (the "**Inspector**"), who can provide proof of training safety upon request, to satisfy the County that the Project is being completed in accordance with the Approved Plan. The said Consulting Engineer shall continue to be engaged until such time as the Project is completed to the sole and absolute satisfaction of the County.
3. All road crossings shall be installed via trenchless methods, including services, and shall be perpendicular to the Highway(s), ninety (90) degrees, except as otherwise approved.
4. The Gas Company shall, based on provincial guidelines, and the nature of the proposed pipeline, install the Distribution System in accordance with the Approved Plans and at the minimum depths required and agreed to in Article 4 of this Agreement.

11. BACKFILL AND RESTORATION

1. Prior to commencing any backfill and restoration work, the Gas Company shall submit a plan for approval to the County Engineer, and shall obtain any and all permits and approvals which are required pursuant to any Applicable Laws.

2. The Gas Company shall backfill the areas disturbed by the installation of the Distribution System by means of full granular backfill, as required, unless otherwise expressly approved by the County Engineer, in her sole discretion.
3. All backfill of trenches shall be placed in 0.3 metre layers and compacted in accordance with the requirements of the County. For backfilling not on the travelled portion of the Highway(s) and not on the gravelled shoulder of the Highways, native material can be used for backfilling, with necessary compaction requirements of the County being met. The Gas Company expressly acknowledges and agrees that excavated material cannot be used for backfilling the trenches on the travelled portion of the Highway(s) and/or on the gravelled shoulder of the Highway(s), with the excavated material being removed from the right-of-way by the Gas Company.
4. All backfilling of boring pits and trenches and compaction shall be completed every night, unless adequate protective safety barriers are erected to the satisfaction of the County Engineer, and which safety barriers do not impede traffic, to allow for full use of the paved portion of the Highway(s) after working hours.
5. The Gas Company expressly acknowledges and agrees that it shall complete the same backfilling and restoration work required by the County with respect to the removal and decommissioning of the Old Line, which may include, without limiting the generality of the foregoing, backfilling and seeding the affected area.

12. PROTECTION OF HIGHWAYS, ACCESS, AND FUTURE EXPANSION

Access and Future Expansion

1. The Gas Company expressly acknowledges and agrees that it is obligated to ensure the right of free and legal use of all Highways by all persons entitled to use them during completion of the Project;
2. The Gas Company further acknowledges and agrees that:
 - (a) the County has an overarching responsibility to ensure that the Highways, including the associated rights-of way, are operated and utilized in a manner that ensures safety of users and that maintains the traffic carrying ability and physical integrity of the Highways and associated rights of ways; and
 - (b) in light of the responsibility of the County, the Gas Company shall complete the Project in such a manner as to protect the structural integrity of the Highway(s) and associated rights-of-way, and to ensure the safety of users of the Highway(s) and associated rights-of-way, during completion of the Project.

3. The Gas Company further acknowledges and agrees that the County has advised the Gas Company that the Distribution System may need to be relocated to accommodate future expansion of the Highway(s) being utilized for the Project, which relocation shall be governed in accordance with the provisions of the Union Gas Agreement, applicable policies and procedures of the County, and by the Gas Company obtaining any and all necessary permits.

Protection of Highways from Damage

4. No tracked or overweight equipment shall be placed on the Highway(s) unless approved protection methods are in place, and with special care and attention being provided with respect to the paved surface of the Highways.

Accommodation of County Moving Permits

5. It is a requirement of this Agreement, that the Highway(s) remain open and available at all times for use by users of the Highways(s), including users who have been issued oversized/super-load permits by the County. To this end, the Gas Company shall ensure that there remains a minimum of 5.0 metres of passable lane available to traffic at all times.
6. Should a temporary closure of the Highway(s) be granted by the County for the completion of any part of the Work, the Gas Company shall, within 24 hours of being notified of a moving permit being issued by the County that effects the Highway(s) being utilized by the Gas Company for the Project, accommodate the party to whom the moving permit has been issued.

13. COMPLIANCE WITH APPROVED PLAN AND PERMITS

1. The Gas Company agrees to commence, perform, and complete the Installation and Decommissioning in accordance and compliance with the Approved Plan(s) for the Distribution System, including all permits and conditions, unless otherwise approved by the County Engineer, acting reasonably.
2. Any modifications, deviations or changes to the Approved Plan, Distribution Pipeline Plan, and/or other approved Plans (except for modifications, deviations, or changes deemed to be minor by the Inspector, which minor modifications the Inspector may approve or deny on behalf of the County), shall be sought from the County Engineer in writing, with approval to be obtained in advance of proceeding with any work that deviates from the Approved Plan, Distribution Pipeline Plan, or any other approved Plans. The Gas Company expressly acknowledges, agrees, and understands that the decision to grant or deny any request for modifications, deviations, or changes to the Approved Plan is in the sole and absolute discretion of the County Engineer and that any decision by her is binding and final, unless and until modified or reversed subject to the provisions of Article 39 hereto.

14. SCHEDULE OF PHASES

1. The Gas Company proposes to complete the Project in 3 phases in accordance with the following schedule commitments:

Phase	Item	Completion
Phase 1	Installation of new main including restoration	15-Dec-20
Phase 2	Service transfer from old main to new main	15-Dec-21
Phase 3	Decommissioning and removal of old main including restoration	15-Dec-21

15. TRAFFIC CONTROL PLANS

1. The Infrastructure Services Department is the contact department to submit traffic control plans, coordinate temporary traffic control, and to set the extent of traffic disruption allowed on County-owned Highways and rights-of-way, with this authority being granted through the County's Traffic Bylaw.
2. Prior to commencing work on each phase of the Project, the Gas Company shall provide the County with traffic control plans for review and approval in compliance with provincial standards, including OTM Book 7, and such other standards in excess of the requirements contained in OTM Book 7 required by the County that are specific to the Project.
3. The Gas Company acknowledges and agrees that Work that requires temporary traffic control requires a Temporary Traffic Control Plan, except for minor matters dealt with in the week-ahead traffic plan. The Temporary Traffic Control Plan(s) must be submitted at least three (3) days prior to the start date of the planned activity for review by the County and to seek approval from the County, to determine the effect the planned work may have on other planned activities requiring access to the Highway(s) and/or rights-of-way by any other public and/or private entity, including, but not limited to, solid waste collection, oversized loads, Emergency Services, Enforcement Services.

16. LANE RESTRICTIONS AND ROAD CLOSURES

1. The County agrees that the Gas Company may request that the County temporarily close or restrict lane access to portions of the Highways, but only where necessary, and for the purpose of safety, and with such requests shall be based on the bona fide requirements of the Project. The Gas Company expressly acknowledges and agrees that the granting or refusal of such requests is at the sole and absolute

discretion of the County Engineer, and for the time limits imposed by the County in its sole and absolute discretion.

2. In the completion of the Project, the Gas Company will use care and diligence to ensure that there will be no unnecessary interference with the Highways, or any other municipal works or improvements.
3. In the event that the impeding of traffic is approved by the County Engineer, all conditions of approval will be detailed on the permit, which condition may include, but are not limited to, advanced warning signs, the use of a pace vehicle, etc.
4. The Gas Company acknowledges and agrees that securing its worksite is necessary to protect the public from potentially hazardous conditions within the work zone. The Gas Company acknowledges and agrees that it is required to secure its worksite both while in use and during any period(s) of inactivity.
5. During any period(s) of time when traffic control signs are not required, they will be turned away from traffic, with such period(s) including, but not being limited to, shutdowns due to weather conditions, at the end of workdays, on weekends, and on holidays.

17. ENVIRONMENTAL LIABILITY

1. The County is not responsible, either directly or indirectly, for any damage to the natural environment or to any property, including any nuisance, trespass, negligence, or injury to any person, howsoever caused, arising from the presence, deposit, escape, discharge, leak, spill, or release, of any hazardous substance in connection with the Gas Company's occupation or use of the Highways as part of the Project, or previous use.
2. The Gas Company agrees to assume all environmental liabilities, claims, fines, penalties, obligations, costs, or expenses, whatsoever, relating to the Project, its removal and decommissioning of the Old Line, and/or its use of the Highways as part of the Project, including, without limitation, any liability for the clean-up, removal, or remediation of any hazardous substance on or under the Highways that result from:
 - (a) the occupation, operations, or activities of the Gas Company, its contractors, agents, or employees, or by any person with the express or implied consent of the Gas Company within the Highways; or
 - (b) any Works brought or placed within the Highway by the Gas Company, its contractors, agents, or employees, or any person with the express or implied consent of the Gas Company;

unless such environmental liabilities (including, without limitation, any liability for the clean-up, removal, or remediation of any hazardous substance) were caused directly or indirectly in whole or in part by the negligence or wilful misconduct on the part of the County or those for which it is responsible under Applicable Laws.

