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VIA Email and RESS

June 26, 2020

Ms. Christine Long
Board Secretary
Ontario Energy Board
2300 Yonge Street, Suite 2700
Toronto, Ontario, M4P 1E4

Dear Ms. Long:

**Re: Enbridge Gas Inc. ("Enbridge Gas")
Ontario Energy Board ("Board") File No.: EB-2018-0096
Liberty Village Pipeline Project – Leave to Construct - Post - Construction Final
Monitoring Report**

On September 27, 2018, the Board, in its Decision and Order for the above noted proceeding, granted Enbridge Gas leave to construct pipeline facilities to meet current and future natural gas demand in the Liberty Village neighbourhood of the City of Toronto.

Pursuant to Conditions 5 and 6. b) of the Conditions of Approval in the aforementioned Decision and Order, Enbridge Gas is to provide the Board with a Post Construction Financial report and Final Monitoring report within 15 months after the in-service date. Please find enclosed a copy of the Post Construction Financial and Final Monitoring Reports ("Final Report") for the Liberty Village Pipeline Project.

Please contact me if you have any questions.

Yours truly,

Alison Evans
Advisor, Regulatory Application

Liberty Village Pipeline Project: Post-Construction Final Monitoring Report

Company: Enbridge Gas Inc.



Table of Contents

Introduction	4
Project Description	5
Construction Effects and Mitigation Measures.....	6
Construction within Species at Risk Habitat.....	6
Contaminated Soils Management.....	6
Spills.....	7
Disruption to Residents.....	7
Traffic Disruption	7
Post Construction Site Conditions.....	8
First Nations Consultation	10
Landowner Comments and Complaints	10
Summary.....	10
Appendix A	11
EXECUTIVE CERTIFICATIONS.....	11
Appendix B	13
LOCATION MAP	13
Appendix C	16
PHOTO LOG.....	16
Appendix D	22
COMPLAINTS LOG.....	22

Introduction

On September 27, 2018 the Ontario Energy Board (“OEB”), under the Decision and Order for EB-2018-0096, granted Enbridge Gas Inc. (then Enbridge Gas Distribution Inc.) (“Enbridge Gas”) leave to construct pipeline facilities to meet current and future natural gas demand in the Liberty Village neighbourhood of the City of Toronto. This project is referred to as the Liberty Village Pipeline Project (“The Project”).

This is the Post-Construction Final Monitoring Report (“Final Report”) for the Project.

As part of the Project, Enbridge Gas conducted the following studies to inform the design, planning and permitting process, identify environmental and socio-economic impacts potentially resulting from construction, and minimize and mitigate impacts through the application of documented mitigation measures:

<u>Report Title</u>	<u>Conducted by:</u>	<u>Date</u>
Stage 1 Archaeological Assessment Liberty Village Pipeline Project Ordinance Reserve	Archaeological Services Inc.	March 9, 2018
Proposed Liberty Village Pipeline Project - Environmental Report	GHD Inc.	April 4, 2018
Proposed Liberty Village Pipeline Project – Amended Environmental Report	GHD Inc.	June 20, 2018
Suspect Soil Management Plan Liberty Village Reinforcement Pipeline, Toronto, Ontario	Dillon Consulting Limited	December 14, 2018

Construction on the Project began on October 15, 2018 and substantial completion was achieved on March 22, 2019. The pipeline was energized and in-service on March 28, 2019. Enbridge Gas filed, in accordance with the Conditions of Approval (“COA”) for the project, notifications of these Project milestones with the OEB.¹

This Final Report was prepared to satisfy the Conditions of Approval (“COA”) set out in Decision and Order for EB-2019-0096, as follows:

6 a) Enbridge shall monitor the impacts of construction and shall file with the Board one paper copy and one electronic (searchable PDF) version of a post construction report, within three months of the in-service date, which shall:

- i) Provide certification, by a senior executive of the company, of Enbridge’s 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;*

¹ Please refer to the letters dated October 1, 2018, March 18, 2019 and March 29, 2019.

- iv) *Include a log of all complaints received by Enbridge, 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; and*
 - v) *Provide a certification, by a senior executive of the company, that the company has obtained all other approvals, permits, licenses, 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 a certification, by a senior executive of the company, of Enbridge's adherence to Condition 3;*
 - ii) *describe the condition of any rehabilitated land;*
 - iii) *describe the effectiveness of any 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; and*
 - v) *include a log of all complaints received by Enbridge, 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.*

Pursuant to COA 6. a) of the EB-2018-0096 Decision and Order, Enbridge prepared an Post-Construction Interim Monitoring Report (“Interim Report”) and filed it with the Board on July 5, 2019. The Interim Report detailed the effectiveness of actions taken that prevented or mitigated identified impacts of construction. The purpose of the immediate report is to provide an update on the final, post-construction, environmental condition of the project site, including outstanding items that were identified in the Interim Report, such as disturbed or impacted areas related to project construction activities. Enbridge has revisited these areas to ensure they are rehabilitated, and where necessary, identified corrective actions to achieve final restoration. Enbridge does not foresee any future issues resulting from past construction work on this project.

