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Enbridge Gas Inc.
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August 27, 2020

VIA EMAIL and RESS

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

Dear Ms. Long:

Re: Enbridge Gas Inc. (Enbridge Gas)
Ontario Energy Board (OEB) File: EB-2020-0136
NPS 20 Replacement Cherry to Bathurst – Evidence Updates

Further to the application and evidence filed on July 31, 2020 for the above noted proceeding, enclosed are the following updated exhibits.

Exhibit	Corrections
A-2-1	Page 1, paragraph 2 – Update to pipeline length Page 2, paragraph 4 – Update to pipeline length and update to routing narrative
B-1-1	Page 1, paragraph 1 – Update to pipeline length Page 5, paragraph 11 – Update to pipeline length Page 29, paragraph 47 – Update to pipeline length

Please contact the undersigned if you have any questions.

Yours truly,

(Original Digitally Signed)

Joel Denomy
Technical Manager, Regulatory Applications

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998,* S.O. 1998, c. 15 (Sched. B), as amended (the "OEB Act");

AND IN THE MATTER OF an application by Enbridge Gas Inc. under section 90 of the OEB Act for an order or orders granting leave to construct natural gas distribution pipelines and ancillary facilities in the City of Toronto.

LEAVE TO CONSTRUCT
APPLICATION: NPS 20 REPLACEMENT CHERRY TO BATHURST

1. The Applicant, Enbridge Gas Inc. (Enbridge Gas), 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 the province of Ontario.

2. Enbridge Gas has identified the need to replace a 4.3 km segment of Nominal Pipe Size (NPS) 20 inch High Pressure (HP) steel (ST) natural gas main on Lake Shore Boulevard from Cherry Street to Bathurst Street and a 230 m section on Parliament Street from Mill Street to Lake Shore Boulevard East (C2B or the Project) in the City of Toronto, Ontario. The pipeline to be replaced forms a part of Enbridge Gas's distribution system known as the Kipling Oshawa Loop (KOL). Details about the purpose, need and timing for the Project can be found at Exhibit B, Tab 1, Schedule 1. /U /U

3. The pipeline to be replaced by the Project is located in the densely populated urban area of downtown Toronto. It supplies natural gas to a large population of residential, apartment, commercial and industrial customers. It is a critical distribution main that supplies natural gas to a diverse mix of customers in the downtown core and provides an important link between natural gas supply from the Lisgar Gate Station to the west of Toronto and Station B Feeder Station in Toronto.

4. The Project consists of the installation of approximately 4.3 km of NPS 20 HP ST natural gas pipeline from the intersection of Cherry Street and Lake Shore Boulevard where it will tie-in to an existing natural gas pipeline. From there it travels west along Lake Shore Boulevard to Remembrance Drive (west of Bathurst Street) where it will tie-in to an existing natural gas pipeline. The Project also requires the construction of a tie-in lateral (the North Tie-In Lateral) which commences at the intersection of Mill Street and Parliament Street. At that intersection the North Tie-in Lateral will tie-in to an existing natural gas pipeline. From there the North Tie-in Lateral travels approximately 230 m south along Parliament Street to Lake Shore Boulevard where it will tie-in to the facilities to be constructed along Lake Shore Boulevard. /U /U /U

5. This Application is made to the Ontario Energy Board (OEB, or the Board) pursuant to section 90 of the OEB Act for an Order granting leave to construct the Project. Details on Project costs are shown in Exhibit D, Tab 1, Schedule 1 in the pre-filed evidence.

6. Exhibit C, Tab 1, Schedule 1, Page 7 provides a map showing the general location of the Project Facilities and the municipalities, and highways through, under, over, upon or across which the pipelines will pass.

7. The route and location for the Project were selected by an independent environmental consultant (Dillon Consulting Ltd.), through the process outlined in the Board's *Environmental Guidelines for the Location, Construction, and Operation of Hydrocarbon Pipelines in Ontario (7th Edition, 2016)* (the Guidelines). Details on the route selection and the Environmental and Socio-Economic Impact Assessment (ER) of the proposed facilities are included at Exhibit C, Tab 1, Schedule 1 of the pre-filed evidence. Information on indigenous consultations and Duty to Consult activities can be found at Exhibit F, Tab 1, Schedule 1 of the pre-filed evidence.

8. Enbridge Gas also applies to the Board pursuant to Section 97 of the Act for an Order approving the Form of Temporary Land Use Agreement which can be found in the prefiled evidence at Exhibit E, Tab 1, Schedule 1, Attachment 1.

9. With leave of the Board, Enbridge Gas expects to commence construction of the Project in the second quarter of 2021. In order to meet Project timelines, Enbridge Gas respectfully requests the approval of this Application as soon as possible or not later than February 2021. Exhibit D, Tab 1, Schedule 1 provides the proposed construction schedule.

10. The parties affected by this Application are the owners of lands, government agencies and municipalities over which the pipeline will be constructed, and Enbridge Gas's distribution customers with respect to quality of service and security of supply. It is impractical to set out in this Application the names and addresses of such persons because they are too numerous.

11. A list of permitting authorities is provided at Exhibit E, Tab 1, Schedule 1.

12. Enbridge Gas requests that this Application proceed by way of written hearing in English.

13. Enbridge Gas therefore requests, on the basis set out above, that the Board make the following orders:

    (i) an Order pursuant to section 90 of the OEB Act granting leave to construct the LCEP Facilities;

    (ii) an Order pursuant to section 97 of the OEB Act approving the proposed form of easement agreements;

    (iii) such additional Orders as Enbridge Gas may request and the Board approves.

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:

(a) The Applicant:
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Enbridge Gas Inc.
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DATED August 27, 2020, at Toronto, Ontario.

ENBRIDGE GAS INC.

(Original Digitally Signed)

_____

Joel Denomy
Technical Manager, Regulatory Applications

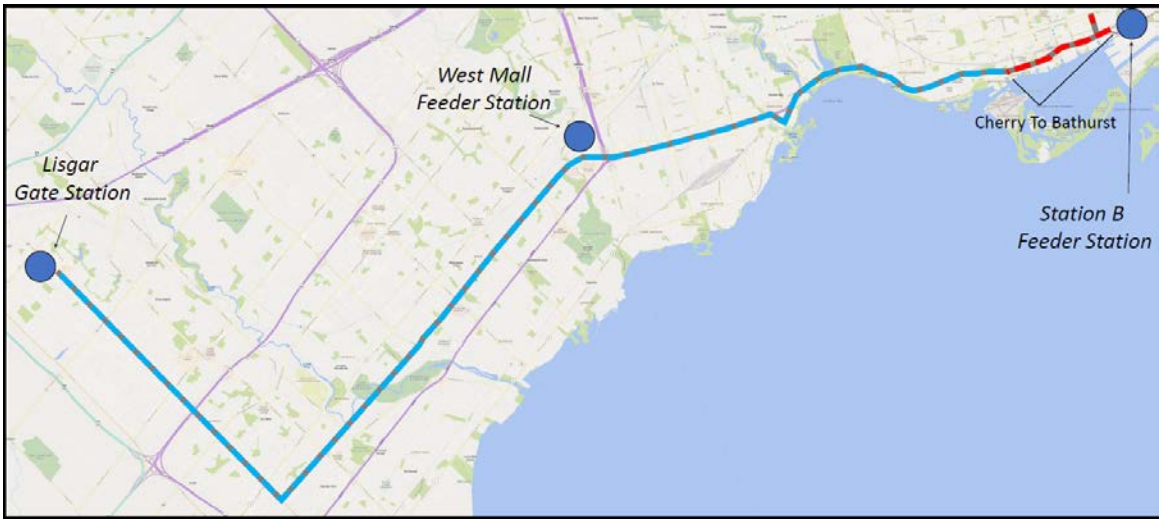
PURPOSE, NEED, PROPOSED FACILITIES & TIMING

Introduction

1. Enbridge Gas Inc. (Enbridge Gas or the Company) has identified the need to replace a 4.3 km segment of Nominal Pipe Size (NPS) 20 inch High Pressure (HP) steel (ST) natural gas main on Lake Shore Boulevard from Cherry Street to Bathurst Street and a 230 m section on Parliament Street from Mill Street to Lake Shore Boulevard East (C2B or the Project) in the City of Toronto (Toronto or the City). /U /U

2. The segment of pipeline to be replaced is part of the NPS 20 HP ST natural gas main known as the Kipling Oshawa Loop (KOL). The C2B segment of the KOL is fed from Station B Feeder Station in the east and from the West Mall Feeder Station and Lisgar Gate Station in the west. The operating limit of the NPS 20 KOL is 1,207 kPag (175 Psig). Figure 1 shows the location of the KOL to the south and southwest of Toronto, the sources of supply for the KOL and the segment of pipeline to be replaced (C2B is shown in red).