18. REQUIRED HIGHWAY UPGRADES TO ACCOMMODATE THE PROJECT

1. In the event that the standard condition or maintenance of any of the Highways is not sufficient to permit the Gas Company to carry out completion of the Project, or any of its obligations under this Agreement, the Gas Company shall be solely responsible for carrying out any required remedial work or maintenance required to upgrade or maintain the Highway(s), at its own and sole expense, but with the Gas Company not carrying out any such remedial work or maintenance without first obtaining the approval of the County Engineer and any necessary permit(s).
2. Should the Gas Company complete any remedial work or maintenance required to upgrade or maintain the Highway(s) to complete the Project, the Gas Company expressly agrees that it shall, at its own and sole expense, return the Highway(s) to the condition it was in prior to the remedial work or maintenance work being completed, unless the County expressly advises that the Gas Company is not required to do so.

19. EMERGENCY

1. In the event of an emergency involving the Distribution System during the Term hereof, the Gas Company shall notify the responsible police force immediately upon becoming aware of the situation and shall do all that is necessary and desirable to control the emergency, including such work in and to the Highways as may be required for the purpose. As soon as is reasonably possible after the emergency is discovered, the Gas Company shall advise the County Engineer by telephone and shall keep her advised throughout the emergency. If the emergency is caused by the Gas Company, the Gas Company shall reimburse the County for any and all costs incurred in connection with the emergency. Forthwith after it becomes necessary for the Gas Company to exercise its obligations under this Section, the Gas Company shall provide a written report to the County Engineer of what work was done and the further work to be undertaken, if any, and seek the approval of the County Engineer for the further work as contemplated in this Section, with the sufficiency of the completed work being subject to the approval of the County Engineer, in her sole and absolute discretion.
2. Should the Gas Company fail to comply with its obligations pursuant to this section of the Agreement to the satisfaction of the County Engineer, in her sole and absolute discretion, the County may complete any and all necessary work to address the

emergency involving the Distribution System, or retain a qualified third party contractor to do so, and shall charge the amounts for same, plus any and all other expenses incurred by the County, which includes, but is not limited to the time expended by the County to oversee the work and for any additional third party expenses, to the Gas Company. The Gas Company expressly agrees to pay for said charges forthwith upon demand from the County.

20. URGENT HIGHWAY REPAIRS

1. During the time the Project and associated Works are underway, should the County determine that urgent repairs to the Highway is required, and which repairs are not required as a result of the Works, the Gas Company shall immediately cease any Works related to the Project, to permit the County to complete the repairs it deems necessary, in the County's sole and absolute discretion.
2. During the time the Project and associated Works are underway, the County may give written notice to the Gas Company that urgent repairs are required to a Highway in order to maintain the Highway(s) in a passable condition for the everyday traffic load or to remove material and adverse safety risk or to prevent imminent harm to the users of such Highway in the normal course, provided that such repairs are required as a direct result of the Gas Company's use of such Highway. The need for such repairs shall be determined by the County Engineer, acting reasonably and based upon the advice of the Consulting Engineer. If the urgent repairs are not completed by the Gas Company within twenty-four (24) hours of the sending of the written notice by the County or, if the emergency repairs cannot be completed within such twenty-four (24) hour period, the Gas Company does not commence to diligently perform the urgent repairs within such twenty-four (24) hour period, the County may perform the emergency repairs at the Gas Company's sole expense and the Gas Company shall pay the County's invoice(s) for such urgent repairs immediately upon receipt. If the Gas Company fails to pay any invoice submitted by the County for urgent repairs within thirty (30) days of receipt, the County shall be entitled to draw upon the Security filed pursuant to this Agreement to recover the full amount of the unpaid invoice(s).

21. PRELIMINARY HIGHWAY CONDITION REPORT

1. The Parties agree that a report detailing the current condition of the Highways (the "**Preliminary Highway Condition Report**"), shall be prepared at the Gas Company's sole expense, with said Preliminary Highway Condition Report to be prepared as follows:
 - (a) the Parties shall jointly identify and engage, at the Gas Company's sole expense, a consulting engineer (the "**Consulting Engineer**") to inspect the

Highway(s) and prepare the aforesaid Preliminary Highway Condition Report, which report shall include, without limitation:

- (i) the identification of all Highways and structures that will or may be subject to damage in connection with any aspect of the Project and the use of the Highways for the Project;
 - (ii) the full scope and nature of the Preliminary Highway Condition Report shall be coordinated and agreed to by the County and the Gas Company jointly; and
 - (iii) draft and final copies of the Preliminary Highway Condition Report shall be provided to the Gas Company and the County as soon as they become available and the Gas company shall be afforded an opportunity to comment on the Preliminary Highway Condition Report before it is finalized. The draft Preliminary Highway Condition Report shall be subject to the approval of the County, not to be unreasonably withheld, after which final copies of the said Preliminary Highway Condition Report shall be provided to both Parties; or
- (b) The County acknowledges that the Gas Company, without prior consultation with the County or the County's approval as to the selection of and instructions to the Consulting Engineer, has prepared a Preliminary Highway Condition Report and provided a copy of same to the County. Should the Preliminary Highway Condition Report prepared by the Gas Company solely be acceptable to the County, or should it be capable of being revised to the satisfaction of the County, the County may waive, in its sole and absolute discretion, the requirements of 21.1.(a) above.

22. ONGOING HIGHWAY MONITORING

1. During the period that the Highway is in use by the Gas Company for the Project, the County or a designated Consulting Engineer shall, at the sole expense of the Gas Company, carry out inspections in respect of those Highways being used by the Gas Company and such inspections shall be carried out with such frequency as is reasonably required having regard to the frequency and nature of the use of the Highways by the Gas Company. Summary reports will be provided to the Gas Company and the County on a timely basis outlining the condition of the Highways and any urgent repair requirements.

23. FINAL HIGHWAY CONDITION REPORT

1. Within ten (10) days of completion of the entire Project, including the Installation and the Decommissioning, the Gas Company shall notify the County in writing that the Project is complete and the County shall then instruct the Consulting Engineer to conduct a further inspection, using the same methodologies employed in producing the Preliminary Highway Condition Report, and provide a supplemental report (the "**Final Highway Condition Report**"), at the Gas Company's sole expense, which Final Highway Condition Report shall include, without limitation:
 - (a) the identification of those portions of the Highways that, in the opinion of the Consulting Engineer, acting reasonably with reference to the Preliminary Highway Condition Report, have been damaged by the Gas Company (taking into consideration normal wear and tear during the period of time taken to complete the Project that would have been likely to occur in any event), its agents and/or contractors during the Project and their use of the Highways in completing the Project; and
 - (b) with respect to the portions of the Highways identified as having been determined to have been damaged pursuant to the subsection above, identification of the extent of repairs, replacements, or remedial work that would be necessary to repair or replace such Highways or otherwise restore such Highways to a condition that is the same or better than the condition demonstrated by the Preliminary Highway Condition Report.
2. The Parties shall use reasonable efforts to ensure that the Final Highway Condition Report is completed not later than thirty (30) business days following receipt by the County of notice of completion of the Project from the Gas Company. Notwithstanding the foregoing, the Final Highway Condition Report shall not be deemed complete or final until the Gas Company has had the opportunity to review and comment on same and the Consulting Engineer has had the opportunity to consider and adopt, where reasonably appropriate, the comments of the Producer with respect to such report.

24. GAS COMPANY'S DUTY REGARDING DAMAGED HIGHWAYS

1. The Gas Company shall well and sufficiently restore, to the reasonable satisfaction of the County Engineer, with reference to the Final Highway Condition Report, all Highways and property that it damages during the course of the Project. The Gas Company shall be solely responsible for all costs associated with the repair of any Highways damaged by the Gas Company or its employees, agents, or contractors as a result of the Works done in completing the Project, in accordance with the process set out herein and as determined by the County Engineer. Such restoration shall be equal to or better than the condition of the said Highway as it was in existence on the said Highway before the Project commenced. If the Gas Company

fails at any time to do, or commence and complete, any of the required work within a reasonable period of time following notification by the County (having regard to the nature of the required work), the County may do so, or may retain a qualified third party contractor to do so, and the County shall charge the amounts for same, plus any and all other expenses incurred by the County, which includes, but is not limited to the time expended by the County to oversee the work and for any additional third party expenses, to the Gas Company. The Gas Company expressly agrees to pay for said charges forthwith upon demand from the County.

2. The Gas Company expressly acknowledges and agrees that any required restoration works shall be paid for by the Gas Company, with the costs for same to be determined by the Consulting Engineer and the Inspector, based on the recommendations contained in the Final Highway Condition Report.