The Certification required pursuant to COA 6 b) i. can be found in Appendix A.

Project Description

The Liberty Village Project included three segments of natural gas pipeline totaling approximately 1.2 km. The first segment is approximately 900 m of nominal pipe size (“NPS”) 8 inch intermediate pressure steel pipe that will serve to reinforce the existing natural gas distribution system. The second segment is approximately 200 m of NPS 6 inch intermediate pressure plastic pipe. The third segment is approximately 85 m of NPS 4 inch intermediate pressure plastic pipe. The latter two segments are main extensions that will provide natural gas service to a number of new condominiums and mixed use towers (refer to Appendix B - Figure 1 for Final Pipeline Location Figure).

Construction Effects and Mitigation Measures

All construction and rehabilitation activities comply with the COAs set out in the OEB Decision and Order for EB-2018-0096, including ensuring that the requirements of all approvals, permits, licenses and certificates are fully addressed. In addition, the Project activities were conducted in accordance with Enbridge Gas' Construction Policies and Procedures and the environmental effects monitoring outlined in Section 5.0 of the Proposed Liberty Village Pipeline Project– Amended Environmental Report (ER). The ER evaluated potential impacts and concerns and proposed mitigation measures to reduce and/or eliminate them.

Many of the potential environmental effects identified in the ER were avoided by locating the pipeline within existing road allowance and previously-disturbed utility corridors. Inspectors monitored construction for potential environmental concerns, provided guidance on environmental protection, as required, and contributed to successful Project completion.

During construction activities, no impacts/concerns were identified.

CONSTRUCTION WITHIN SPECIES AT RISK HABITAT

As part of the environmental assessment process, GHD confirmed with Ministry of Natural Resources and Forestry (“MNRF”), the applicable regulatory authority at the time of construction, that there were no known species at risk (“SAR”) in the vicinity of the project area.

CONTAMINATED SOILS MANAGEMENT

Dillon Consulting Limited (“Dillon”) was retained by Enbridge Gas to develop a Soil Management Plan (“SMP”) in advance of the installation of Section 1 of the Project. The route for Section 1 of the Project is as follows:

- West on King Street West from Jefferson Avenue to Atlantic Avenue;
- South on Atlantic Avenue from King Street West to Snooker Street;
- East on Snooker Street;
- South on Hanna Avenue from Snooker Street to East Liberty Street; and
- East on East Liberty Street from Hanna Avenue to Pirandello Street.

To characterize the environmental quality of soil in this area, Dillon reviewed available environmental documents and conducted a subsurface soil investigation on October 29 and 30, 2018. Soil samples were collected and submitted for analysis of metals, petroleum hydrocarbon compounds (“PHCs”), benzene/toluene/ethylbenzene/xylenes (“BTEX”), volatile organic compounds (“VOCs”) and polycyclic aromatic hydrocarbons (“PAHs”). Soil analytical results were compared to the Ministry of the Environment, Conservation and Parks (“MECP”) Table 3, Generic Site Condition Standards in a Non-Potable Ground Water Condition (“Table 3 SCS”) under Ontario Regulation (O. Reg.) 153/04.

The complete list of contaminants whose concentrations exceeded MECP Table 3 SCS are:

- Zinc;
- PAH Benzo(b)fluoranthene; and

- PAH Benzo(a)pyrene.

The identified contaminants are not considered volatile and; therefore, do not pose an inhalation hazard. The primary exposure risk is through direct/dermal contact. Dillon provided recommendations for health and safety precautions to protect construction workers during the project.

Analysis for waste characterization under O. Reg. 347 was also conducted. This analysis verified that the soil could be disposed of as solid non-hazardous waste at a MECP licensed facility. Based on the results of analysis, Dillon recommended that soil within the following project areas be managed off-site as waste:

- King Street West;
- On Hanna Avenue between Snooker Street to north of East Liberty Street; and
- From eastern portion of East Liberty Street to Pirandello Street (please refer to Appendix B - Figure 2 for Soil Management Plan Figure).

From November 19, 2018 to March 2019, contaminated soil was removed from identified areas and disposed at MECP approved receiving sites.

SPILLS

No spills were reported during construction activities.

DISRUPTION TO RESIDENTS

Prior to construction, communication with residents and businesses along the construction route was established, and every reasonable effort was made to address concerns and maintain good relationships with landowners. Enbridge Gas ensured that construction noise levels met the minimum applicable performance standards, and that work was limited to daytime hours (in compliance with noise bylaws).