Figure 1: KOL Location in Toronto and West of Toronto



3. This pipeline is located in a densely populated downtown area of the City of Toronto where a pipeline failure could result in loss of gas distribution service for thousands of customers or in the extreme place public safety at risk. The potential consequences of a failure are amplified as the C2B segment is located in a high consequence area including characteristics such as wall-to-wall concrete, a densely populated downtown core with residential, commercial and critical customers, the Gardiner Expressway, utility congested road allowance, and close proximity to railway/public transportation.

Purpose & Need

Condition of the C2B Segment

4. Enbridge Gas's Distribution Integrity Management Program (DIMP) continually evaluates assets to identify risks and determine the condition of pipelines in the distribution network. Analysis conducted by Enbridge Gas in 2015 and 2016 via an asset health review (AHR) observed that vintage steel mains, defined as those mains installed in the 1970s and prior thereto, have demonstrated declining health compared to steel mains installed after the 1970s. Reasons for this decline in health include, but are not limited to, less advanced design and construction and damage prevention practices of the past that are not comparable to today's practices. The AHR identified three major pipelines with vintage steel mains requiring further investigation. These three pipelines were: the KOL, Martin Grove pipeline (which is part of the KOL) and the St. Laurent pipeline in Ottawa.

5. Canadian Standards Association (CSA) standard Z662 provides guidance on when a pipeline operator should address pipeline integrity and condition concerns. It is the responsibility of the pipeline operator, in this case Enbridge Gas, to monitor the

condition of its pipeline assets and compare the condition of those assets to the guidance set out in CSA Z662. Should the condition of a pipeline be such that it creates a risk pursuant to CSA Z662 guidance, the pipeline operator must address the condition of the pipeline. Enbridge Gas's Integrity Management Program incorporates the guidance set out in CSA Z662. Pipeline condition will typically be addressed via repairs or replacement. In the case of the C2B segment of the KOL, Enbridge Gas has determined, for the reasons set out later in this evidence, that the C2B segment should be replaced.

6. Enbridge Gas's Asset Management Plan (AMP) has identified the KOL as having all of the characteristics and external environmental risks of vintage steel mains including but not limited to corrosion, dents, compression couplings on mains and services, reduced depth of cover, shallow blow-off valves, drips/siphons, lack of cathodic protection, live stubs, mitered bends, stray current from hydro infrastructure and contaminated soil.

7. As indicated in the AMP, the KOL has been identified as potentially requiring repair or replacement due to its condition. The Project is the first segment of the KOL to be replaced as the C2B segment is located in a highly congested area of downtown Toronto with the potential for large impacts to customers in the event of a pipeline incident. As a result, Enbridge Gas prioritized the C2B segment as the first part of the KOL to be investigated in detail to ascertain the condition of this segment. Enbridge Gas is continuing its investigations of the KOL to determine the condition of the rest of this pipeline. These investigations are ongoing and over time will identify other segments of the KOL requiring remediation or replacement.

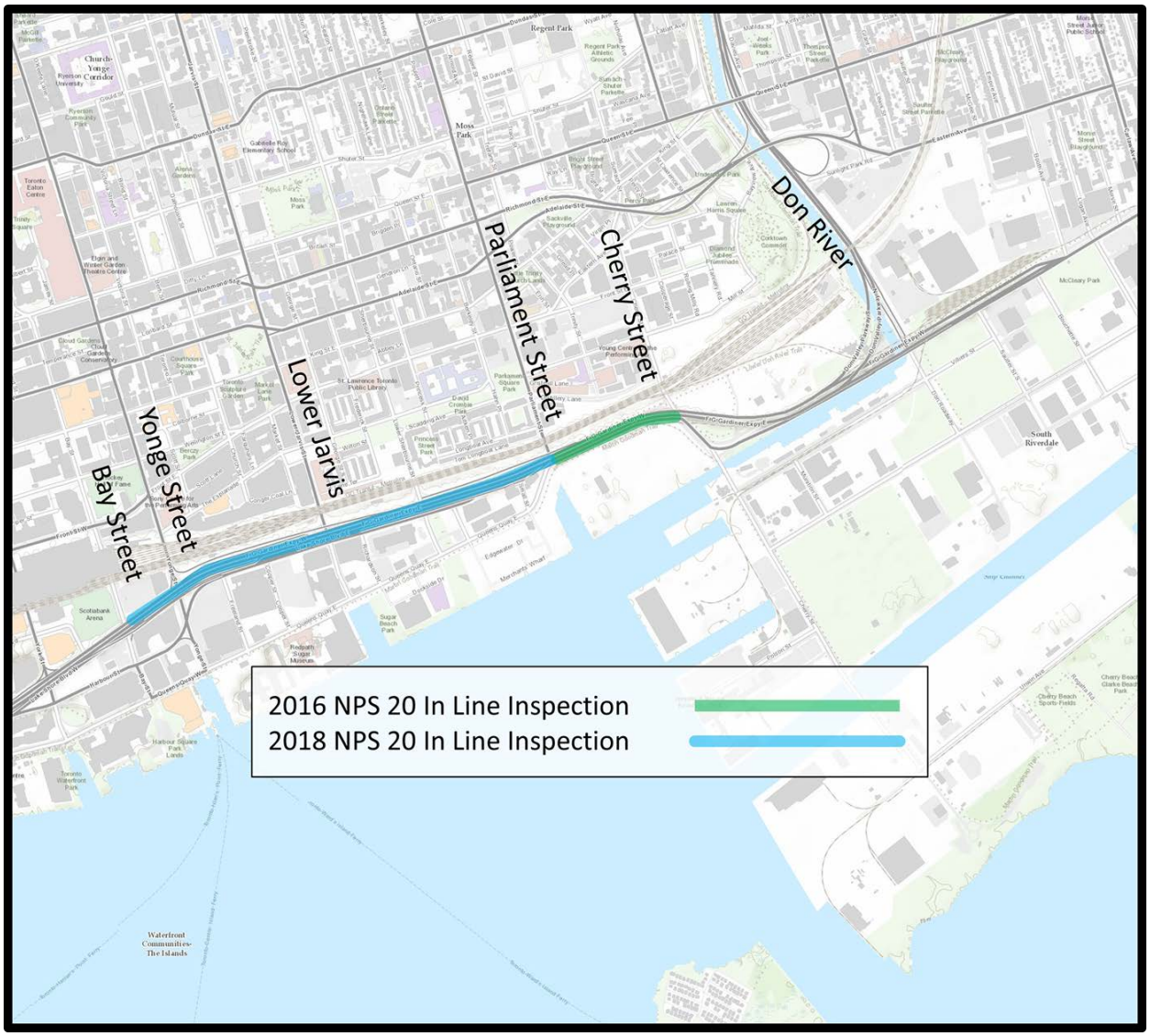
8. The vintage steel section of the KOL to be replaced by the Project was constructed in 1954. Since the C2B segment of the KOL was completed, certain segments have

been replaced or relocated as a result of road work or developments along the running line of the pipeline.