25. ADDITIONAL REPAIRS

1. Twelve (12) months following completion of the road repairs identified in the Final Highway Condition Report, the Parties shall jointly inspect the said repairs to confirm the repairs were properly completed. If following such joint inspection, the Parties agree that no additional repair is required, the County shall immediately return the Letter of Credit. If, however, the said repairs require further repair as a result of having been improperly completed and not as a result of the use of the Highways by third parties subsequent to the completion of the said repairs, the Gas Company shall complete such additional repairs forthwith ("**Additional Repairs**"). Following the completion of the Additional Repairs to the satisfaction of the County Engineer, the County shall immediately return the Letter of Credit to the Gas Company.

26. RECORD DRAWINGS

1. The Gas Company shall provide two (2) copies of the "as constructed" Distribution System (with sufficient detail to the satisfaction of the County, including but not limited to, both location and pipe depth) for the records of the County plus a final electronic copy prepared in an AUTOCAD, CAD, or GIS environment, prior to release of any deposits or securities (including the Security).

27. LOCATING OF DISTRIBUTION SYSTEM

1. The Gas Company agrees that throughout the Term of this Agreement it shall, at its own cost, record and maintain adequate records of the locations of the Distribution System. If requested by the County, the Gas Company shall, at its own expense,

physically locate the Distribution System by marking the applicable Highways using paint, staking, or other suitable identification methods ("**Locates**").

2. The Gas Company agrees to respond within sixty (60) days to any request from the County for a mark up of the Distribution System design drawings showing the location of any portion of the Distribution System within the portion of the Highways shown on the plans (the "**Mark-ups**") and shall provide such accurate and detailed information as may be reasonably required by the County.

28. ABANDONMENT OR RELOCATION OF DISTRIBUTION SYSTEM

1. Should the Gas Company require the abandonment or relocation of the Distribution System, or any part thereof, during the Term of this Agreement, then the Gas Company shall give written notice to the County that the Distribution System has been abandoned, or seek approval for the relocation of the Distribution System, or any part thereof, with the abandonment and/or relocation shall be governed in accordance with the provisions of the Union Gas Agreement, applicable policies and procedures of the County, and by the Gas Company obtaining any and all necessary permits.

29. INSURANCE

1. The Gas Company shall procure and maintain public liability insurance ("**Liability Insurance**"), which Liability Insurance shall:
 - (a) be comprised of primary and/or umbrella coverage with a limit of **TEN MILLION DOLLARS (\$10,000,000.00)** per occurrence, with not less than a limit of **THIRTY MILLION DOLLARS (\$30,000,000.00)** in the aggregate;
 - (b) include Commercial General Liability Insurance covering all operations and liability assumed under this Agreement with the County. The Commercial General Liability Insurance Policy shall be written on an occurrence form and include:
 - (i) Premises and Operations
 - (ii) Products and Completed Operations
 - (iii) Blanket Contractual
 - (iv) Broad Form Property Damage
 - (v) Contingent Employer's Liability

- (vi) Cross Liability
 - (vii) Severability of Interests
 - (viii) Owners and Contractors Protective
 - (ix) Personal Injury
 - (x) Employer's Liability
 - (xi) Employees as Additional Insureds
 - (xii) Non-owned Automobile including OEF #96
 - (xiii) Hostile Fire
 - (xiv) Attached Machinery
- (c) if the Works are to include shoring, underpinning, etc. this policy must not contain any exclusions with respect to the intended Works, and a copy of the endorsement or a letter from the insurer verifying coverage is to accompany the Certificate of Insurance;
- (d) include coverage against liability for bodily injury and property damage caused by vehicles owned and/or operated by the Gas Company and used in conjunction with the Works either within or outside the terms of this Agreement, and shall have a limit of liability of not less than **FIVE MILLION DOLLARS (\$5,000,000.00)** inclusive for any one occurrence;
- (e) include an Equipment Floater in sufficient amounts to provide full coverage for the Gas Company's equipment that may be located on the County's lands, from time to time, throughout the duration of this Agreement;
- (f) provide that the policy or policies will not be cancelled or allowed to lapse without thirty (30) days prior written notice to the County; and
- (g) include the County as an additional named insured.

30. SECURITY DEPOSIT

1. Prior to making any use of the Highways for the purpose described in this Agreement, the Gas Company shall provide the County with an irrevocable letter of credit as security for the Gas Company's performance of its obligations under this Agreement. The letter of credit shall be in a form acceptable to the County, and shall be in the amount of **TWO MILLION DOLLARS (\$2,000,000.00)** (the "**First LC**").

2. Prior to making any use of the Highways for the purposes described in this Agreement the Gas Company shall provide the County with an irrevocable letter of credit as security for the Gas Company's obligation to remove and decommission the Old Line to the Satisfaction of the County. The letter of credit shall be in a form acceptable to the County, and shall be in the amount of **SEVEN HUNDRED AND FIFTY THOUSAND DOLLARS (\$750,000.00)** (the "**Second LC**").
3. Upon completion of the repairs identified in the Final Highway Condition Report to the satisfaction of the County Engineer, the County shall return the First LC to the Gas Company, and the Gas Company shall at the same time, provide a second irrevocable letter of credit, substantially in the same form as the First LC, but in the amount of **TWO HUNDRED THOUSAND DOLLARS (\$200,000.00)** (the "**Third LC**", and together with the First LC and the Second LC, the "**Security**"), to be held for the balance of the Term of the Agreement.
4. Upon completion of the removal and decommissioning of the Old Line to the satisfaction of the County, in its sole and absolute discretion, the County shall return the Second LC to the Gas Company.

31. SECURITY TERMS

1. The Security to be provided under this Agreement shall be held by the County on the following terms:
 - (a) The Gas Company acknowledges and agrees that the County reserves the right to draw on and use the proceeds from the First LC to complete repairs required to be done by the Gas Company under the terms of this Agreement; and
 - (b) The Gas Company acknowledges and agrees that the County reserves the right to draw on and use the proceeds from the Second LC to complete the removal and decommissioning of the Old Line, should the Gas Company fail to do so to the satisfaction of the County;
 - (c) The Gas Company acknowledges and agrees that the County reserves the right to draw on and use the proceeds from the Third LC to complete the Additional Repairs as provided for in this Agreement, provided that the Parties have first agreed on the repairs to be performed by the Gas Company and the Gas Company has not completed such repairs within ten (10) business days of the date of written notice from the County is provided with respect to the requirement to complete the Additional Repairs, or such further time as the Parties may agree in writing. Upon the completion of the Additional Repairs to the satisfaction of the County Engineer, the County shall immediately return the Third LC to the Gas Company.

32. COSTS AND PERMIT FEES

Permits

1. The Gas Company acknowledges and agrees that **Schedule "D"** attached hereto is a list of fees and charges associated with permits, which are consistent with fees and charges normally required by the County, and which may be requested and issued by the County in respect of the Project and the associated Works contemplated by this Agreement, and further undertakes and agrees to pay such fees and charges in accordance with **Schedule "D"**.

Approval and Construction

2. The Gas Company shall be responsible for the following payment obligations:
 - (a) Upon the presentation of invoices, the Gas Company shall reimburse the County, within thirty (30) business days of receipt of an invoice from the County, with respect to all reasonable out of pocket costs incurred in connection with the negotiation, preparation, execution, and implementation of this Agreement, including legal costs to a maximum aggregate cap of **THIRTY THOUSAND DOLLARS (\$30,000.00)**;
 - (b) A non-refundable administration fee in the amount of **TWENTY THOUSAND DOLLARS (\$20,000.00)** shall be paid to the County by the Gas Company within thirty (30) days of the execution of this Agreement by the Parties; and
 - (c) Upon the presentation of invoices, the Gas Company shall reimburse the County in connection with any inspections by the County and/or its designated Inspector during the use of the Highways by the Gas Company for the Project, and for necessary monitoring, inspections, and field work during the Project.

33. FORCE MAJEURE

1. If either Party is prevented from carrying out its obligations under this Agreement by reason of any cause beyond its control, such Party shall be relieved from such obligations while such inability continues; provided, however, that this Section shall not relieve the Gas Company from its obligations to indemnify the County as contemplated herein, and provided further that nothing herein shall require either Party to settle any labour or similar dispute unless it is in the best interests of such Party to do so.

34. APPLICABLE LAWS

1. It is acknowledged and agreed by the Parties that this Agreement is subject to the provisions of all Applicable Laws of the Province of Ontario.

35. NOTICES

1. Any notice to be given under any of the provisions of this Agreement shall be provided to the County by delivering the notice to the Clerk of the County, or by sending the notice by facsimile transmission to 519-776-4455, or by registered mail, postage prepaid, addressed to the attention of the Clerk of the County at **360 Fairview Avenue West, Suite 202, Essex, Ontario N8M 1Y6**, and to the Gas Company by delivering the same to its head office, or by sending same to its business office by registered mail, postage prepaid, addressed to the Gas Company as follows:

Enbridge Gas Inc.
50 Keil Drive North
Chatham, Ontario N7M 5J5

Attention: Manager Major Projects

If any notice is sent by facsimile transmission, the notice shall be deemed to have been given on the next business day following its transmission. If any notice is sent by mail, the same shall be deemed to have been given on the fourth (4th) day following the posting of the notice, provided that in the event of a disruption in postal service, either at the point of mailing or the point of delivery, any notice sent by mail shall be deemed to have been given on the day when it is actually received by the addressee of such notice.