TRAFFIC DISRUPTION

The Project was constructed and located within municipal road allowances. As a result, pedestrian and vehicular traffic flow along the roadways and sidewalks was modified during construction. In addition to communicating with residents and businesses along the construction route, Enbridge Gas retained OTS (an experienced traffic control contractor) and paid duty police officers, as required, to coordinate and conduct traffic control along all affected roadways and sidewalks. Traffic control measures included applying traffic restrictions (timing of lane closures and truck traffic) and installing appropriate signage along the affected route.

A field safety presentation was conducted for all on-site personnel on December 11, 2018 to maintain heightened vigilance around pedestrian safety.

Additional measures, including movement of equipment and material to compounds off of East Liberty Street was required to ensure pedestrian safety during from March 18 to 22, 2019 in order to accommodate City of Toronto events occurring in the immediate vicinity.

POST CONSTRUCTION SITE CONDITIONS

Restoration along the pipeline corridor included reinstatement of asphalt road surfaces and concrete and brick sidewalks and was conducted on an ongoing basis, with restoration beginning in areas where construction was complete. These areas were monitored during site inspections to ensure appropriate restoration measures were completed and to monitor the success of restoration.

The table below shows current conditions along the pipeline route. The area has been restored to pre-construction conditions and no further actions are required.. Refer to Appendix C for the for the photo log.

PHOTO #	LOCATION	CURRENT CONDITION	ACTION
Photo 1	Tie-in at King St W/west of Jefferson Ave (looking west)	Complete. Curb restored to pre-construction condition.	None required.
Photo 2	King St W/Jefferson Ave intersection (looking south)	Complete. Curb restored to pre-construction condition.	None required.
Photo 3	Atlantic Ave/Snooker St intersection (looking east).	Complete. Roadway restored to pre-construction condition.	None required.
Photo 4	Hanna Ave (looking north)	Complete. Roadway and curb/pavers restored to pre-construction condition.	None required.
Photo 5	Hanna Ave/East Liberty St intersection (looking north)	Complete. Roadway and curb/pavers restored to pre-construction condition.	None required.
Photo 6	Hanna Ave/East Liberty St intersection (looking south)	Complete. Roadway and curb/pavers restored to pre-construction condition.	None required.
Photo 7	East Liberty St (looking east)	Complete. Roadway and curb restored to pre-construction condition.	None required.
Photo 8	East Liberty St/Western Battery Rd intersection (looking north)	Complete. Roadway and curb restored to pre-construction condition.	None required.

PHOTO #	LOCATION	CURRENT CONDITION	ACTION
Photo 9	East Liberty St/Strachan Ave intersection (looking east)	Complete. Roadway restored to pre-construction condition.	None required.
Photo 10	Ordnance St (looking east)	Temporary restoration has been completed. The developers of 11/25 and 30/50 Ordnance St will be completing the final restoration once the condominiums are built as the grade is changing significantly on Ordnance St.	None required.

FIRST NATIONS CONSULTATION

As documented in the ER prepared by GHD, it was confirmed with Ministry of Energy, Northern Development and Mines (“MOENDM”) that the Project would not result in any appreciable adverse impacts to the asserted or established rights of any First Nation or Métis communities. As such, no duty to consult was required for the Project.

Landowner Comments and Complaints

There are no further unresolved landowner comments or complaints associated with the construction of the Project at the time of completion of this Final Report. A Complaints Log for the Project can be found in Appendix D.

Summary

This Final Report has been prepared in accordance with the OEB Decision and Order for EB-2018-0096. It documents the post-construction and restoration activities completed as part of the construction of the Project from late 2018 to early 2020. Measures implemented during construction and site restoration activities have been successful and there are no further actions required.

Appendix A

EXECUTIVE CERTIFICATIONS



Liberty Village Pipeline Project

EB-2018-0096

Decision and Order

September 27, 2018

I hereby certify that Enbridge Gas Inc. ("Enbridge") has complied with the Decision and Order, Schedule B, EB-2018-0226, Section 6 (b) i.

June 16, 2020

Date

Neil MacNeil

Senior Executive

Condition 6 (b) i.

6. Both during and after construction, Enbridge shall monitor the impacts of construction, and shall file with the OEB one paper copy and one electronic copy (searchable PDF) version of each of the following reports:
 - 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 a certification, by a senior executive of the company, of Enbridge's adherence to Condition 3.

Condition 3

Enbridge shall implement all the recommendations of the Environmental Report filed in the proceeding, and all the recommendations and directives identified by the Ontario Pipeline Coordinating Committee review.