9. In 2016 and 2018, Inline Inspections (ILI) using a robotic crawler tool were performed on approximately 1.9 km of the 4.5 km section of pipeline being replaced by the Project. The robotic crawler tool is a self propelled tether-less remote-controlled fully articulated tool capable of detecting features in pipelines. Features the robotic tool is able to detect include internal and external corrosion, dents, changes in wall thickness, previous repairs, residual liquids and debris. It also provides topography data on features of the pipeline such as long-seam welds, girth welds, sleeves and hot tap fittings. This particular tool has the capability to be launched and received through a standard fitting and conduct its operations under normal operating pressure within a pipeline, therefore stopping gas flow is not required in order for inspection to occur.

10. The ILI assessments provided additional information (above that provided in the AHR) indicating that the C2B segment of the KOL requires remediation or replacement due to pipeline condition pursuant to CSA Z662 guidelines. Figure 2 shows the location of the 2016 ILI and the 2018 ILI.

Figure 2: Location of 2016 ILI and 2018 ILI



11. The 2016 ILI was conducted on approximately 400 m of pipeline from roughly Cherry Street to Parliament Street. This ILI found two areas that required immediate rehabilitation activities, in the form of integrity digs, pursuant to CSA Z662 guidance. These integrity digs were conducted in 2017and repaired portions of the C2B segment exhibiting significant wall loss in addition to other areas requiring repair /U

within the extent of the excavation for the integrity dig. The results of the 2016 ILI also indicated that this segment of pipeline contained several anomalies which would likely require remediation or replacement. The 2018 ILI was conducted on approximately 1.5 km of pipeline from Parliament Street to Bay Street. The results of the 2018 ILI indicated that the segment of pipeline inspected contained numerous anomalies which would likely require remediation or replacement.

12. Results of the ILIs indicate that there are a significant amount of anomalies along the portions of the C2B segment that were investigated. These anomalies can be grouped into two basic categories: corrosion and dents.

13. Corrosion is the deterioration of a steel pipeline that results from an electrochemical reaction with its immediate surroundings. This reaction causes the iron in the steel pipe to oxidize (rust). Corrosion results in metal loss along the pipeline. Over time and if left unmitigated, corrosion can cause the steel to lose its strength and possibly render it unable to contain the natural gas within the pipeline at its operating pressure. Remediation to corroded pipeline can be achieved by repair of the corrosion areas by way of a sleeve (structural reinforcement steel that is welded around the pipeline) or by replacing the segment of the pipe that is corroded. Table 1 provides a summary of the metal loss anomalies discovered by the 2016 and 2018 ILIs.

Table 1: Metal Loss Anomalies

Area of Anomaly (metal loss)	**Number of Anomalies**	**Average Depth of Anomaly (mm)**
<100cm^2	1022	1.39
100cm2 – <700cm^2	139	1.56
700cm2 – <1000cm^2	15	1.55
≥1000cm^2	35	1.97

14. A dent in a natural gas pipeline causes a local stress and strain concentration and a local reduction in the pipe diameter. A dent's area and depth are the critical factors used to assess the severity of the dent. Remediation to pipeline dents can be achieved by repairing the dented pipeline by way of a composite repair sleeve and reinforcement system (a system of related fiberglass and resin matrix products used to repair defects on pipelines), or by cutting out and replacing the segment of pipe that has been dented. Table 2 provides a summary of the dents discovered by the 2016 and 2018 ILIs.

Table 2: Dents

Area of Dent	Number of Dents	Average Depth (mm)
<300cm^2	3	3.42
300cm2 – <700cm^2	5	3.56
701cm2 – <1000cm^2	3	8.81
≥1000cm^2	5	13.15

15. Based on the data gathered through the completed ILIs, Enbridge Gas forecasts that around 72 integrity digs would have to be conducted on the inspected sections of the C2B segment in the next 40 years (taking into account that required digs could be combined where close to one another).

16. Using the information provided by the ILIs, Enbridge Gas developed a forecast of the number of integrity digs that could be required on the full C2B segment over the next 40 years. In total, 171 integrity digs are expected over the next 40 years. These projections were developed using an engineering forecasting model called PiMSlider. This model is used by Enbridge Gas's Integrity Management department to determine expected corrosion growth rates on existing features identified by ILIs. Using data from the 2016 and 2018 ILIs the model was used to forecast the number of integrity digs that would be required for the 1.9 km C2B segment that was

inspected in 2016 and 2018. Enbridge Gas then extrapolated these results to arrive at an integrity dig forecast for the entire 4.5 km of the C2B segment. Table 3 provides the results of this analysis. The number of integrity digs forecast through this analysis equates to one integrity dig for every 26 m of the C2B segment.

Table 3: Integrity Dig Projections

Number of Integrity Digs in Years:	**Number of Integrity Digs**	**Cumulative Number of Integrity Digs**
1-10	30	30
11-20	44	74
21-30	46	120
31-40	51	171
Total	171	171

17. The ILI results and the expected number of integrity digs were considered by Enbridge Gas as an indication of the condition of the C2B segment that was not inspected in 2016 or 2018.

18. Specifically, due to the location of the C2B segment relative to the parts of the segment for which ILIs were conducted, comparable environmental conditions (such as high concentrations of petroleum hydrocarbons and volatile organic compounds) and its year of construction, Enbridge Gas believes it is reasonable to expect that the remaining 2.6 km of the C2B segment is in a similar condition to that of the segments of C2B for which ILIs were conducted. This is supported by the fact that many of the features described below (aside from the ILI anomalies) are observed across the entire C2B segment and not just along the sections of C2B that were inspected.

19. Based on the observations described above, and in consideration of the additional costs that would be incurred, Enbridge Gas made the decision to not conduct an ILI of the remaining 2.6 km of the C2B segment.

20. In addition to the anomalies identified by the ILIs, the C2B segment also exhibits several other features requiring mitigation and/or repair. These features include reduced depth of cover, cathodic protection, field applied coatings and compression couplings.

21. Depth of Cover: Natural Gas Pipelines are installed to meet or exceed applicable minimum regulatory requirements at the time of construction. In some instances, cover may be altered due to excavation activities, erosion, construction, flooding, ground subsidence or other environment factors or human intervention. Over time this can increase the risk of 3rd party damages (constructors believing there is more cover than what is actually there) as well as jeopardize the pipeline in high traffic areas through weight transfer of large vehicles and heavy equipment moving over top of a pipeline. This is a specific concern for the C2B segment of the KOL. Depth of cover also plays a role with the safe embedment distance pertaining to compression couplings. Enbridge Gas minimum depth is 0.9 m and CSA Z662 minimum depth is 0.6 m. Remediation related to depth of cover issues can be completed by relocating the pipeline to a greater depth, or by adding additional cover over top of the pipeline. Additional cover is not a feasible solution with the C2B segment as a majority of it is beneath roadway. Table 4 shows the sections of the C2B segment which fall below the minimum depth of 0.9 m installation.

Table 4: Depth of Cover

Current Depth	Number of Segments	Average Length of Segments (m)	Percentage of Route
<60cm	3	6.1	0.004%
60cm – <90cm	26	25.8	14.9%

22. Cathodic Protection and Coating: Corrosion of underground pipelines can be controlled and mitigated via a combination of protective coatings and maintaining adequate levels of cathodic protection. The primary defense against corrosion is coating, and it acts as a physical and dielectric (low- or non-conductive) barrier. To protect the pipe against corrosion at coating voids, known as holidays, cathodic protection current is used to reduce the soil-side corrosion rates to a negligible level. The population of vintage steel mains installed in the 1970s and prior, including the C2B segment, have been found to have varying degrees of corrosion associated with declining cathodic protection and poor coating. This drives the steady increase of forecasted leak rates. Additionally, vintage steel mains were installed when protection programs, including cathodic protection procedures were different from current practices. In urban areas, challenges exist in ensuring adequate cathodic protection due to interference from subway, streetcar and light-rail transit systems.