36. ASSIGNMENT

1. The Gas Company may not assign any part of this Agreement without the express written consent of the County. The Gas Company acknowledges that any proposed assignee shall be required to covenant, in favour of the County, to assume full responsibility of this Agreement.

37. INDEMNIFICATION

1. The Gas Company shall indemnify and save harmless the County, its Councillors, officers, directors, employees, legal counsel, agents, and contractors from and against all claims, suits, demands, liabilities, losses, costs, damages, or other

expenses of every kind that the County may incur or suffer as a consequence of or in connection with the Project, or in any other way with the rights granted hereunder, except to the extent that such claims, liabilities, losses, costs, damages, and other expenses are caused by the County's negligence or breach of this Agreement.

38. BREACH BY GAS COMPANY

1. If the Gas Company commits a breach of or otherwise fails to comply with any of the provisions of this Agreement, the County shall give the Gas Company notice in writing specifying the breach complained of. In the event the Gas Company fails to remedy such breach within sixty (60) days of receipt of such notice (or such longer period of time having regard to the nature of the breach as the County may in its sole discretion deem appropriate), the matter shall be addressed in accordance with Article 39 of this Agreement, being the Dispute Resolution provisions provided for hereunder.

39. DISPUTE RESOLUTION

1. Any controversy, dispute, difference, question or claim arising between the Parties hereto in connection with the interpretation, performance, construction, or implementation of this Agreement that cannot be resolved by the County Engineer and a representative of the Gas Company (the "**Dispute**") shall be settled in accordance with this Section. The aggrieved Party shall send the other Party written notice identifying the Dispute, the amount involved (if any) and the remedy sought, and invoking the procedures in this Section. The Parties shall confer in an effort to resolve the Dispute themselves. If the Parties are unable to resolve the Dispute within five (5) business days after receipt of the written notice of the Dispute, then the Dispute is to be referred to a Mediator selected by Agreement between the Parties. If the Parties cannot agree on the selection of a Mediator, the final decision as to the Mediator shall be at the sole discretion of the County, provided that the Mediator selected is a certified Mediator, a senior, respected lawyer with experience as a mediator, or a retired Judge.
2. If the Dispute cannot be resolved by way of Mediation, the Parties may then pursue any remedies available to them at law.
3. Except to the extent that a matter is specifically the subject of a Dispute, both Parties shall continue to observe and perform the terms and conditions of this Agreement pending the resolution of the Dispute.

40. NUMBER AND GENDER

1. This Agreement shall be construed with all changes in number and gender as may be required by the context.

41. COVENANTS

1. All obligations herein contained, although not expressed to be covenants, shall be deemed to be covenants.

42. INCLUSIONS

1. Whenever a statement or provision in this Agreement is followed by words denoting inclusion or example and then a list of or reference to specific items, such list or reference shall not be read so as to limit the generality of that statement or provision, even if words such as "without limiting the generality of the foregoing" do not precede such list or reference.

43. SEVERABILITY

1. The Parties agree that all covenants and conditions contained in this Agreement shall be severable, and that should any covenant in the Agreement be declared invalid or unenforceable by a court of competent jurisdiction, the remaining covenants and conditions of the remainder of the Agreement shall remain valid and of full force and effect.

44. NO JOINT VENTURE, PARTNERSHIP, OR CO-OWNERSHIP

1. The Parties hereby acknowledge and agree that this Agreement is solely a road user agreement, and that no relationship is formed between the Parties in the nature of a joint venture, partnership, co-ownership arrangement or other similar relationship.

45. GOVERNING LAW

1. This Agreement shall be interpreted under and is governed by the laws of the Province of Ontario.

46. BINDING AGREEMENT

1. This Agreement shall extend to, benefit, and bind the Parties hereto, and their respective successors and permitted assigns.

IN WITNESS WHEREOF the Parties hereto have duly executed this Agreement, written on this and the preceding twenty-five (25) pages, with effect from the day first written above.

**THE CORPORATION OF THE
COUNTY OF ESSEX**

ENBRIDGE GAS INC.

Per: Gary McNamara
Title: Warden

Per:
Title:

I have authority to bind Enbridge.

Per: Mary Birch
Title: Clerk

We have authority to bind the County.

SCHEDULE A

Map depicting boundaries of Project



SCHEDULE B

List of Highways upon which Distribution System located

- County Road 46 from Enbridge's proposed station (05B-302), approximately 1 km west of Concession 9 Road, in the Town of Tecumseh to Rochester Townline in the Town of Lakeshore; and
 - 6.3 km's outside the travelled portion of the roadway (located at a distance of greater than 6.0 meters from the edge of pavement) installed at a depth of cover of 1.0 meters; and
 - 22.5 km's within the travelled portion of the roadway (located at a distance of 6.0 meters or less from the edge of pavement) installed at a depth of cover of 1.5 meters.

- County Road 1 from Lakeshore Road 309 to Goodreau Line
 - 2.1 km's outside the travelled portion of the roadway (located at a distance of greater than 6.0 meters from the edge of pavement) installed at a depth of cover of 1.0 meters.

SCHEDULE C

Distribution Pipeline Plan comprised of List of Drawings & Drawing reference
with full and approved drawings on file with the County

(TO BE APPENDED ONCE APPROVED DRAWINGS ARE RECEIVED)

SCHEDULE D

Schedule of Permits, Fees, and Charges



SCHEDULE - D

PERMIT FEES AND OTHER CHARGES

1. **Permit Fees**

Permit Fees and charges shall be as per the most recent County of Essex Permit Fee By-Law #2020-13

- a) Access Permits (and as per By-Law #2481)
- b) Setback Permit (and as per By-Law #2480)
- c) Moving Permits – Oversized Loads
- d) Work Permits (includes detour plans, traffic management, etc.)

2. **Fees not identified in County of Essex Permit Fee By-Law that require Permits**

- a) Tree clearing in the right-of-way (ROW)

3. **Producer Payment Obligations Regarding Engineering & Administrative Fees as per Road User Agreement**

- 1) Legal Fees – up to \$30,000.00 upon invoice
- 2) Administration Fee - \$20,000.00 (non-refundable)
- 3) Upon the presentation of invoices, the Gas Company shall reimburse the County in connection with any inspections by the County and/or its designated Inspector during the use of the Highways by the Gas

Company for the Project, and for necessary monitoring, inspections, and field work during the Project.

- 4) Removal Costs – Obligations of the Producer commencing on the day of activation of the New Line for a period of 2 years, the Producer shall bear 100% of the costs of Removal of the old line.

I HEREBY certify the attached to be true copies of
By-law # 1270 of the County of Essex,
finally passed the 11th day of December, 19 57,
and agreement pursuant thereto dated the 11th day
of December, 19 57, between the said County
of Essex and Union Gas Company of Canada,
Limited, duplicate originals of which are in the
possession of the said Union Gas Company of Canada,
Limited.

AS WITNESS my hand as Secretary and the corporate seal
of the said Union Gas Company of Canada, Limited this
11th day of May, 1965.


Secretary.

BY-LAW NUMBER 1270

- of -

1

THE CORPORATION OF THE COUNTY OF ESSEX

A By-law to authorize Union Gas Company of Canada, Limited (hereinafter called "the Company") to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the Council of The Corporation of the County of Essex. *LR*

FINALLY PASSED the ~~10th~~ *11th* day of December, A.D. 1957.

WHEREAS the Company has requested The Corporation of the County of Essex (hereinafter called "the Municipality") to grant it a franchise or right to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

AND WHEREAS subject to the terms and conditions hereinafter set forth, the Council of the said Municipality has agreed to grant the said franchise.

BE IT THEREFORE ENACTED by the Council of The Corporation of the County of Essex as follows:-

1. Full right, power, permission and consent are hereby granted, conferred and assured unto Union Gas Company of Canada, Limited, its successors and assigns, to keep, use, operate, repair, maintain, remove, abandon, replace, reconstruct, alter and extend its existing lines, pipes and works in the highways under the jurisdiction of the Council of the Municipality and to lay down, maintain and use

pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

2. Such right or franchise shall be subject to all the terms and conditions set out in an Agreement to be entered into in pursuance of this By-law.

3. The Warden and Clerk of the Municipality are hereby authorized and empowered to enter into and to execute on behalf of the Corporation an Agreement in the form hereto annexed, and to affix the corporate seal thereto.

4. This By-law shall come into force and take effect immediately after the Agreement hereto annexed shall have been executed by all the parties hereto.

THE CORPORATION OF THE COUNTY OF ESSEX



Laurence Brunet Warden.
[Signature] Clerk.