Appendix B

LOCATION MAP

Figure 1: Final Pipeline Location Figure

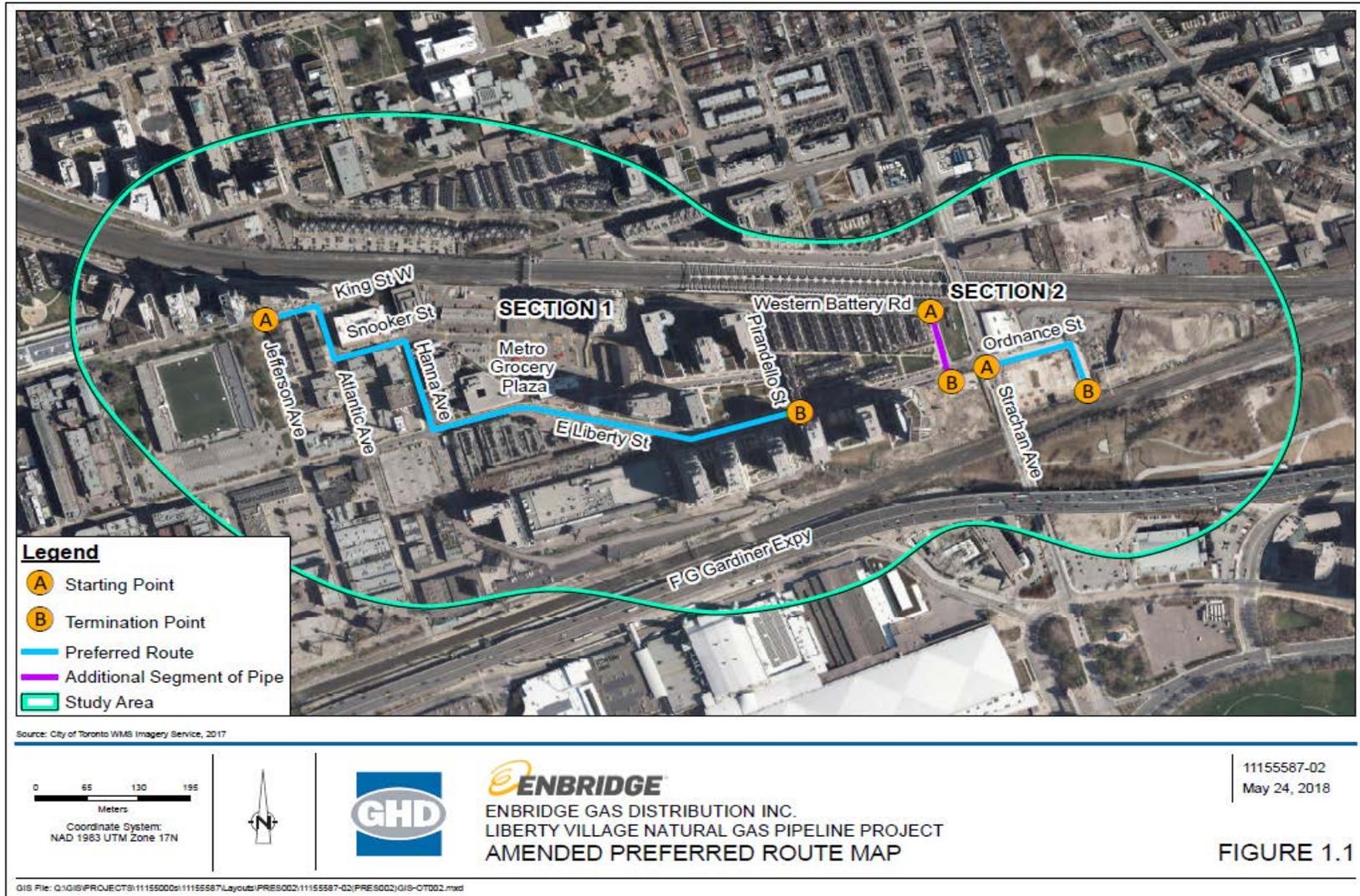
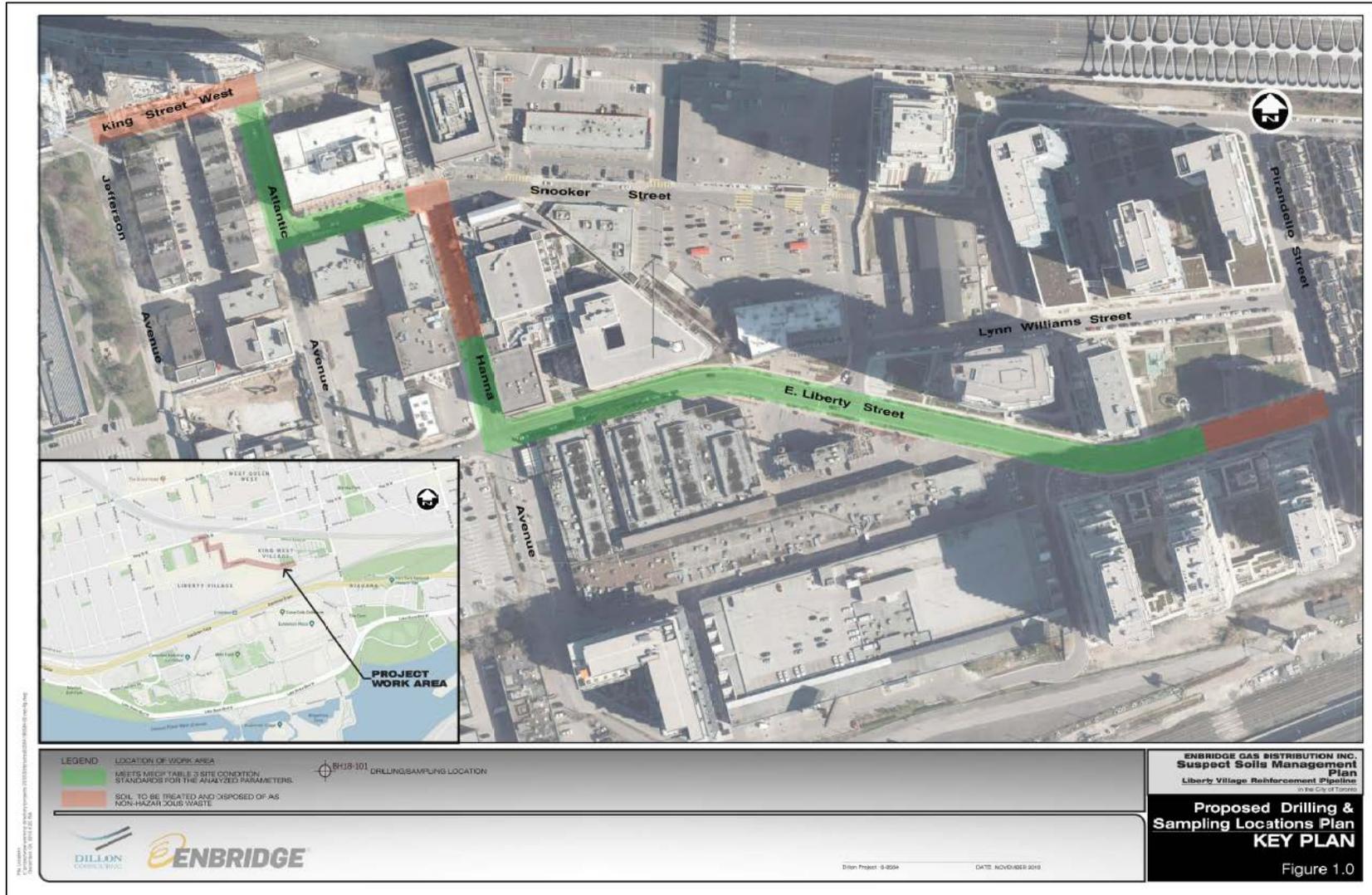