23. Field Applied Coatings: Field applied coatings are used in steel natural gas systems to coat weld joints, fittings, risers, or for making repairs on damaged coatings or pipelines where coatings were removed to complete an assessment. Field application of coatings is challenging relative to factory applied coatings, since they are applied outside and are subject to non-ideal weather and/or environmental conditions and/or difficult terrain. If the quality of field applied coatings is compromised, pipe coatings can soften, flow, or become cracked and brittle, resulting in disbonded and ineffective coating, which could lead to corrosion problems. The C2B segment has 27 services and five district stations connecting

directly to the main, all of which required field applied coatings following installation. In addition, the C2B segment contains multiple girth welds and taps that have also required field applied coating.

24. Compression Couplings: Compression couplings (which are mechanical fittings not welded onto the main) that are not properly restrained could cause a loss of containment due to exposed points of thrust. Compression couplings are held in place by the weight of the soil. When the soil is disturbed, for example as a result of reduced depth of cover or via freeze/thaw of the surrounding soil, the pipe can shift or pull out of the fitting, resulting in gas escaping through the open pipe end. Enbridge Gas has mitigation practices in place to address existing known compression couplings when they are discovered. Compression couplings on steel mains that are unknowingly isolated from the corrosion protection system could result in inadequate cathodic protection, leading to accelerated corrosion and potential loss of containment. Some vintage gas mains (such as the KOL) do not have sufficient records identifying the existence and location of these fittings.

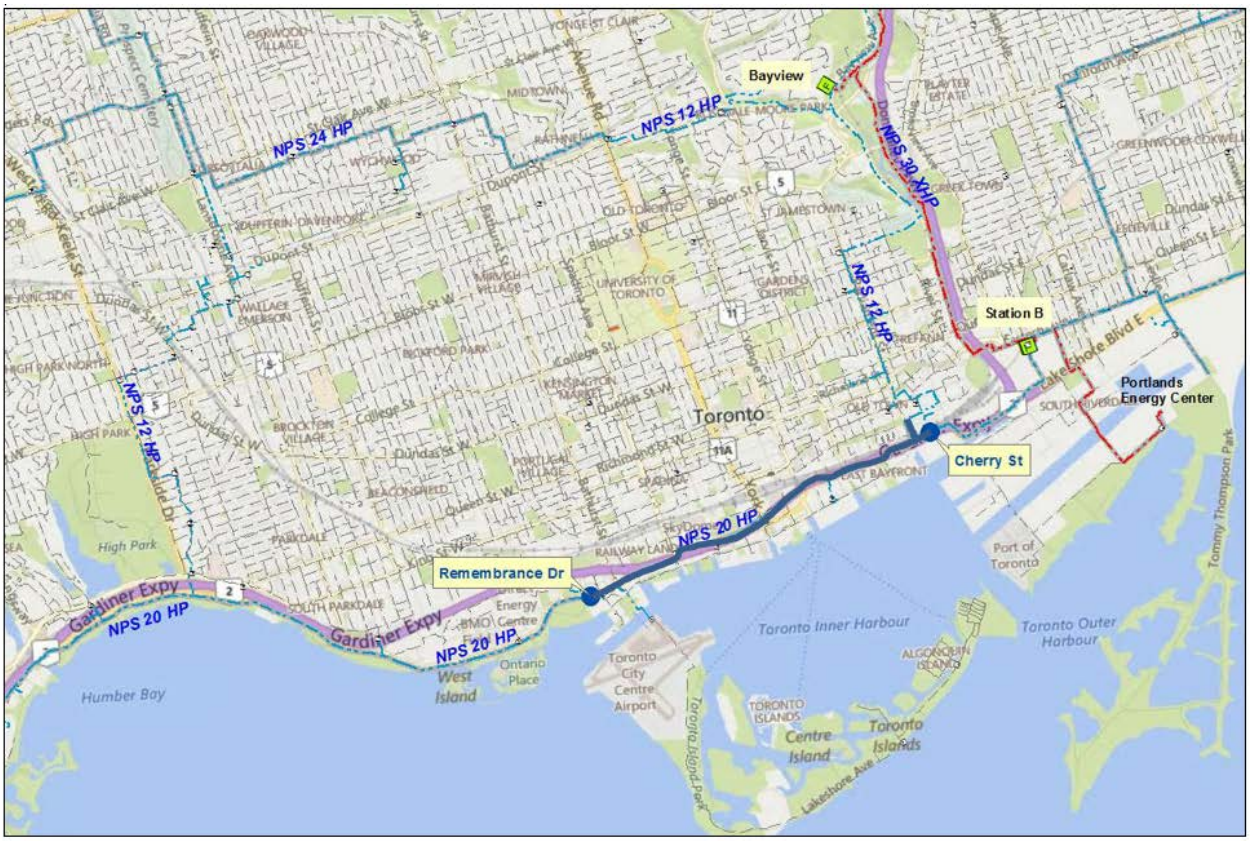
25. As indicated in the AMP, the features described above are all characteristic of vintage steel mains. These features provide an indication of degradation of the pipeline and that the C2B segment is reaching the end of its safe and reliable service life and that a repair approach is not sustainable or cost effective.

Consequences of a Failure

26. The C2B section of the KOL forms a critical section of the HP pipeline grid that provides natural gas supply to downtown Toronto and surrounding area. The area supplied by this section of pipeline is bounded by Dupont Street to the north, the Don Valley Parkway to the east, Keele Street to the west and the Toronto Islands to

the south. Figure 3 shows the location of the C2B section of the KOL and the other major (HP and XHP) pipelines that provide gas supply to downtown Toronto. This section of the KOL forms a critical segment of a HP natural gas pipeline loop which connects multiple feeder stations.

Figure 3: Cherry to Bathurst Section of KOL



27. The area served by the C2B segment of the KOL has the highest density of customers within the Enbridge Gas franchise area and is one of the largest economic centers in Canada. In addition to the residential, commercial, institutional (including hospitals) and government buildings served in this area, there are several large volume customers served by Enbridge Gas. These customers include Redpath

Sugar, the University of Toronto and Enwave Energy Corporation (Enwave). Enwave provides district heating to approximately 180 buildings in downtown Toronto. Many of these indirectly served buildings (i.e. indirectly served by Enbridge Gas through Enwave) include hospitals, commercial office towers and condominiums representing approximately 40 million square feet of real estate within downtown Toronto.

28. Should the C2B segment of the KOL experience a defect or sustain damage Enbridge Gas may need to temporarily reduce operating pressures within the pipeline segment or shut down the line depending on the severity of the defect or damage sustained. Any pipeline defects or failures that could or do release gas into the atmosphere would most likely require a large emergency response and mitigation effort. If this situation were to occur during a period of high demand, for example under design conditions, there may be supply interruptions to many of the customers supplied directly and/or indirectly by the C2B segment of the KOL.

29. Emergency response and mitigation efforts will depend on the magnitude of the defect or damage and the time of year. A significant number of customers may lose gas supply in addition to potential traffic disruptions and potential public evacuations within the impacted area. Multiple visits per customer site to both “make safe” and restore service once the system issue is remediated could be required. It may take many days or even weeks to restore service to the affected customers, once the pipeline issue has been safely addressed.

30. Figure 4 shows the area impacted if the C2B segment of the KOL is isolated due to a damage in a situation where temperature on the day is -23°C or 41 degree days. This scenario corresponds to design day conditions for Toronto. The pipes coloured pink will lose their primary feed for the duration of the incident. Depending on the

incident the duration of the gas supply interruption could be weeks to months. In this situation gas supply to approximately 4,700 customers will be interrupted. Note that this is the number of customers that would be impacted and not the number of gas users. The number of gas users impacted would be significantly greater than the number of customers impacted. Table 5 shows the customers impacted by customer type.