BY-LAW NUMBER 1270

- of -

THE CORPORATION OF THE COUNTY OF ESSEX

A By-law to authorize Union Gas Company of Canada, Limited (hereinafter called "the Company") to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the Council of The Corporation of the County of Essex.

- - - - -

1st READING - December 10, 1957

2nd READING - December 11, 1957

3rd READING - December 11, 1957

FINALLY PASSED - December 11, 1957

- - - - -

McNevin, Gee & O'Connor,
Barristers, etc.
Bank of Montreal Bldg.
CHATHAM, Ontario.

11th *13*
1957

1957

AGREEMENT made in duplicate this ~~10th~~ day of December,

A.D. 1957.

B E T W E E N:

THE CORPORATION OF THE COUNTY OF ESSEX,
hereinafter called "the Corporation"

- OF THE FIRST PART - 2

A N D

UNION GAS COMPANY OF CANADA, LIMITED,
hereinafter called "the Company"

- OF THE SECOND PART -

WHEREAS the Company has requested The Corporation of the County of Essex (hereinafter called "the Municipality") to grant it a franchise or right to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

1957

AND WHEREAS the Council of the Corporation has by By-law passed on the ~~10th~~ day of December, A.D. 1957, granted the said franchise from and after the date of the execution of this Agreement and has authorized and empowered the Warden and Clerk of the Corporation to execute this Agreement and to affix the corporate seal thereto.

NOW THEREFORE THIS AGREEMENT made in consideration of the premises and of the performance of the covenants and obligations hereinafter contained on the part of the Company, WITNESSETH as follows:-

1. Full right, power, permission and consent are hereby granted, conferred and assured unto Union Gas Company of Canada, Limi-

- 2 -

ted, its successors and assigns, to keep, use, operate, repair, maintain, remove, abandon, replace, reconstruct, alter and extend its existing lines, pipes and works in the highways under the jurisdiction of the Council of the Municipality and to lay down, maintain and use pipes and other necessary works for the transmission of gas on, in, under, along or across any highway under the jurisdiction of the said Council for the purpose of passing through the Municipality in the continuation of a line, work or system which is intended to be operated in or for the benefit of another municipality and is not used or operated in the Municipality for any other purpose except that of supplying gas in a township to persons whose land abuts on a highway along or across which gas is carried or conveyed or to persons whose land lies within such limits as the said Council by by-law passed from time to time at the request of the Company determines should be supplied with such service.

2. The rights and privileges hereby granted shall continue and remain in force for a period of ten years from the date hereof and so long thereafter as the said lines are in actual use for the transportation of gas.

3. The said pipelines shall be laid across the said highways in locations approved by the Road Superintendent of the County of Essex for the time being or such other officer as may be appointed by the Council for that purpose, and the charges of such Road Superintendent or other officer attending to give such approval shall be paid by the Company.

4. All pipelines shall be placed underground, if required by the officer of the Corporation and shall be so constructed as not to obstruct or interfere with the use of the highway or with any sewers, water-pipes, drains or ditches thereon or therein, or with works of improvement or repair thereof or with the roads or bridges to property fronting thereon.

5. Upon the laying down of the said pipelines or other works hereby authorized or taking any of the same up, or moving the same from place to place in any highway, the highway shall be left unbroken on its surface and in as safe and good a state of repair as it was before

it was entered upon or opened.

6. In the event that the Corporation in pursuance of its statutory powers shall deem it expedient to alter the construction of any highway or of any municipal drain, ditch, bridge, culvert or other municipal works or improvements thereon or therein and in the course thereof it shall become reasonably necessary that the location of a main, line, pipe or works of the Company laid or operated under this By-law should be altered at a specified point to facilitate the work of the Corporation, then upon receipt of reasonable notice in writing from the Clerk of the Corporation specifying the alteration desired, the Company shall, at its own expense, alter or re-locate its main, pipe, line or works at the point specified.

7. The Company shall and does hereby at all times indemnify and save harmless the Municipality from and against all loss, damage, injury or expense which the Municipality may bear, suffer or be put to by reason of any damage to property or injury to persons caused by the construction, repair, maintenance, removal or operation by the Company of any of its mains, pipes, lines or works in the Municipality unless such loss, damage, injury or expense is occasioned by Act of God or/ by the act, neglect, or default of some person, firm or corporation other than the Company, its servants, contractors, sub-contractors, agents or employees.

8. This agreement shall enure to the benefit of and be binding upon the parties hereto, their successors and assigns.

IN WITNESS WHEREOF the said parties have caused to be affixed hereto their respective corporate seals duly attested by the hands of their proper officers in that behalf.

SIGNED, SEALED AND DELIVERED

of



APPROVED AS TO FORM

[Signature]

THE CORPORATION OF THE COUNTY OF ESSEX

Laurence Barrett
Warden.

[Signature]
Clerk.

UNION GAS COMPANY OF CANADA, LIMITED

[Signature]
Vice-President and General Manager.

[Signature]
Assistant Secretary.

DATED December 11th A.D. 1957.

THE CORPORATION OF THE COUNTY OF
ESSEX

- and -

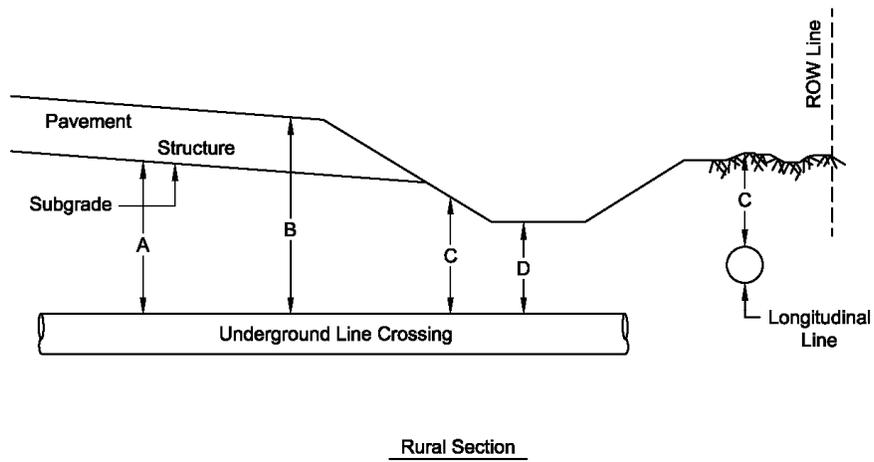
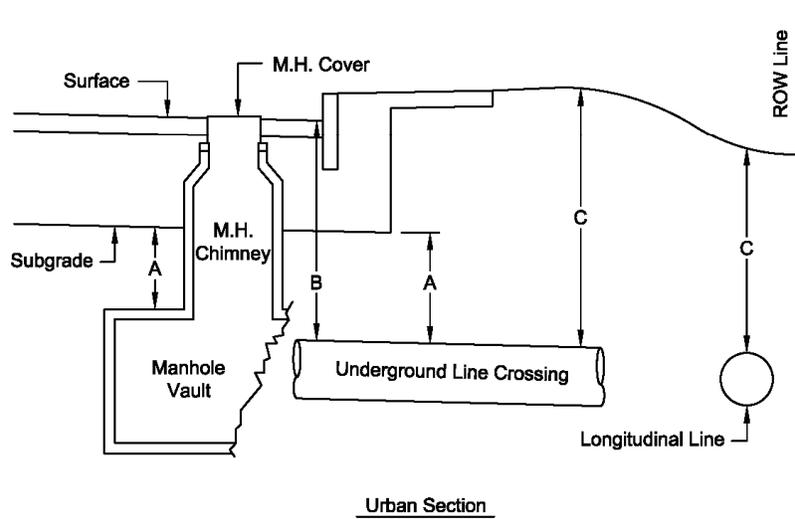
UNION GAS COMPANY OF CANADA,
LIMITED

-: AGREEMENT :-

McNevin, Gee & O'Connor,
Barristers, etc.
Bank of Montreal Bldg.
CHATHAM, Ontario.



FIGURE 4 – Minimum Cover DEPTH for Underground Installations





**TABLE 1 -- Minimum Cover DEPTH FOR Underground Installations
Crossing Highways (and Freeways)**

Utility Facility Type		A	B	C	D
		Below pavement structure (subgrade) mm	Below pavement surface mm	Below ground elevation mm	Below ditch line elevation mm
High Pressure Gas or Liquid Petroleum Pipelines (> 680 kPa)	unencased existant	450	1 200	900	900
	unencased new	450 or ½∅	1 500	1 000	1 200
	encased existant	300	1 000	750	750
	encased new	450 or ½∅	1 200	900	1 200
Medium and Low Pressure Gas or Liquid Petroleum Pipelines (< 680 kPa)	unencased existant	450	1 000	600	750
	unencased new	450 or ½∅	1 200	600 <i>750 plastic</i>	900
	encased existant	300	1 000	600	750
	encased new	450 or ½∅	1 200	600	900
Water and Sewer Pipes	existant	450	1 200	1 000	1 000
	new	450 or ½∅	1 800	1 500	1 200
Electric Power	existant	300	1 000	750	750



Distribution Lines (all in conduit)	new	450	1 500	900	1 200	
	Communication Lines	existant	300	1 000	750	750
		new	450	1 200	750	900

(∅ : pipe diameter)

GLOSSARY

Backfill - Material used to replace or the act of replacing material removed during construction; also may denote material placed or the act of placing material adjacent to structures.