Figure 2: Soil Management Plan Figure



Appendix C

PHOTO LOG



Photo 1: Tie-in at King St W/west of Jefferson Ave (looking west)



Photo 2: King St W/Jefferson Ave intersection (looking south)



Photo 3: Atlantic Ave/Snooker St intersection (looking east)



Photo 4: Hanna Ave (looking north)



Photo 5: Hanna Ave/East Liberty St intersection (looking north)

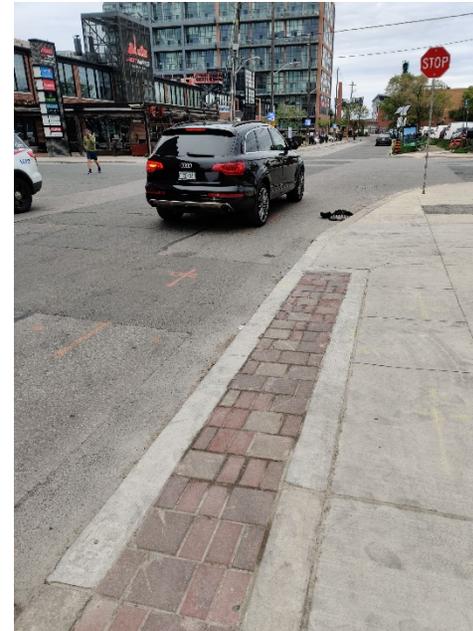


Photo 6: Hanna Ave/East Liberty St intersection (looking south)



Photo 7: South side of East Liberty St (looking east)

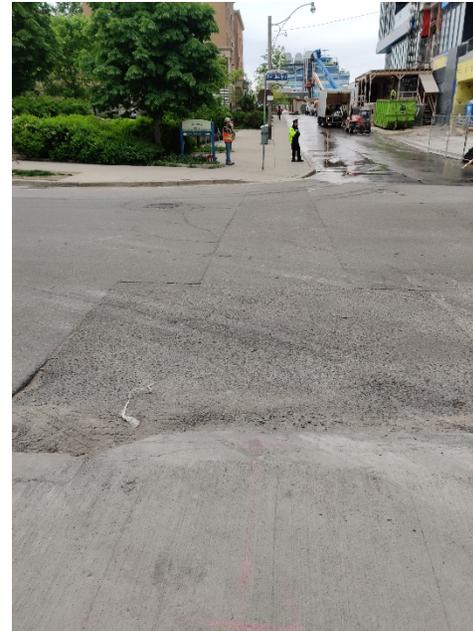


Photo 8: E Liberty St/Western Battery Rd intersection (looking north)