Figure 4: Customer Loss at 41 Degree Days

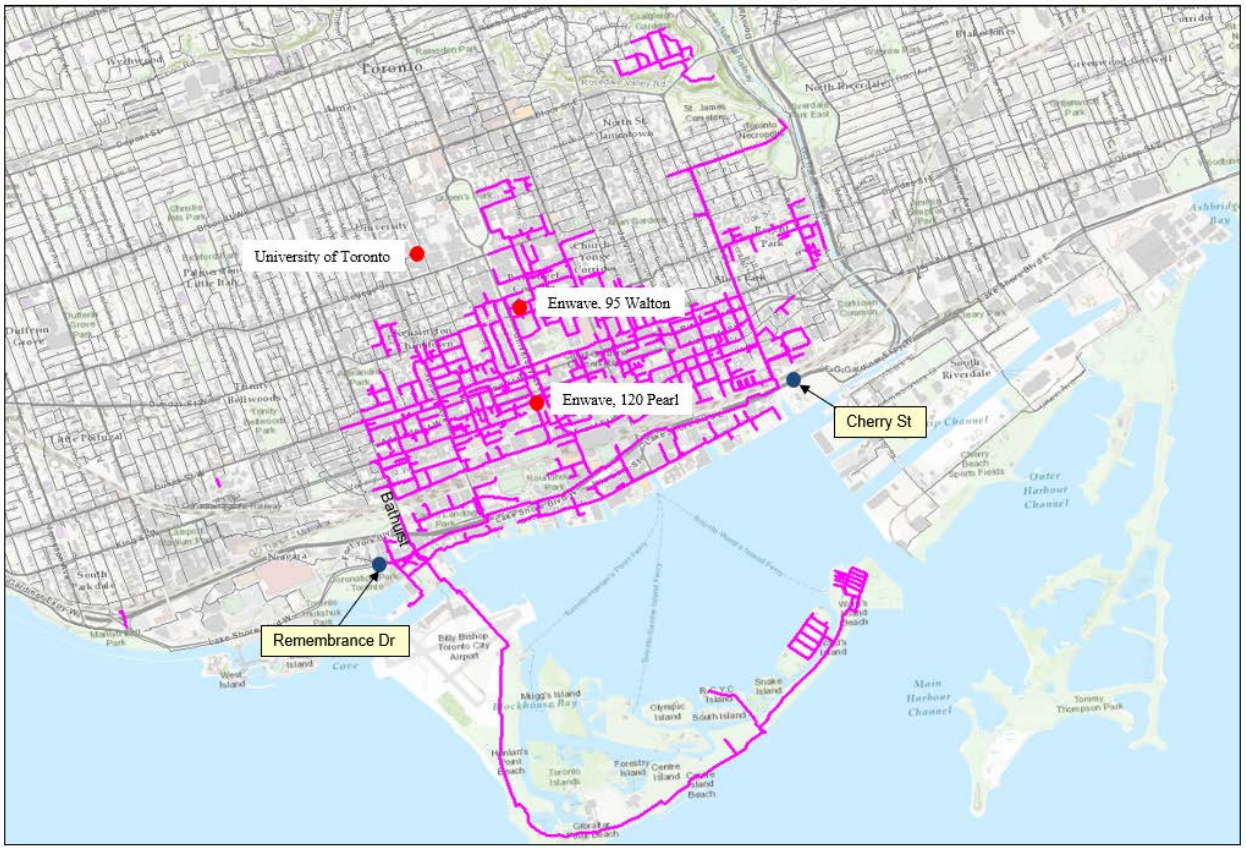


Table 5: Customer Loss at 41 Degree Days by Customer Type

Customer Type	Number of Customers
Residential	2,333
Apartment*	74
Commercial	2,212
Industrial	77
Total	4,696
Mass Market (General Service)	4,247
Large Volume (Contract)	449
Total	4,696

*Apartments/Condominiums can be listed under Commercial as well depending on building use.

31. Figure 5 shows the area impacted if the C2B segment of the KOL is isolated due to a damage in a situation where temperature on the day is -7°C or 25 degree days. This scenario corresponds to a warm day in January[1]. The results of this scenario also correspond to what could occur if the isolation occurs during the summer. This occurs because, unlike the previous scenario, all of the customers in this scenario are within the insolation area. The pipes coloured pink will lose their primary feed for the duration of the incident. Depending on the incident the duration of the gas supply interruption could be weeks to months. In this situation, gas supply to approximately 770 customers will be interrupted. Note that this is the number of customers that would be impacted and not the number of gas users. The number of gas users

[1] -7°C corresponds to the daily minimum temperature in January according to 1980 to 2010 Canadian Climate Normals.

impacted would be significantly greater than the number of customers impacted. Table 6 shows the customers impacted by customer type.

Figure 5: Customer Loss at 25 Degree Days or Less

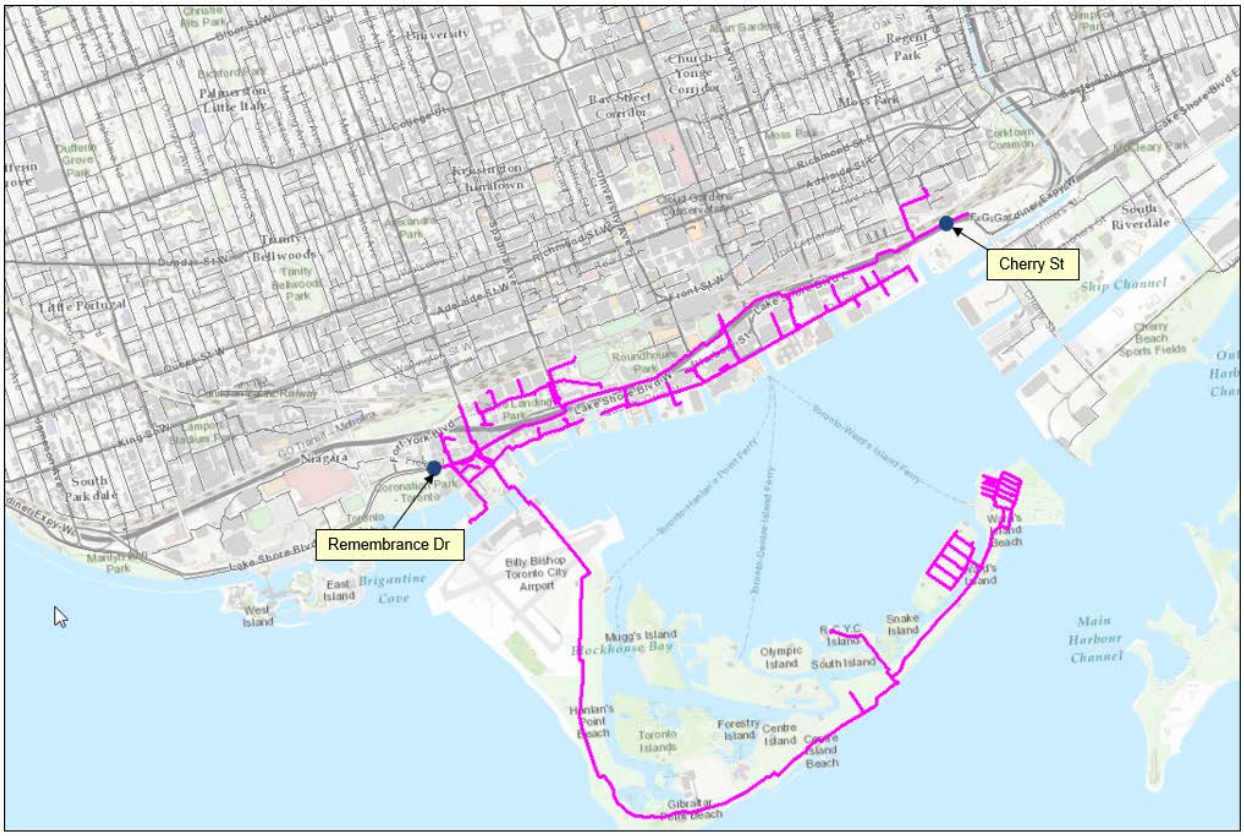


Table 6: Customer Loss at 25 Degree Days or Less by Customer Type

Customer Type	Number of Customers
Residential	578
Apartment*	24
Commercial	161
Industrial	3
Total	766

Mass Market (General Service)	673
Large Volume (Contract)	93
Total	766

*Apartments/Condominiums can be listed under Commercial as well depending on building use.