Boring - The operation by which large carriers or casings are jacked through oversize bores. The bores are carved progressively ahead of the leading edge of the advancing pipe as soil is mucked back through the pipe.

Carrier - A pipe directly enclosing a transmitted fluid (liquid, gas or slurry). Also an electric or communication cable, wire or line.

Casing - A larger pipe, conduit or duct enclosing a carrier.

Clear Zone - The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope and/or a clear run-out area. The desired width is dependent upon the traffic volumes and speeds, and on the roadside geometry.

Coating - Material applied to or wrapped around a pipe.

Conduit - An enclosed tubular casing, singularly or multiple, for the protection of wires, cables or lines, usually jacketed and often extended from utility access hole to utility access hole.

Control of Access - The condition where the right of owners or occupants of abutting land or other persons to access, light, air or view in connection with a highway is fully or partially controlled by road authority.

Coring - The operation by which a small casing is drilled into firm soil. As the pipe advances, the core material is removed by sluicing during or after the drilling.

Enbridge Pipeline Vehicle Loading Analysis

Proposed NPS 6 Windsor Line along County Road 46, County of Essex Ontario

Introduction:

Enbridge is proposing to replace the existing NPS 10 Windsor Line with a new NPS 6 pipeline. The pipeline will be installed within the road allowance parallel to roads for approximately 64 kms between Chatham-Kent and The County of Essex. There was a concern about the stress of the pipeline in its proposed location as it is likely to be exposed to vehicle loading including but not limited to superloads, particularly on County Road 46 in the County of Essex as the pipeline's proposed alignment is within approximately 2m of road edge in some locations. The following analysis will provide results of a load assessment on this new pipeline under vehicle loading conditions to meet the Enbridge's design and operating requirements and those of CSA Z662-15 and to determine the max allowable axle load that can be accepted by the pipeline. Analysis considers the hoop stress due to internal pressure and those imposed on it by the soil and vehicle loading.

Assumptions:

- Basis for axle load will be the Ministry of Transportation Ontario (MTO) legal axle load limit of 9000kgs per axle.
- Superload is considered a vehicle weighing more than 120000kgs, from MTO, A Guide to Oversize/Overweight Vehicles and Loads in Ontario, but is limited to max axle load of 9000kgs per axle.
- Vehicle axle load is to be positioned directly vertical over the pipeline. This arrangement will create the maximum loading for this condition.
- An imbalance factor of 10% which increases the wheel load of the axle to allow for consideration of illegal loads and an impact factor of 1.5 was used to simulate vehicles driving on uneven surface over the pipeline.
- Analysis will consider tired vehicles only, which will simulate the maximum ground pressure over the pipeline. Other vehicles, such as those that ride on tracks generally disperse their weight over a larger area and therefore have a lower ground pressure values than those of tired vehicles.
- Assume the pipeline is backfilled only with the native material found within the road allowance, which is known to be ordinary clay. This is considered a conservative assumption as compacted granular fill over and/or around the pipeline would bear more of the vehicle loading than clay and transfer less to the pipeline.

Pipeline Design Parameters:

Outside Diameter (OD): NPS 6 (168.3mm)

Wall Thickness: 4.8mm

Material: Gr. 359, Cat. I, HFERW seam, CSA Z245.1-18 steel pipe

Specified Minimum Yield Strength: 359 MPa

Cover Depth: 100cm

Max Op Temp: 20C degree

Max Op Pressure: 3450 kPa

Min Install Temp: 0C degree

Content: Sweet Natural Gas

Pipeline design to meet the requirements of Clause 12, of CSA Z661-15

During vehicle loading pipeline shall operate at less than 85% SMYS

Live Loads To Calculate:

1. MTO road legal limit or 9000kgs per axle. See analysis equipment label SHL.
2. 5 x MTO road legal limit or ~45000kgs per axle. See analysis equipment label 5xSHL
3. 10 x MTO road legal limit or ~90000kgs per axle, to simulate a maximum pipeline loading. See analysis equipment label 10xSHL

Results:

In all live load cases the results display that the pipeline operates below allowable stress limits under the proposed design conditions for the pipeline located near or under the travelled portion of the roadway. This includes a superload.

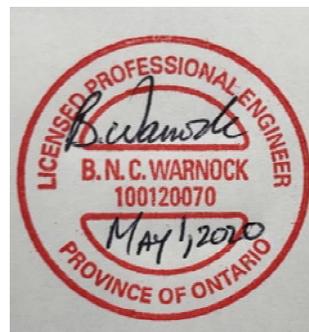
The results of the analysis meet the requirements of the Transportation Association of Canada (TAC) Guidelines For Underground Utilities Crossing Highway Right-Of-Ways.

Results for the 9000kgs and ~45000kgs per axle load considered the impacts of fluctuating hoop stresses or fatigue loading. This can be assumed to represent the case of loads sustained by regular vehicle traffic over the roadway and pipeline.

Results for the ~45000kgs per axle analysis displays an allowable loading factor of safety of 5 over what could be expected the normal vehicle use along the roadway.

Results for the ~90000kgs per axle analysis display a near maximum loading that can be accepted by the pipeline. In this case if a superload were to be overweight or given a permit to operate an axle load at greater than 9000kgs up to ~90000kgs per axle the pipeline is robust enough to carry that extreme load.

Analysis performed by Blair Warnock, P.Eng, Senior Pipeline Design Engineer, Enbridge Inc.



Pipelines Crossed by Equipment on Tires

Location:		Description & Purpose NPS 6 Windsor Line - Oversize Vehicle Load Analysis					
Province		ON		Permanent crossing? Yes		Type 3rd Party	
Equipment:	Label		SHL		Tire or ground bearing pressure, psi kPa		110 758
	Description		MTO limit of 9000kgs/axle under Fatigue/Cyclic loading		Distance between axles in set, in cm		48 122
	Axle Load, lb kg		19,841 8,998		Axle gauge, ft m		6.0 1.83
	# axles in set		3		Impact Factor		1.5
					Imbalance Factor		10%
Line(s) to be crossed:		Line Name		6WL			
		OD, in cm		6.625 16.8			
		Wall thickness, in mm		0.189 4.8			
		Pipe grade, ksi MPa		52 359			
		Pressure, psi kPa		500 3447			
		Long seam type		ERW			
Installation:		Depth of cover, in cm		39 100			
		Installation type		Settled			
		Bottom Reaction Angle, deg		60			
		Trench or bore width, in cm		7 17			
		Soil Unit Weight, pcf kg/m ³		120 1922			
		Soil Type		4			
		Modulus of soil reaction E', psi kPa		250 1724			
Slab or Matting:		no slab					
		Slab thickness, in cm					
		Impact Factor on slab or mat					
		Slab material					
		Slab width across pipe, ft m					
		Slab length along pipe, ft m					
		Modulus of subgrade reaction k, pci MPa/m					
Maximum Hoop Stress, % SMYS:		Calculated		26.3%			
		Allowable		85%			
Fluctuating Hoop Stress, psi MPa:		Calculated		4.2 28.7			
		Allowable		20 138			
Requirements / Notes:		Axle load for analysis of ~9000 kgs or MTO Road Legal Axle limit. Results show pipeline still remains below maximum allowable hoop stress limit and max allowable fluctuating hoop stress limit, which considers fatigue or cyclic loading which can be assumed to be representative of continuous vehicle traffic over the pipeline/roadway.					
Analyzed by:		BNW 4/17/2020					