Photo 9: East Liberty St/Strachan Ave intersection (looking east)



Photo 10: Ordnance St (looking east)

Appendix D

COMPLAINTS LOG

Date Received	Contact Name	Landowner Type	Comment	Resolution
15-Oct-18	Trevor Young	Construction	15-Oct-18 - EllisDon concerned with construction overlap as multiple projects going on in a very congested area.	15-Oct-18 - Site meeting arranged with Ellis Don. Topics discussed included traffic, parking, and weather on Ordnance St. to ensure construction activities could continue without significant delays and ensure worker safety.
17-Oct-18	Did not provide	Residential Tenant	17-Oct-18 - Resident observed saw cutting on work by NPL on Western Battery Rd. and complained about the noise from the saw and overall construction in the area.	17-Oct-18 - Work has been completed on Western Battery Rd.
23-Oct-18	Did not provide	Customer	23-Oct-18 - Customer trying to leave parking garage was delayed as a result of overall congestion in the area. When traffic cleared the customer sped away.	23-Oct-18 - Work has been completed on Western Battery Rd. without any further complaints
25-Oct-18	City Councilor's Office	Municipal	25-Oct-18 - Residents in the Condos in front of Lynn Williams were concerned 20-30 meters of parking space was taken when NPL (contractor) set up their temporary working space. Residents indicated to councilor's office that residents have permit parking and were not given notification.	4-Nov-18 – Enbridge Gas issued notifications to residents during the week of November 4, 2018.
5-Nov-18	Trevor Young	Construction	5-Nov-18 - Too many NPL trucks parked on Ordnance St.	5-Nov-18 - Unnecessary vehicles moved from Ordnance St.
5-Nov-18	Leona Knap	Commercial Tenant	5-Nov-18 - Owner of the Mad Batter Bakers, upset about the temporary working compound set up on Jefferson Ave on the east side as it was occupying parking spaces and blocking store front.	6-Nov-18 - Construction compound was moved to the west side on Jefferson after a meeting with the City Zone Coordinator. Follow up with owner indicated satisfaction with resolution.

Date Received	Contact Name	Landowner Type	Comment	Resolution
7-Nov-18	Sharon Waylitt	Residential Tenant	7-Nov-18 - Resident complained that a truck and backhoe parked half on the road and half on the sidewalk and running in front of the Liberty Powers Presentation Center.	8-Nov-18 - Inspector followed up with NPL Supervisor and assured resident that this will not occur again.
9-Nov-18	Leona Knap	Commercial Tenant	9-Nov-18 - Owner of the Mad Batter Bakers complained about NPL closing down Jefferson St. temporarily and asked how long closure will last; suggested if this remains closed it will begin to affect the other local businesses.	16-Nov-18 - Inspector informed owner that the closure would only last one week and Jefferson St. would be back open to the public as of Friday Nov 16, 2018.
20-Nov-18	Police Officer	Police Services	20-Nov-18 - Police Office was stopped at Strachan Ave. and Ordnance St. while Enbridge Gas and NPL were conducting tie-in work. Advised that project must have a paid duty office on site. NPL advised that Paid Duty officers were ordered but officers were not fulfilling request.	20-Nov-18 – NPL/Enbridge Gas Inc. will make every effort to order Paid Duty officers. In the absence of a paid duty officer, NPL/Enbridge Gas will use a combination of third-party traffic control specialists and resources on site.
30-Nov-18	Ryan Lambie	Construction	30-Nov-18 - Noisy road plates when vehicles driving over.	1-Dec-18 - Notified construction team to put down additional asphalt to soften the sound when vehicles drive over.
30-Nov-18	Uber Driver	Commercial	30-Nov-18 - Uber driver stopped in work zone to drop off passengers. Construction team advised driver not to be in work area, as the Uber driver could have hit someone or caused an accident. Driver began to yell and scream at the workers.	30-Nov-18 - Construction team took pictures and a report of incident. No complaints were received from Uber or from the Uber driver and no subsequent developments have occurred related to the incident.
1-Dec-18		Residential Tenant	1-Dec-18 - Resident complained of smell of gas in	3-Dec-18 - Enbridge Gas attended the site and