32. The scenarios presented above are premised on existing customers. As discussed below, Enbridge Gas expects that the downtown core will continue to experience growth over the coming years. Should the C2B segment remain in place in its current condition and be isolated in the future due to a defect or damage, then more customers and gas users could experience a service interruption than those presented in the scenarios above.

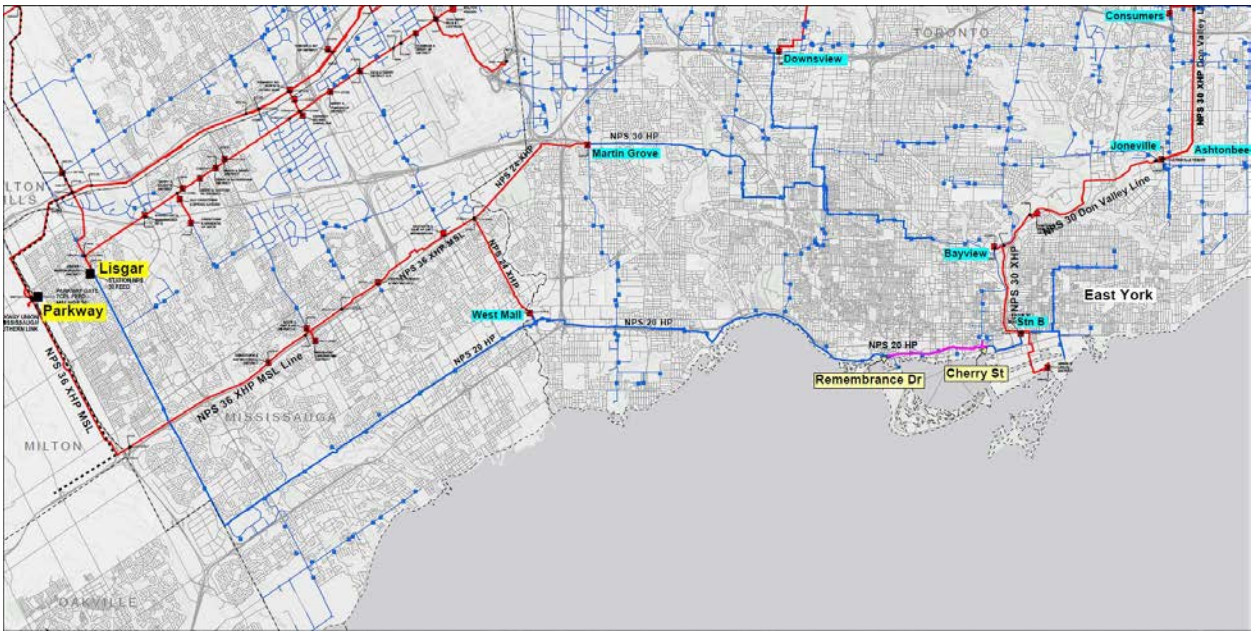
Pipe Size & Integrated Resource Planning

33. Enbridge Gas expects that downtown Toronto will continue to grow over the coming years. While this growth will likely slow due to the impacts of COVID 19, this growth is expected to continue. Figure 6 provides a map showing real estate developments (under construction and proposed) along the C2B segment of the KOL. As is typical of development in a downtown core, most of these developments are high rise mixed use buildings. The data contained in Figure 6 are not complete as these are the developments that Enbridge Gas is currently aware of. In total Enbridge Gas is aware of fifty-five developments in the immediate area of the C2B segment that are either scheduled for occupancy in 2020 or 2021, under construction or in the development process.

Figure 6: Real Estate Developments – Under Construction & Proposed

34. As indicated earlier in this evidence, the C2B segment of the KOL forms an integral part of a HP loop in Toronto which connects multiple feeder stations. The City receives gas supply from multiple sources. The NPS 30 extra high pressure (XHP) Don Valley Line (DV Line) feeds the City from the east, the NPS 36 XHP MSL Line (MSL Line) feeds the City from the west and the NPS 36 XHP Parkway North Line (PN Line) feeds the City from the North. The C2B segment of the KOL forms a critical connection for gas supply from the MSL Line and the DV Line. It also connects two major feeder stations: Station B Feeder Station in the east and the West Mall Feeder Station in the west. Figure 7 shows the location of the C2B segment of the KOL in relation to these major sources of gas supply for Toronto.

Figure 7: Location of KOL and XHP Supply Sources



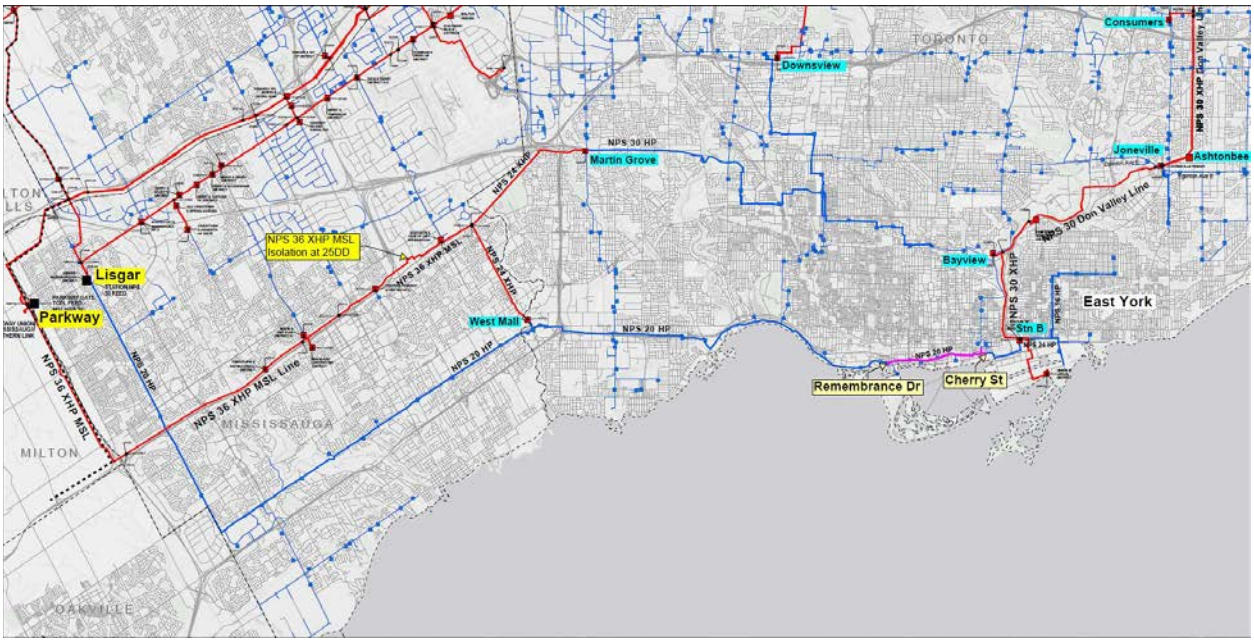
35. Enbridge Gas ran scenarios to determine if the C2B segment could be downsized and therefore lower the overall cost of the Project. Three scenarios were examined. The scenarios were selected as they represent situations where gas supply from a particular source is cut to the KOL. Each scenario examined the performance of the KOL assuming a smaller pipe size, NPS 16, is constructed for the C2B segment, in order to determine if the KOL could maintain gas supply under conditions that the KOL has either experienced in the past or to simulate a major supply disruption. Each scenario did not take into account customer growth.