Pipelines Crossed by Equipment on Tires

Location:		Description & Purpose		NPS 6 Windsor Line - Oversize Vehicle Load Analysis							
		Province		ON		Permanent crossing?		Yes		Type 3rd Party	
Equipment:		Label		SHLx5		Tire or ground bearing pressure, psi kPa		110 758			
		Description		5 x MTO limit of 9000kgs/axle under Fatigue/Cyclic loading		Distance between axles in set, in cm		48 122			
		Axle Load, lb kg		99,000 44,898		Axle gauge, ft m		6.0 1.83			
		# axles in set		1		Impact Factor		1.5			
						Imbalance Factor		10%			
Line(s) to be crossed:		Line Name		6WL							
		OD, in cm		6.625 16.8							
		Wall thickness, in mm		0.189 4.8							
		Pipe grade, ksi MPa		52 359							
		Pressure, psi kPa		500 3447							
		Long seam type		ERW							
Installation:		Depth of cover, in cm		39 100							
		Installation type		Settled							
		Bottom Reaction Angle, deg		60							
		Trench or bore width, in cm		7 17							
		Soil Unit Weight, pcf kg/m ³		120 1922							
		Soil Type		4							
		Modulus of soil reaction E', psi kPa		250 1724							
Slab or Matting:		Slab thickness, in cm		no slab							
		Impact Factor on slab or mat									
		Slab material									
		Slab width across pipe, ft m									
		Slab length along pipe, ft m									
		Modulus of subgrade reaction k, pci MPa/m									
Maximum Hoop Stress, % SMYS:		Calculated		50.5%							
		Allowable		85%							
Fluctuating Hoop Stress, psi MPa:		Calculated		19.4 133.7							
		Allowable		20 138							
Requirements / Notes:		Axle load for analysis of ~45000kgs or ~5 x MTO Road Legal Axle limit of 9000kgs. Results show pipeline still remains below maximum allowable hoop stress limit and max allowable fluctuating hoop stress limit, which considers fatigue or cyclic loading which can be assumed to be representative of continuous vehicle traffic over the pipeline/roadway.									
		Analyzed by: BNW 4/17/2020									

Pipelines Crossed by Equipment on Tires

Location:					
Description & Purpose	NPS 6 Windsor Line - Oversize Vehicle Load Analysis				
Province	ON	Permanent crossing?	No	Type	3rd Party
Equipment:	Tire or ground bearing pressure, psi kPa				110 758
Label	SHLx10		Distance between axles in set, in cm		157 400
Description	10 x MTO limit of 9000kgs/axle assumed Super Load			Axle gauge, ft m	19.7 6.00
Axle Load, lb kg	198,000		89,796	Impact Factor	1.5
# axles in set	1			Imbalance Factor	10%
Line(s) to be crossed:					
Line Name	6WL				
OD, in cm	6.625		16.8		
Wall thickness, in mm	0.189		4.8		
Pipe grade, ksi MPa	52		359		
Pressure, psi kPa	500		3447		
Long seam type	ERW				
Installation:					
Depth of cover, in cm	39		100		
Installation type	Settled				
Bottom Reaction Angle, deg	60				
Trench or bore width, in cm	7		17		
Soil Unit Weight, pcf kg/m ³	120		1922		
Soil Type	4				
Modulus of soil reaction E', psi kPa	250		1724		
Slab or Matting:					
	no slab				
Slab thickness, in cm					
Impact Factor on slab or mat					
Slab material					
Slab width across pipe, ft m					
Slab length along pipe, ft m					
Modulus of subgrade reaction k, pci MPa/m					
Maximum Hoop Stress, % SMYS:					
Calculated	77.1%				
Allowable	85%				
Fluctuating Hoop Stress, psi MPa:					
Calculated	N/A		N/A		
Allowable	20		138		
Requirements / Notes:					
Axle load for analysis of ~90000kgs or ~10 x MTO Road Legal Axle limit of 9000kgs. Results show pipeline still remains below maximum allowable hoop stress limit. This load is considered to represent a superload or over weight vehicle permitted load.					
Analyzed by: BNW 4/17/2020					

May 7, 2020

The Corporation of the County of Essex
360 Fairview Avenue West
Essex, Ontario
N8M 1Y6

Attention: Ms. Jane Mustac, P. Eng, County Engineer
Ms. Krystal Kalbol, P.Eng., Manager, Transportation Planning & Development

**RE: REVIEW OF ENBRIDGE SUBMISSION FOR NEW GAS LINE ON
COUNTY ROAD 46
Our Project No.: 20-163**

Ms. Mustac, Ms. Kalbol,

Subsequent to the request of your office we have undertaken a review of the Enbridge Pipeline vehicle loading analysis dated May 1, 2020 in addition to Ms. Kalbol's memo of April 27, 2020. The following will outline the results of our review.

1. Background

It is our understanding from the above noted documents (2) that Enbridge is preparing to replace 29 kilometers of high-pressure gas line with the County of Essex's right of way. This work will occur on County Road 46 within the Municipalities of the Town of Tecumseh and the Town of Lakeshore.

The April 27 memo notes the recommendation of the Transportation Association of Canada (TAC) guidelines for such works with specific reference to the minimum encased and non-encased depth of bury. Given the pressure we have confirmed that the following memo's values are consistent with our investigation results:

- Non-Encased – 1.5m below paved surfaces but not less than 1m below ground elevation
- Encased – 1.2m below paved surfaces but not less than 0.9m below ground elevation

Enbridge's documents (calculations) suggest a buried depth of 1m and included calculations per CSA Z662-15 *Oil and Gas Pipeline Systems*.

Both parties note the proposed construction will be located outside the current main roadway driving path but will come within 2m of the existing road edge. However, it is our understanding that the Country Road 46 will experience road widening over the course of the pipelines life placing the proposed service within the drive path. Moreover, the existing shoulder is considered a travelled portion based on use of this region for maintenance activities and other motorist access needs.

2. Our Assessment

Our assessment included a review of the documents received and the TAC recommendations as they form an established standard for works within the right of way. We also assessed the results of the Enbridge analysis against loading analysis for buried pipes and conduits (consistent with the Canadian Highway Bridge Code) and fundamentals for buried structures.

3. Observations

The following observations were made specific to our assessment:

Calculation Specific

- The Enbridge calculations provided for a 10% wheel load imbalance and an impact factor of 1.5. Furthermore, their analysis calculated the resulting hoop stresses under a truck with an axial load of up to 198,000lbs (880kN), which is ten times greater than their reported standard load.
- The Enbridge calculations were based on the vehicle crossing over (perpendicular) to the service with a wheel to wheel center of 157" (4m).
- The higher end of the load analysis presented by Enbridge yields results in excess of that following the prescribed loading criterion set forth by the Bridge Code's CL-625ONT vehicle or any evaluation vehicle defined in CAN/CSA S6.
- The Enbridge analysis assumed a modulus of soil reaction of 250psi (1.724 MPa). Such a value would be consistent for a fine-grained soil with a liquid limit of less than 50. However, such values should be field verified by a qualified Geotechnical Engineer. Note, if the liquid limit was greater than 50 would zero (Bureau of Reclamation). Failure to confirm this value in situ would be considered contrary to good Engineering practices; moreover, should a lower value exist the capacity of the pipe could be in question.
- The density of the soil carried by Enbridge was 120 pcf which is reasonable for the regional clay soil conditions significantly changing the analysis results.
- Consideration, with respect to soil response, does not include areas that have been disturbed and are formed with non-native soil to form the road, driveways and road shoulders over the years, to name a few instances of disturbance.
- The analysis completed by Enbridge's Engineer was to Z662-15; however, there is a more current version of this standard at Z662-19.

Review of Relevant Standards and Guidelines

Transportation Association of Canada

- Section 4.11 of the TAC Guidelines for geometric design (TAC 2017) specifically speaks to the placement of utilities in the right-of-way, included in this list, found in Section 4.11.1 – *Technical Foundation* is “Gas Lines”. In this same section they note that the location of utilities is dependent on “several factors” inclusive of:
 - Designation of the road
 - Maintenance requirements
 - Public safety, and future stages improvements for the road.

(TAC 2017)

- Given the proposed long-term expansion of the right-of-way as per 4.12 of TAC 2017 best practices would call to “*Determine the initial requirements and select the dimensions so as to allow for future expansion*”, an action currently being under taken by the County as the designated Road Authority.
- TAC’s guideline for Underground Utilities Installation (March 2013) states in the forward:

“... the responsibility of road authorities includes operating the highway rights-of-way in a manner that ensures the safety, traffic-carrying ability and physical integrity of their installations. The presence of a utility within the right-of-way can affect these characteristics, so it is necessary for road authorities to reasonably regulate the presence of utilities.”

Such statements, place emphasis of the responsibility of the Road Authority (County) to ensure compliance with the recommendations set forward by industry, such as the TAC guidelines.

- The function of the TAC guidelines is to “*assist the various road authorities in establishing and administering uniform criteria for the accommodation of utilities crossing highway (and freeway) rights-of-way*” (TAC March 2013 – Underground Utilities Installation). As a member of the Association the County must as a measure of good practice assess, and as appropriate, apply the recommendations and guidelines of this organization.
- The “intended audience” for the TAC – Underground Utilities installation (TAC March 2013) includes “*Consulting engineers practicing in the highway/utility field*” however, such assessment was not observed from a review of the Enbridge submission suggesting this guideline was not referenced prior to submission.
- Per Clause 4.1.8 of TAC March 2013 the recommend values are presented in Table 1 of document, but this clause further states that:

“The minimum utility cover depths specified by a road authority may be greater when installed within freeway rights-of-way. The road authority may approve other protection designed by the utility in lieu of the minimum cover depth specified.”