Date Received	Contact Name	Landowner Type	Comment	Resolution
	Did not provide		building at 80 Western Battery Rd.	confirmed area was clear of gas.
6-Dec-18		Construction	6-Dec-18 - OTS traffic control person smoking on-site while doing traffic control on East Liberty St. at Pirandello St.	6-Dec-18 - Construction lead spoke with the traffic control person and advised smoking is not permitted while working on the site.
11-Dec-18	Craig Gagliano	Residential Tenant	11-Dec-18 - Resident complaint regarding the traffic control on Hanna Ave and lack of notification.	11-Dec-18 - Construction team confirmed that notices went out to all residents within a geographical area which included 43 Hanna Ave. Further confirmed by Canada Post.
9-Jan-19		Construction	9-Jan-19 - Backhoe initiated work at 6:45 am; by-law states that equipment cannot start up until 7:00 am.	9-Jan-19 - Inspector reminded NPL crews not to start equipment until 7:00 am.
24-Jan-19	Sharon Waylitt	Residential Tenant	24-Jan-19 - NPL crews left coal ash debris in front of Lynn Williams St. sidewalk.	24-Jan-19 - Inspector had the debris removed from area.
4-Feb-19	Yasser	Municipal	4-Feb-19 - City Inspector came to site to ensure road plates are secure and there were no tripping hazards.	4-Feb-19 - NPL complied and checked to ensure all items were secure.
28-Feb-19	Sharon Waylitt	Residential Tenant	28-Feb-19 - NPL compound on Lynn Williams St. was identified excessive snow and debris in area.	28-Feb-19 - NPL promptly cleaned up snow and debris around compound.
6-Mar-19	Did not provide	Commercial Tenant	6-Mar-19 - Manager of Local restaurant indicated to Inspector that construction sidewalk removal was loud.	6-Mar-19 - Inspector spoke with manager and manager satisfied with discussion.
6-Mar-19	Residents driving by	Municipal	6-Mar-19 - City called Enbridge Gas regarding road closure of Hanna Ave. and East Liberty St.; indicated that road must be open on Hanna Ave. north of East Liberty St.	6-Mar-19 - This was addressed and road was opened back up.

Date Received	Contact Name	Landowner Type	Comment	Resolution
12-Mar-19	Syed	Commercial Tenant	12-Mar-19 - Hero Burger Owner concerned due to entrance blocked off by NPL during pipeline installation.	12-Mar-19 - Inspector reassured owner that work was short term and confirmed the Hero Burger had a second entrance for access during installation.
14-Mar-19	Syed	Commercial Tenant	14-Mar-19 - Bevcon (contractor) blocking Hero Burger entrance and owner claimed loss of business.	14-Mar-19 - Inspector reassured owner that work was short term and confirmed the Hero Burger had a second entrance for access during installation.

Liberty Village Reinforcement Project

EB-2018-0096

Post-Construction Financial Report on Costs and Variances

June 24, 2020

Introduction

Enbridge Gas Distribution Inc. (“Enbridge”) filed an application with the Ontario Energy Board (the “Board”) on April 9, 2018, under section 90 of the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, Schedule B for an order granting Leave to Construct of approximately 1.2 kilometers of natural gas pipeline in the City of Toronto. The project is comprised of two sections of pipeline. The first section of pipeline is reinforcement to the existing distribution system and the second section of pipeline will allow the provision of gas distribution service to new customers in the Liberty Village. The first section of the proposed pipeline is 900 m of Nominal Pipeline Size (“NPS 8”) Intermediate Pressure (“IP”) steel natural gas main. The second section of the proposed pipeline consists of two individual segments of pipe. The first segment, which is approximately 200 m of Nominal Pipeline Size (“NPS 6”) Intermediate Pressure (“IP”) plastic gas main on Strachan Avenue and the second segment is approximately 85 m of Nominal Pipeline Size (“NPS 4”) Intermediate Pressure (“IP”) plastic gas main on Western Battery Road.

The Board assigned the file number EB-2018-0096 to the application and granted Leave to Construct on September 27, 2018.

Pipeline construction activities for the Liberty Village Reinforcement Project commenced in October 2018 and were completed in March 2019. Most of the restoration activities were completed in March 2019. Additional restoration activities were completed in June and July of 2019.

This Post-Construction Financial Report summarizes the actual capital costs of the project and provides an explanation of significant variances from the original estimates.

Cost and Variance Reporting

The total project cost was \$4,151,681. This project total was approximately \$528 thousand greater than the original estimate of \$3.6 million reported in **EB-2012-0438**, Exhibit D, Tab 2, Schedule 1.

A comparison of actual versus estimated project costs is shown in Table 1 below.

Table 1 – Total Project Costs

Liberty Village Reinforcement Project

Item No.	Breakdown	Budgeted Cost (\$)	Actual Cost (\$)	Variance (\$)
1.0	Material Costs	98,750	76,490	(22,260)
2.0	Labour Costs	2,778,066	4,048,493	1,270,427
3.0	Land Costs	47,170	11,128	(36,042)
4.0	Contingency Costs	687,997	0	(687,997)
5.0	Interest During Construction	11,279	15,570	4,291
6.0	Total Project Cost	3,623,263	4,151,681	528,418

The primary factors which contributed to the actual costs exceeding the original filed budget was the estimated cost of permanent restoration at the time of filing the application, scope changes due to utility conflicts, running line changes, and costs associated with encountering contaminated soil.