36. The KOL system is designed such that it maintains a minimum pressure of 100 psig for the inlet pressure for all downstream district stations. These district stations regulate gas from HP to intermediate pressure.

37. The KOL forms a critical connection between gas supplied by the MSL Line and the DV Line. It allows gas to be moved across the southern portion of the City to maintain proper gas supply to customers in the event that supply from one direction is disrupted. Consequently, each of the scenarios examined if pressures can be maintained at or greater than 100 psig on critical points along the KOL. If pressures are not maintained supply interruptions to customers will occur. The three scenarios examined were as follows:

- **No Feed From MSL Line** – In this scenario it is assumed that gas supply from the MSL Line is disrupted due to an isolation near the end of the MSL Line. In this instance gas supply to both the West Mall Feeder Station and the Martin Grove Feeder Station will be disrupted. This scenario is depicted in Figure 8.

Figure 8: No Feed From MSL Line



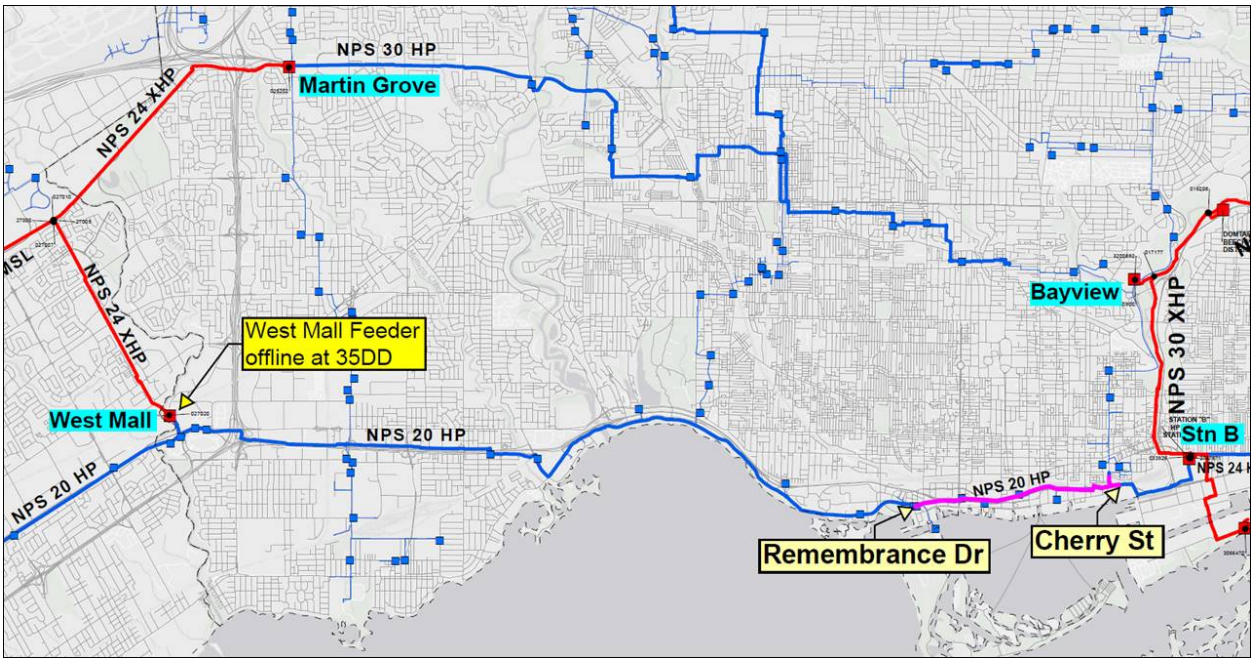
At -7°C or 25 degree days (which corresponds to the temperatures assumed in the customer loss scenario discussed previously in the *Consequences of a Failure* section of this Exhibit) pressures at the West Mall Feeder station drop to below 100 psig if the C2B segment of the KOL is sized to NPS 16. In this scenario, while pressures in downtown Toronto are maintained, it is the pressure in the western segment of the KOL that drops and impacts gas supply to customers west of the downtown core. There are several large customers, including a hospital that would be impacted in this scenario in addition to many other customers. Table 7 provides the results of this scenario.

Table 7: No Feed From MSL Line

	NPS 20 (C2B)	NPS 16 (C2B)
NPS 20 P_{low} at West Mall Tie-In (psig)	100	83
NPS 20 P_{low} in Downtown (psig)	125	100

- **No Feed From West Mall Feeder Station** – In this scenario it is assumed that gas supply from the West Mall Feeder Station is disrupted. This scenario is depicted in Figure 9.

Figure 9: No Feed From West Mall Feeder Station



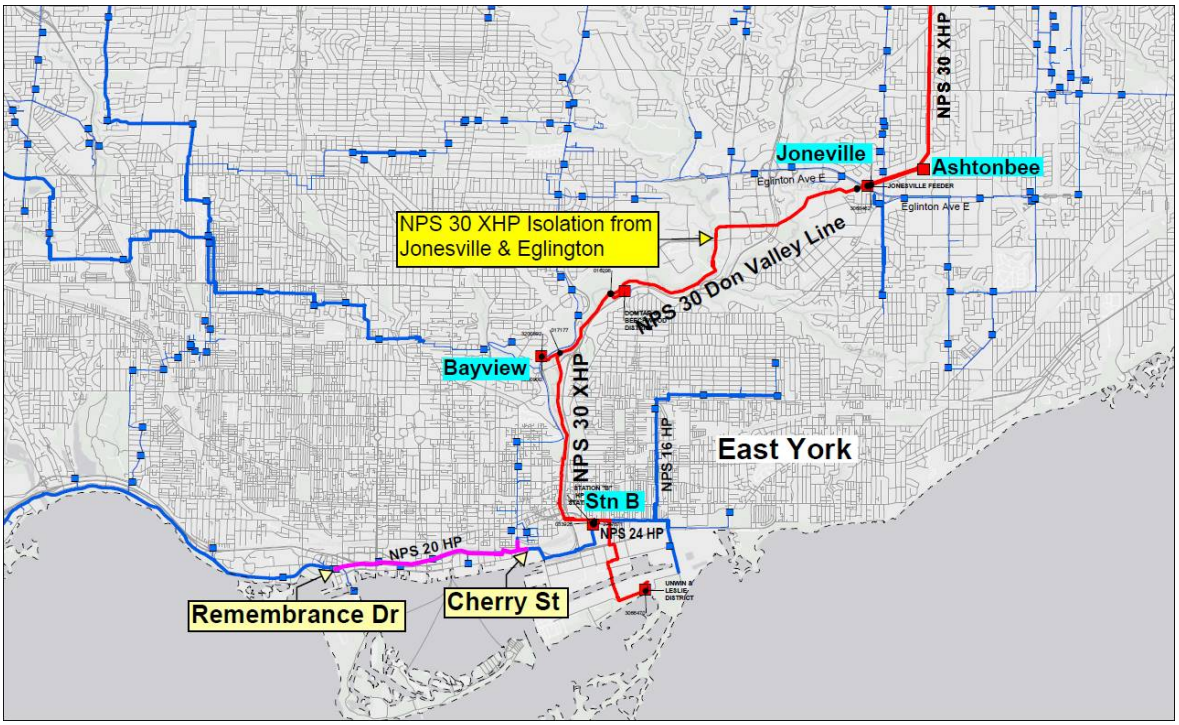
At -17°C or 35 degree days (which corresponds to a cold winter day) pressures at the West Mall Feeder station drop to below 100 psig if the C2B segment of the KOL is sized to NPS 16. In this scenario, while pressures in downtown Toronto are maintained, it is the pressure in the western segment of the KOL that drops and impacts gas supply to customers west of the downtown core. There are several large customers, including a hospital that would be impacted in this scenario in addition to many other customers. Table 8 provides the results of this scenario.