By requesting compliance with Table 1 of the present document the County fails to create a condition of undo hardship on Enbridge, albeit, the County would be within its rights, as the Road Authority, to implement and mandate a standard requiring greater depths of bury then those in Table 1.

- Provided Enbridge proceeds in accordance with Z662-19 and applies the 1.2m depth (discussion to follow under Z662-19), and following from TAC March 2013, the County could accept the 1.2m depth per Table 1 provided the main was encased. Such encasement would further protect the line from loading criterion and other hazards faced by underground utilities within the right-of-way.

CAN/CSA Z662-19 National Standard of Canada – Oil and Gas Pipeline Systems

- Following the latest Z662-19, within Table 4.9 – Cover and clearance, the applicable guidelines governing Enbridge specifically note a minimum depth of bury, “*below travelled surface (road)*” of 1.2m; a value which is more than that currently proposed by Enbridge.
- Specific to Z662-19 Clause 1.4 the statement is made that “*This standard is intended to establish essential requirements and minimum standards for the design, construction....*” Emphasis should be placed on the declaration of minimum, thus in the presence of other guidelines specific to the zone of construction the most stringent should be considered in the interest of best engineering practice and public safety.
- Clause 4.11.1 of Z662-19 notes that “*cover requirements for buried pipelines shall not be less than the values given in Table 4.9*” contrary to the proposal of Enbridge.

4. Recommendations

The following recommendations are based on our review and assessment:

Calculation Specific

- The ten times analysis performed by Enbridge was conservative seeing a maximum concentrated wheel load of 16.5 (1.5 x 1.1 x 10) times their base value. Such conservative approaches far exceed those prescribed in other standards.
- The analysis by Enbridge does support that the proposed material is able to carry the applied loads under hoop stress.
- Given that hoop stresses are the only analysis performed care should be given during construction to ensure that the bedding of the pipe is free of any large or stiff elements that may cause beam actions resulting in longitudinal and shearing stresses which, when combined with the hoop stress, (ie Van Mises Stress Theory) could result in a principal stress far in excess of that of the pipes capacity.
- There should be some geotechnical verification of the soil assumptions made, specifically the modulus of soil reaction.
- Care should be taken in confirming adequacy of the pipe in non-clay soils albeit the modulus of soil reaction and overall soil response would tend to improve in a granular system.

Guidelines Review Discussion

The following discussion will set the design calculations aside and considering the applicable industry recommendations. Following the TAC Guidelines, outlined previously, such recommendations are formed based on the input of the industry and as such form the same value to practicing Engineers and Road Authorities as a given CSA (Canadian Standards Association) document. Consideration should also be given to the mission of the Transportation Association of Canada which is “*to promote the provision of safe, secure, efficient, effective and environmentally and financially sustainable transportation services in support of Canada’s social and economic goals*” (TAC Guidelines Dec 2011). The focus of the mission being in part “safe” and as such the recommendations are set to provide the best possible solutions for such safety. Moreover, TAC is a widely accepted authority in the industry and as such its standards and guidelines form the basis of good right of way management with the realm of engineering and roadway management.

Given the above, and the consideration that the proposed pipeline will lay within the driving surface within the life span of the proposed new construction the minimum depth measured from drive surface (or anticipated drive surface) should be 1.5m versus the proposed 1.0m depth if compliance with the TAC guidelines is to be consistently applied by the County within its right of ways.

Specific to Z662-19 Enbridge appears through the current proposal to have failed to meet the minimum standards set forth in the latest document. Moreover, as noted in observations the current standard provides only the minimum cover requirements and as such makes no consideration for assessment of other appropriate standards and guidelines. As such and in the presence of both Z662-19 and the current TAC standards the greater requirement of the two would be considered the most appropriate value.

With regard to liability, should in the unfortunate situation an event occur which creates a threat or risk to the public, specific to the proposed gas line, failure to adhere to the TAC recommendations could result in the County being in part liable for failure to follow best practices. Such legal discussions should obviously be had with the County legal team; however, failure to follow guidelines does create a situation of increased risk and liability.

Speaking to the previous point care by the County should also be taken to not deviating from the TAC standards as it is a standard adhered to by the County itself on all other projects inclusive its own. Failure to consistently follow an established standard with the County, and in general most every Road Authority, also increases liability.

5. Summary and Conclusions

Following from the above, the calculations submitted by Enbridge do confirm structural capacity based on the assumptions made; however, from the second portion of the discussion, failure to address the risk imposed by deviating from a standard regularly applied by the County and other similar Authorities will incur increased liability in the short and long term conditions. Moreover, the proposed construction appears to be in contravention of the current standards governing the actions of Enbridge itself.

The situation specific to County Road 46 expansion within the pipeline's life span is further support to follow the current guidelines and maintain a depth of cover that represents the most conservative approach in the interest of public safety, specifically 1.5m as this would also be supportive of the statements made in Z662-19 and the TAC guidelines.

Following from the above, and in the interest of trying to validate the most appropriate action in the current condition one only need to assess the reverse condition. Under the current standards and guidelines the following depths of bury are recommended, TAC -1.5m and Z662-19 -1.2m; should the case have been 1.5m requirement by Z662 and TAC permitted a shallower bury of 1.2m Enbridge would have been remiss to construct their plant at the lesser depth of 1.2m and would not have been alleviated from their professional responsibility or the legal obligations by doing so. As such, in the interest of best engineering practices, and good right-of-way management, the County and Enbridge itself, must assess the condition not in isolation but against all appropriate guidelines to ensure the best end results. Blindly ignoring the recommendations of an origination such as the Transportation Association of Canada, and its guidelines, is tantamount to negligence on the part of any party doing so. The provisions previously noted in the recommendation discussion specifically noted that the 1.2m is a minimum prescribed in Z662-19 and not a mandated maximum. The function of the various standards and guidelines making declarations of minimum is the committee's means of ensuring that a responsible professional will follow their professional, ethical and legal obligations to ensure the public trust and protection by the application of all best practices.

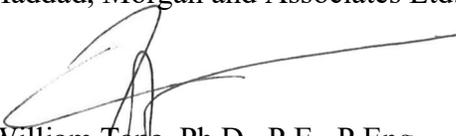
Based on our review and in the interest of shielding the County from liability while maintaining a consistent application of policy, and in the interest of good engineering and right-of-way management practices, we formal recommend that Enbridge be directed to adhere to the requirements set forth by your office as the Road Authority; as such compliance with the TAC guidelines should occur without further discussion.

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May 7, 2020

6. Closing

We trust that the above meets your needs at this time. Should you have any questions or comments please do not hesitate to contact our office.

Yours Truly
Haddad, Morgan and Associates Ltd.



William Tape, Ph.D., P.E., P.Eng.
Senior Engineer



The Corporation of the County of Essex

By-Law Number 2020-23

A By-Law authorizing the execution of a Road User Agreement with Enbridge Gas Inc. ("Enbridge")

Whereas Enbridge, as successor to the Union Gas Limited, currently operates and maintains pipelines and distributes gas to the residents of the County of Essex pursuant to the terms of an Agreement, dated December 11, 1957;

And whereas Enbridge has requested permission from the Corporation of the County of Essex to construct a new pipeline on and/or along, among other Highways, County Road 46;

And whereas to construct the said new pipeline, Enbridge wishes to utilize certain Highways owned by the County and to utilize the County's right of way to install a pipeline (the "**Installation**") and carry out additional Works on the Highways for the distribution of gas to the residents of the County of Essex;

And whereas, in consideration of permitting the Installation on and along its Highways, the Corporation of the County of Essex requires that the existing pipeline installed by Union Gas Limited be decommissioned and removed from on and along the Highways, or the associated rights of way, by Enbridge, and further requires that Enbridge enter into a Road User Agreement;

And whereas it is deemed expedient to grant the request of Enbridge to complete the Installation on certain terms and conditions;

Now therefore the Council of the Corporation of the County of Essex hereby enacts as follows:

- 1) That permission be granted to Enbridge to complete the Installation, subject to the execution of the above mentioned Road User Agreement, and subject to the terms and conditions contained in the said Road User Agreement.

By-Law Number 2020-23

Page 2

- 2) A copy of the said Road User Agreement is attached hereto and forms a part of this By-law.
- 3) The Warden and the Clerk of the Corporation be and the same are hereby authorized to execute the said Agreement, to affix the seal of the Corporation of the County of Essex thereto, as well as any and all other documents necessary to give effect to this By-law.
- 4) This By-law will come into force and take effect on the final passing thereof.

Read a first, second and third time and Finally Passed this 20th day of May, 2020.

Gary McNamara, Warden

Mary S. Birch, Clerk

Clerk's Certificate

I, Mary S. Birch, Clerk of the Corporation of the County of Essex, do hereby certify that the foregoing is a true and correct copy of **By-law Number 2020-23** passed by the Council of the said Corporation on the 20th, day of May **2020**.

Mary S. Birch, Clerk
Corporation of the County of Essex