Weather was another factor affecting the costs during the construction phase. Approximately 15 days of downtime due to weather increased contractor labour costs and extended the construction schedule.

The cost variances in the specific categories are described below.

- 1.0 The final 'Material Costs' were \$ 76,490, approximately \$22 thousand less than expected at the time of filing.
- 2.0 The final labour cost was \$4 million, approximately \$1.3 million higher than the estimate originally provided.

Contaminated Soil - The labour budget at the time of the LTC filing did not account for the removal and disposal of contaminated soils. Contaminated soils were encountered on Ordnance St, King St and parts of East Liberty St. As a result, a Suspect Soil Management Plan was developed and a Consultant was hired to test the soil quality both during and ahead of construction to ensure the Contractor was aware of the soil contaminates and how to protect the safety of the workers. The contaminated soils had to be hauled to an alternative site for disposal at a higher rate for disposal than what was anticipated.

Restoration work – The original budgetary estimate provided by Enbridge’s City of Toronto approved restoration contractor, Bevcon, was based on a preliminary pipeline route drawing which had several

field changes during construction. A summary of changes which led to the increased costs are listed below:

- The original estimate for road work was based on a 1m wide trench. Actual road trench varied in size from 1.5m to over 3m. This increased the area of roadwork required. The reason for inconsistent trench widths were mainly due to line changes as a result of utility conflicts.
- The City of Toronto standard which requires the contractor to remove all pavement up to the closest curb line if the work area is within 1m of the curb line. A significant portion of the road trench along East Liberty Street fell under this guideline. The drawings at the time of the estimate had the pipeline right on the border of 1 meter from the curb line. In construction, it was not possible to maintain the 1 meter clearance which resulted in complete restoration right up to the curb line.
- The original cost estimate was based on a composite pavement structure roadway. No boreholes or geo-technical investigation was available at the time of the estimate. Without boreholes or Geo-technical reports available there was no way to know exactly what the pavement was composed of. The City of Toronto uses 3 different pavement structures; flexible pavements, which are composed entirely of asphalt; Composite pavements, which combine a concrete road base with an asphalt surface course; and Rigid pavements, which are constructed entirely out of concrete. Generally, from experience and past projects in the area of Liberty Village, the pavement is of a composite structure. Once onsite however, it was determined that approximately 65% of the pavement was composed of flexible pavement of varying depths ranging from 160mm - 220mm. This in turn increased the amount of asphalt required.
- Changes in proposed gas line location: Due to conflicts with other underground utilities the new gas line was installed wherever space with the appropriate clearances could be found. This increased the area that required restoration on Atlantic Ave. as the roadway was already cut as per the original location of the proposed pipeline.
- Reconstruction of tree pits: Due to the way the streetscape was constructed and the City of Toronto restoration standards, various tree pits along Hanna Ave. required reconstruction. What was originally estimated was to simply remove and replace the basic concrete sidewalk surface. Once onsite and after a meeting with City of Toronto representatives, it was determined that various tree pits required reconstruction. This in turn significantly increased the cost for the work related to Hanna Ave.
- Restricted working hours and limitations: The original cost estimate accounted for standard working hours and restrictions. After meeting the City of Toronto Traffic Work Zone Coordinator, Bevcon was given restrictions on both working hours and lane closures. This in turn increased the cost of required traffic control measures.

Pipeline - Many complexities associated with construction of the final pipeline route in a dense urban environment increased costs of the pipeline construction. Challenges encountered included limited working space, weather, work period restrictions due to traffic congestion and conflicting projects in the area. As a result of these factors, the construction phase which was originally anticipated to take four months, required approximately five months to complete.

3.0 The final land costs were \$11 thousand, approximately a quarter of the original estimate. This is due to the fact an internal Pipeline Inspector completed the records and not an external consultant as originally forecasted.

4.0 The contingency amount that was forecasted for this project was used.

Conclusion

The Liberty Village Pipeline Reinforcement Project was completed with a total project cost of \$4,151,681, approximately \$500 thousand higher than the application estimate. The primary reason for the variance was encountering contaminated soils in the area and cost associated with the removal and disposal of the soil. Liberty Village is undergoing significant development as many condominiums are being built in the area and in very close proximity to where our Contractor was installing the pipeline. This led to significant delays and presented many challenges to ensure the work was done safely and as efficiently as possible while maintaining traffic flow and ensuring the other developers were not impacted as a result of our work. In addition, Liberty Village is very congested with underground utilities (both active and abandoned). These utilities were not all represented in the design drawings which resulted in several field changes compared to the designed line location as well as elevation changes to go above or below existing utilities to ensure proper clearances were met.