Table 8: No Feed From West Mall Feeder Station

	NPS 20 (C2B)	NPS 16 (C2B)
NPS 20 P_{low} at West Mall Tie-In (psig)	98	80
NPS 20 P_{low} in Downtown (psig)	124	100

- **Isolation of DV Line** – In this scenario it is assumed that the DV line is isolated south of Eglington Avenue and Jonesville Crescent for emergency repair or planned work. This has occurred on three occasions in recent years. In this scenario gas flow through Station B needs to be reversed so that the KOL can continue supplying the one-way fed NPS 24 HP line that provides gas supply to a large portion of East York. Inlet pressures at Station B must be maintained above 90 psig to ensure gas supply to customers in East York. This scenario is depicted in Figure 10.

Figure 10: Isolation of DV Line



The DV Line is the only supply source for Portlands Energy Centre. This scenario assumes that the DV line is isolated in April or October to correspond to PEC planned maintenance shutdowns. 0°C or 18 degree days was the assumed temperature for this scenario as it corresponds to temperatures typically seen in during April and October. In this scenario if the C2B segment of the KOL is sized at NPS 16, pressures at Station B fall below 90 psig to 78 psig. This will impact supply to seven downstream district stations that provide gas supply to approximately 50,000 customers, including hospitals and industrial customers in East York. Table 9 provides the results of this scenario.

Table 9: Isolation of DV Line

	NPS 20 (C2B)	NPS 16 (C2B)
NPS 20 P_{low} at Station B	94	78

38. Enbridge Gas recognizes that there are other scenarios that could occur throughout the year for various reasons. However, the scenarios presented above, in particular the very real scenario of a DV Line isolation, indicate that downsizing the C2B segment of the KOL is not a viable option.

39. In addition, it is common practice to allow for the ability to ILI a pipeline in its entirety. Reducing the size of the C2B segment will preclude Enbridge Gas from being able to ILI the Lisgar to Station B portion of the KOL in its entirety.

40. Enbridge Gas is in the midst of a proceeding (EB-2020-0091) with respect to Integrated Resource Planning (IRP). The Company expects to receive guidance from the Board about the nature, timing and content of IRP considerations for future identified needs. Until such time that a more comprehensive IRP Framework is in place, Enbridge Gas has used a high level screening process and determined that in-depth IRP analysis is not warranted for this Project. The Project is driven by integrity issues and is a like-for-like replacement of only part of a major pipeline (KOL) that serves much of Downtown Toronto and surrounding area. IRP is not considered a viable option to support downsizing or delaying the Project.

Options Considered

41. Enbridge Gas considered two options for the Project. The first option was to repair issues at localized areas via integrity digs on the C2B segment of the KOL rather than replacing this segment (Repair Option). The second option was to replace the

C2B segment of the KOL (the Project). Table 10 provides a summary comparison of the advantages and disadvantages of these two options.

Table 10: Comparison of Integrity Dig Option & Replacement Option

	Repair Option	Project
Advantages	Capital expenditures can be spread out over multiple years.	New asset will be constructed using modern standards, materials, training etc..
		Addresses the entire segment of the pipeline, improving the life of the entire segment, not just the localized sections repaired.
		Reduces operations and maintenance costs.
		Reduces probability of pipeline failure.
		Installing a new segment per current standards will allow for additional protection against and mitigation of third party damages.
Disadvantages	Multiple integrity digs within the next 40 years (see Condition of C2B Segment narrative above). More integrity digs than indicated may be required over the next 40 years and even more thereafter.	Large capital investment upfront.
	Impact to the public and reputational damage to Enbridge Gas as all recommended integrity digs are completed. On average there will be an integrity dig every 26m, requiring Enbridge Gas crews to return multiple times to similar locations	Public inconvenience for a period of time while replacement occurs (see Exhibit D, Tab 1, Schedule 1 for Project schedule).

	over the next 40 years. Extended beyond 40 years the impact is prolonged. This will negatively impact traffic, local businesses and residents and will reduce public confidence in the safety and reliability of Enbridge Gas's distribution network in the most densely populated location of the franchise area.	
	Extensive development is expected in the area. Coordination of multiple construction zones over multiple years may not the practical.	
	Existing depth of cover issues will remain.	
	Increased operations and maintenance costs as frequent ILIs are required as the pipeline ages.	
	Increase security of supply risk. If an issue occurs pipeline operating pressures may have to be reduced or the pipeline may have to be shut down (see Consequences of a Failure Section above).	
	Vintage 1970s pipe remains in place and will continue to degrade.	
	Many fittings along the C2B segment are inaccessible due to development around and above the pipeline.	

42. Based on the condition of the KOL as assessed through the DIMP, AMP and ILI processes, as well as the qualitative analysis comparing the advantages and disadvantages of each option, Enbridge Gas determined that the Project (i.e. replacement of the C2B segment) is the preferred option over the Repair Option.

43. To analyze and support the decision to proceed with the Project, Enbridge Gas has conducted analyses of the cost of the two options.

44. The analysis set out below assumes a 40 year time horizon as this approximately corresponds to the depreciable life of the Project. The costs related to the two options were then discounted using the methods prescribed in EBO 188 to arrive at a net present value for each.

45. For the Repair Option analysis, Enbridge Gas assumed that 171 integrity digs would have to be conducted over the next 40 years. The integrity digs were assumed to be either repairs or replacements. Costs for the repairs were based on actual costs for the integrity digs completed on the C2B segment in 2017. Costs for the replacements were based on costs for integrity digs involving repairs adjusted for the additional facilities that would need to be constructed for replacing a segment of pipeline. These estimates are conservative as they to not take into account specific locations for where a replacement integrity dig may have to occur. Costs for each of these types of integrity digs were then escalated of the 40 year time horizon. Also included in the Repair Option analysis were costs related to continued ILIs over the 40 year time horizon. These costs were also escalated over the 40 year time horizon.

46. Table 11 provides a summary of the results of the cost comparison analysis. The total cost of the Project is much lower than the cost of the Repair Option. While the

net present value of the Repair Option is modestly lower than that of the Project, the cost of the Repair Option is a conservative estimate. It does not take into account any of the secondary impacts identified in Table 10 above such as economic impacts to residents and local businesses. Also it does not take into account the scenario where a larger replacement in the future would be required as part of the Repair Option.

Table11: Comparison of Repair Option & Project Costs

($ millions)	**Repair Issues at Localized Areas as They Occur**	**Replace 4.5km Segment of KOL Line**
Total Cost	$262	$107
Net Present Value	($74)	($84)

Proposed Facilities

47. The facilities for the Project will require the construction of approximately 4.3 km of NPS 20 HP ST natural gas pipeline. The Project commences at the intersection of Cherry Street and Lake Shore Boulevard where it will tie-in to an existing natural gas pipeline. From there it travels west along Lake Shore Boulevard to Remembrance Drive (west of Bathurst Street) where it will tie-in to an existing natural gas pipeline. The Project also requires the construction of a tie-in lateral (the North Tie-In Lateral) which commences at the intersection of Mill Street and Parliament Street. At that intersection the North Tie-in Lateral will tie-in to an existing natural gas pipeline. From there the North Tie-in Lateral travels approximately 230 m south along Parliament Street to Lake Shore Boulevard where it will tie-in to the facilities to be constructed along Lake Shore Boulevard. /U /U /U

48. Given the location of the Project and that there are several upcoming developments in the City of Toronto by third parties, consultation became an important part in identifying and selecting route alternatives. Enbridge Gas conducted an extensive routing study to determine the preferred route (PR) for the Project. Details of this routing study and the consultation that lead to the selection of the PR for the Project can be found in Exhibit C, Tab 1, Schedule 1.

Timing

49. With leave of the Board, Enbridge Gas expects to commence construction of the Project in Q2 of 2021. In order to meet Project timelines, Enbridge Gas respectfully requests the approval of this Application as soon as possible and not later than February 2021. /U

Conclusion

50. The Project will allow Enbridge Gas to continue to provide natural gas to customers in the City of Toronto in a safe and reliable manner by replacing a segment of an existing pipeline with known integrity issues. /U